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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-Based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The National Center for Complementary and Alternative Medicine (NCCAM) requested and funded this report. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

To bring the broadest range of experts into the development of evidence reports and health technology assessments, AHRQ encourages the EPCs to form partnerships and enter into collaborations with other medical and research organizations. The EPCs work with these partner organizations to ensure that the evidence reports and technology assessments they produce will become building blocks for health care quality improvement projects throughout the Nation. The reports undergo peer review prior to their release.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality.

We welcome comments on this evidence report. They may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by e-mail to **epc@ahrq.gov.**

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Structured Abstract

Background: Back and neck pain are important health problems with serious societal and economic implications. Conventional treatments have been shown to have limited benefit in improving patient outcomes. Complementary and Alternative Medicine (CAM) therapies offer additional options in the management of low back and neck pain. Many trials evaluating CAM therapies have poor quality and inconsistent results.

Objectives: To systematically review the efficacy, effectiveness, cost-effectiveness, and harms of acupuncture, spinal manipulation, mobilization, and massage techniques in management of back, neck, and/or thoracic pain.

Data Sources: MEDLINE, Cochrane Central, Cochrane Database of Systematic Reviews, CINAHL, and EMBASE were searched up to 2010; unpublished literature and reference lists of relevant articles were also searched.

Study Selection: All records were screened by two independent reviewers. Primary reports of comparative efficacy, effectiveness, harms, and/or economic evaluations from randomized controlled trials (RCTs) of the CAM therapies in adults (age ≥ 18 years) with back, neck, or thoracic pain were eligible. Non-randomized controlled trials and observational studies (case-control, cohort, cross-sectional) comparing harms were also included. Reviews, case reports, editorials, commentaries or letters were excluded.

Data Extraction: Two independent reviewers using a predefined form extracted data on study, participants, treatments, and outcome characteristics.

Data Analysis: Included studies were stratified by the region, cause, and duration of pain. Evidence was summarized qualitatively and RCTs were pooled according to the post-treatment followup at which the outcomes were measured. Subgroup and sensitivity analyses were planned a priori. Publication bias was examined through visual inspection of funnel plot and a regression-based method.

Results: 265 RCTs and 5 non-RCTs were included. Acupuncture for chronic nonspecific low back pain was associated with significantly lower pain intensity than placebo but only immediately post-treatment (VAS: -0.59, 95 percent CI: -0.93, -0.25). However, acupuncture was not different from placebo in post-treatment disability, pain medication intake, or global improvement in chronic nonspecific low back pain. Acupuncture did not differ from sham-acupuncture in reducing chronic non-specific neck pain immediately after treatment (VAS: -0.24, 95 percent CI: -1.20, 0.73). Acupuncture was superior to no treatment in improving pain intensity (VAS: -1.19, 95 percent CI: 95 percent CI: -2.17, -0.21), disability (PDI), functioning (HFAQ), well-being (SF-36), and range of mobility (extension, flexion), immediately after the treatment. In general, trials that applied sham-acupuncture tended to produce negative results (i.e., statistically non-significant) compared to trials that applied other types of placebo (e.g., TENS, medication, laser). Results regarding comparisons with other active treatments (pain

medication, mobilization, laser therapy) were less consistent Acupuncture was more cost-effective compared to usual care or no treatment for patients with chronic back pain.

For both low back and neck pain, manipulation was significantly better than placebo or no treatment in reducing pain immediately or short-term after the end of treatment. Manipulation was also better than acupuncture in improving pain and function in chronic nonspecific low back pain. Results from studies comparing manipulation to massage, medication, or physiotherapy were inconsistent, either in favor of manipulation or indicating no significant difference between the two treatments. Findings of studies regarding costs of manipulation relative to other therapies were inconsistent.

Mobilization was superior to no treatment but not different from placebo in reducing low back pain or spinal flexibility after the treatment. Mobilization was better than physiotherapy in reducing low back pain (VAS: -0.50, 95 percent CI: -0.70, -0.30) and disability (Oswestry: -4.93, 95 percent CI: -5.91, -3.96). In subjects with acute or subacute neck pain, mobilization compared to placebo significantly reduced neck pain. Mobilization and placebo did not differ in subjects with chronic neck pain.

Massage was superior to placebo or no treatment in reducing pain and disability only amongst subjects with acute/sub-acute low back pain. Massage was also significantly better than physical therapy in improving back pain (VAS: -2.11, 95 percent CI: -3.15, -1.07) or disability. For subjects with neck pain, massage was better than no treatment, placebo, or exercise in improving pain or disability, but not neck flexibility. Some evidence indicated higher costs for massage use compared to general practitioner care for low back pain.

Reporting of harms in RCTs was poor and inconsistent. Subjects receiving CAM therapies reported soreness or bleeding on the site of application after acupuncture and worsening of pain after manipulation or massage. In two case-control studies cervical manipulation was shown to be significantly associated with vertebral artery dissection or vertebrobasilar vascular accident.

Conclusions: Evidence was of poor to moderate grade and most of it pertained to chronic non-specific pain, making it difficult to draw more definitive conclusions regarding benefits and harms of CAM therapies in subjects with acute/subacute, mixed, or unknown duration of pain. The benefit of CAM treatments was mostly evident immediately or shortly after the end of the treatment and then faded with time. Very few studies reported long-term outcomes. There was insufficient data to explore subgroup effects. The trial results were inconsistent due probably to methodological and clinical diversity, thereby limiting the extent of quantitative synthesis and complicating interpretation of trial results. Strong efforts are warranted to improve the conduct methodology and reporting quality of primary studies of CAM therapies. Future well powered head to head comparisons of CAM treatments and trials comparing CAM to widely used active treatments that report on all clinically relevant outcomes are needed to draw better conclusions.

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Appendixes and Evidence Tables for this report are provided electronically at: http://www.ahrq.gov/downloads/pub/evidence/pdf/backpaincam/backcam2.pdf.

Executive Summary

Background

Back and neck pain are important health problems with serious societal and economic consequences. The prevalence of back and/or neck pain in US in 2007 was estimated to be 31 percent. The costs associated with low productivity, lost-time at work, permanent disability, and healthcare are enormous. Conventional medical treatments have been shown to have limited effectiveness in the management of back and neck pain. Complementary and Alternative Medicine (CAM) therapies offer additional options for management of back and neck pain. The number of people in Western societies using CAM therapies is increasing. The most prevalent CAM therapies are spinal manipulation, acupuncture, and massage. The number of randomized controlled trials (RCTs) evaluating CAM therapies for back and neck pain has increased over the past two decades. The results of these trials are inconsistent.

The University of Ottawa Evidence-based Practice Center (UO-EPC) reviewed and synthesized evidence to better understand effectiveness and safety of the most prevalent CAM therapies in the management of back, neck, and thoracic pain in adults. The current review commissioned by the Agency for Healthcare Research and Quality (AHRQ) and National Center for Complementary and Alternative Medicine (NCCAM) aimed to address the following research Key Questions (KQ):

KQ1. What is the efficacy, effectiveness and cost-effectiveness of the most prevalent types of practitioner-based manual CAM therapies (e.g., spinal manipulation, spinal mobilization, massage; acupuncture) compared to other CAM therapies, conventional therapies, placebo, no treatment, or wait list in improving outcomes (e.g., QoL, Pain, Function, progression of acute to chronic/ or disabling BP) in patients with nonspecific and certain specific (e.g. disc herniation, spinal stenosis, facet joint syndrome, whiplash) types of back and neck pain.

a. For any of the CAM therapies found to be effective for BP, what factors influence success of treatments?
    i. Patient-specific factors
    ii. Socio-demographics (e.g., age, gender, race, education, income)
    iii. Comorbidities
b. Severity, specific causes (as identified in Q1), and duration of BP
    i. Treatment-specific factors (e.g., dose, frequency, duration)
    ii. Treatment provider-specific factors (e.g., training, specialization, experience)
c. Does the use of any of the 3 most prevalent types of CAM for BP in adults result in a decreased or increased utilization of conventional management (diagnostic tests, number of visits & dose of medications, procedures)?

KQ2. What are the contraindications and safety profile of the three most prevalent CAM therapies for BP in adults compared to that for other CAM therapies, conventional therapies, placebo or no treatment? Does the safety profile of these therapies change across subgroups of patients with comorbidities?

Methods

Data Sources and Search Strategy

A comprehensive search was conducted in the following databases: MEDLINE, the Cochrane Library, EMBASE, and Allied and Complementary Medicine (AMED) were all searched from inception until February 2010. CINAHL, Mantis, and the ACP Journal Club were also searched from inception until September 2008. Additional literature was searched through bibliographies of relevant items. The Web sites of relevant organizations/agencies, trial registries, and conference proceedings were searched for the grey literature.

Study Selection Criteria and Process

Randomized controlled trials (RCTs) reporting efficacy/effectiveness and/or economic data of the CAM therapies (acupuncture, manipulation, mobilization, massage) versus any inactive or active treatments in adults with back, neck, or thoracic pain were eligible. Nonrandomized controlled trials and observational studies (e.g., cohort, case-control, cross-sectional) reporting harms were also included.

Reports published in English, German, Dutch, Chinese, Japanese, Italian, French, Portuguese, and Spanish were eligible for inclusion. Systematic and narrative reviews, case reports, editorials, commentaries or letters to the editor were excluded.

Titles and abstracts of all identified bibliographies were screened for eligibility by two independent reviewers who later reviewed full-text reports of potentially eligible records. Discrepancies were resolved by consensus.

Data Extraction

Two independent reviewers extracted data using an a priori developed abstraction form. The abstracted data were crosschecked and conflicts were resolved by consensus.

Primary efficacy/effectiveness outcomes included pain intensity (e.g., Visual Analog Scale-VAS, McGill Pain Questionnaire-MPQ) function (Hannover Functional Ability Questionnaire-HFAQ), and disability (e.g., Roland Morris Disability Questionnaire-RMDQ, Northwick Park Neck Pain Questionnaire-NPQ, Pain Disability Index-PDI, and Oswestry Disability Index). Secondary outcomes included spinal range of motion (ROM), straight leg raise (SLR), finger-to-floor distance (FFD), and muscle strength. Harms (e.g., any adverse event, withdrawals due to adverse events, specific adverse events) were extracted as proportions of patients with an event.

For cost-effectiveness analysis, data was extracted on: a) costs in the health care sector, b) costs of production loss, c) costs in other sectors, d) patient and family costs, and e) total costs.

Assessment of Study Quality and Reporting

The risk of bias for RCTs was assessed using the criteria list recommended in the Updated Method Guidelines for Systematic Reviews in the Cochrane Collaboration Back Review Group. Depending on the number of ‘Yes’ ratings (score range: 0-4) across four domains (treatment

allocation concealment, balance in baseline characteristics, blinding, and number/reasons for dropouts), the quality of individual studies was classified into three groups: good (score: 4), fair (score: 2-3), and poor (score: 0-1). The overall bias was explored using risk-of-bias graphs. The quality of observational studies was assessed using the modified Downs and Black tool. Methodological quality of economic studies was determined using the 19-item CHEC list.

Quantitative Synthesis

The results were grouped according to a type of experimental intervention (e.g., acupuncture, manipulation, mobilization, massage), pain location in spinal region (low back, neck, thorax), duration of pain (acute/sub-acute, chronic, mixed, unknown), and cause of pain (specific versus nonspecific). Study, treatment, population, and outcome characteristics were summarized in text and/or summary tables.

We pooled RCTs with similar populations (demographics, duration, and cause of pain), same types of experimental and controls treatments, which reported outcomes measured with the same instruments (and scale) at similar post-treatment followup periods. The meta-analyses of pain were based on a 1-10 visual analogue scale. The random-effects models of DerSimonian and Laird were used to generate pooled estimates of relative risks (RRs) and weighted end point mean difference (WMDs) with 95 percent confidence intervals (CIs). Statistical heterogeneity was evaluated using the Chi-square test and the I^2 statistic (low: 25.0 percent; moderate: 50.0 percent; high: 75.0 percent). Subgroup (e.g., patients' age, gender) and sensitivity (e.g., trial quality) analyses were planned to investigate the sources of unexplained heterogeneity.

If data allowed, the statistically significant pooled estimates of post-treatment pain intensity were planned to be examined in order to determine the degree of clinical importance for the observed differences between the treatment groups. The degree of clinical importance was defined as small (WMD < 10 percent of the VAS scale), medium (10 percent ≤ WMD < 20 percent of the VAS scale), and large (WMD ≥20 percent of the VAS scale).

Publication bias was examined through visual inspection of funnel plot asymmetry with respect to contours of statistical significance and the Egger's regression-based method.

Rating the Strength of Evidence

We assessed the overall strength of evidence using the approach of grading system outlined in the Methods guide prepared for the AHRQ Evidence-based Practice Center (EPC) program. The grading method consists of four major domains: risk of bias (high, medium, low), consistency, directness, and precision. Body of evidence for a given outcome was classified into four groups: high, moderate, low, or insufficient (no evidence). The initial grade was reduced by one level (e.g., from high to moderate; from moderate to low) for each of the domains not met and by two levels in case of high risk of bias (e.g., from high to low grade; from moderate to low grade).

Results

KQ1. Efficacy/effectiveness and Cost-effectiveness of CAM Therapies Compared to no Treatment, Placebo, and Other Active CAM/nonCAM Therapies in Management of Back, Neck, and/or Thoracic Pain.

In total, 265 RCTs (including 10 reporting economic data), and five controlled observational studies which provided harms data were included. Most studies included subjects with chronic nonspecific pain. Immediate and short-term post-treatment follow-ups were most frequently reported. Only the main findings for pain, disability, and mobility are reported in this summary.

Efficacy/Effectiveness

Acupuncture – Low Back Pain. In subjects with chronic nonspecific LBP, acupuncture compared to placebo led to statistically significantly lower pain intensity (Grade – moderate) but only for the immediate-post-treatment followup (10 trials; pooled VAS: -0.59, 95 percent CI: -0.93, -0.25). Acupuncture did not significantly differ from placebo in improving pain intensity scores, well-being, disability, use of medication, proportion of subjects on sick leave, and proportion of subjects with global improvement at short-, intermediate-, and long-term post-treatment. Trials using TENS-sham, laser-sham, or medication-sham compared to those using sham-acupuncture tended to produce results in favor of acupuncture in relation to pain intensity and disability.

Subjects in acupuncture group had statistically significantly better post-treatment pain intensity (three trials; pooled short-term VAS: -1.19, 95 percent CI: -2.17, -0.21; Grade - moderate), pain disability index (one trial; immediate-term PDI; Grade - moderate), function (two trials; immediate-term HFAQ; Grade - moderate), well-being (two trials; immediate-term SF-36; Grade - moderate), or ROM (one trial; immediate-/intermediate-term extension, flexion Grade - low) compared to ‘no treatment’ group.

Subjects in the acupuncture group compared with those in usual care had significantly better post-treatment pain intensity (two trials; short-/intermediate-term VAS; Grade - moderate), disability (two trials; short-/intermediate-term RMDQ; Grade - moderate), quality of life (one trial; intermediate-term SF-12; Grade - moderate), or function (one trial; intermediate-term HFAQ; Grade - moderate).

In two meta-analyses, acupuncture did not significantly differ from pain medication in reducing immediate post-treatment pain (four trials; immediate-term pooled VAS: 0.11, 95 percent CI: -1.42, 1.65; Grade – low) or disability (two trials; pooled Oswestry: -2.40, 95 percent CI: -12.20, 7.40; Grade – low). In contrast, another meta-analyses indicated significantly worse post-treatment pain (two trials; immediate VAS: 3.70, 95 percent CI: 1.50, 5.80; Grade – low) for acupuncture versus manipulation.

Subjects receiving acupuncture had significantly better immediate post-treatment pain and disability than subjects receiving physiotherapy (two trials; trial one - light, electricity and heat therapy; trial two - hot packs, ultrasound, short-wave diathermy, TENS, muscle strengthening; Grade – low). There was no difference between acupuncture and massage in healthcare

utilization (one trial; intermediate-term number of provider visits, percentage of subjects using medication; Grade - low).

In subjects with acute nonspecific LBP there was no statistically significantly difference between acupuncture and usual care groups (one trial; immediate-short-intermediate-term RMDQ; Grade-low).

Acupuncture – Neck Pain. Two meta-analyses indicated no significant difference between acupuncture and sham-acupuncture in subjects with chronic specific (two trials; Grade – moderate; VAS: 0.27, 95 percent CI: -0.60, 1.13) or nonspecific pain (three trials; Grade – low; VAS: -0.24, 95 percent CI: -1.20, 0.73) for immediate post-treatment pain intensity. Trials using TENS-sham, laser-sham, or medication-sham compared to those using sham-acupuncture tended to produce results in favor of acupuncture in relation to pain intensity and disability.

There were inconsistent results for immediate- or short-term post-treatment pain intensity between acupuncture and pain medication groups of subjects. Intermediate-term followup indicated no significant difference between acupuncture and pain medication groups. Acupuncture did not differ from standard mobilization and traction techniques or laser therapy in short-term post-treatment pain intensity or disability. Immediate/short-term post-treatment pain and disability were better in manipulation than acupuncture groups (two trials, Grade - low).

Manipulation – Low Back Pain. In subjects with acute/sub-acute nonspecific LBP, manipulation was significantly more effective than placebo (five trials; Grade – moderate) or no treatment (one trial; Grade – low) in reducing pain intensity (VAS score) immediately or short-term after the end of treatment. There was no significant difference between manipulation and placebo in post-treatment pain medication intake, disability, or back flexibility (three trials; Grade -low). Manipulation did not differ from medication in reducing pain intensity (two trials; Grade - low).

In subjects with chronic nonspecific LBP, manipulation was significantly more effective than placebo in reducing pain intensity (VAS score) immediately or short-term after the end of treatment (three trials; Grade – low). Manipulation was significantly better (in immediate post-treatment pain; two trials; Grade – low) or no different (in intermediate-term post-treatment pain; one trial; Grade – low) from medication in improving pain intensity.

In older subjects with mixed duration LBP, spinal manipulation was significantly better than medical care in improving immediate and short-term post-treatment disability (Oswestry) and perception of global improvement but not pain intensity or physical function (one trial; Grade – low).

Results from studies comparing manipulation to massage or physiotherapy in improving post-treatment pain intensity (two trials; Grade – low) or mobility (three trials; grade – low) were inconsistent, either in favor of manipulation or indicating no significant difference between the two treatments.

In two large trials (UK BEAM and Childs 2004), subjects receiving combination of manipulation and exercise or best care by general practitioner improved in pain and disability compared to subjects with no spinal manipulation treatment (Grade – Moderate).

Manipulation – Neck Pain. Subjects receiving manipulation had significantly better post-treatment pain (two trials; Grade - moderate) disability (one trial; Grade - low), or mobility (extension, flexion, rotation) (one trial; Grade - low) compared to those taking placebo. Manipulation did not significantly differ from medication in reducing pain intensity (three trials; Grade - moderate) and disability (two trials - Grade – moderate).

Mobilization – Low Back Pain. There were no significant differences in pain intensity (VAS) and ROM (flexion, extension, floor to floor) between subjects who received mobilization and placebo immediately or short-term after treatment (two trials; specific acute/sub-acute and nonspecific mixed duration pain; grade – low). Subjects with specific acute/sub-acute pain receiving mobilization had significantly reduced intake of analgesic medication and duration of sick leave compared to those receiving placebo (one trial; Grade - low).

Subjects with acute/sub-acute and chronic pain (specific or nonspecific) receiving mobilization experienced significantly improved pain intensity (VAS, MPQ) and lumbar ROM (side bending) compared to subjects not receiving any treatment, immediately and short-term after treatment (two trials; Grade – low). Results regarding disability (RMDQ, Oswestry) were inconsistent, showing either a significant difference in favor of mobilization (one trial; Grade – low) or no difference between mobilization and no treatment (one trial; Grade - low). In subjects with mixed duration of pain, there were no significant differences in pain intensity (VAS) and ROM (flexion, extension) immediately or short-term after treatment (one trial; Grade – low).

In two meta-analyses, subjects with chronic nonspecific pain receiving mobilization (traditional bone setting) compared to physiotherapy (massage, stretching, trunk exercise) had significantly lower pain intensity (two trials, Grade – low; VAS score: -0.50, 95 percent CI: -0.70, -0.30) and disability degree (two trials, Grade – moderate; Oswestry score: -4.93, 95 percent CI: -5.91, -3.96) immediately after treatment. There was no significant difference between the groups in the mean finger to floor distance immediately after treatment (two trials, Grade – moderate; -0.89, 95 percent CI: -1.89, 0.12). Similarly, mobilization and physiotherapy groups did not significantly differ in ROM (Schober's test, extension, straight leg raising) immediately or intermediate-term after treatment (one trial; Grade - low). In subjects with nonspecific pain of mixed duration, mobilization was significantly superior to physiotherapy (massage, mobilization, thermal, and electrotherapies according to the Finnish routine) in reducing disability (Oswestry), but only at intermediate term post-treatment (one trial, Grade – low). There was no significant difference between the groups in the number of sick leave days for the trial period.

The immediate- or intermediate-term post-treatment pain intensity (VAS score; one trial; Grade - low), disability (Oswestry; one trial; Grade - low), and ROM (Schober's test, extension, straight leg raising; two trials; Grade - low) did not significantly differ between mobilization and exercise given to subjects with nonspecific chronic or mixed duration of pain.

Mobilization – Neck Pain. Mobilization was significantly better than placebo in subjects with acute/sub-acute nonspecific pain (one trial; Grade – Low), but did not differ from placebo in subjects with chronic nonspecific pain (one trial; Grade – low).

Subjects with chronic or mixed nonspecific pain receiving mobilization had significantly lower pain intensity compared to no treatment (two trials; Grade - Low). There was no significant difference between the mobilization and no treatment groups in the mean intake of analgesic medication pills and the number of sick leave days immediately or short-term after treatment (one trial; Grade - low).

Mobilization was significantly better than massage or physiotherapy (massage, stretching and exercise) in improving pain (VAS score), disability (NDI), global assessment, analgesic medication intake, and the number of sick leave days in chronic nonspecific pain at intermediate-term post-treatment followup (one trial; Grade – Low). Subjects with mixed duration nonspecific

pain in the mobilization and continued general practitioner care groups had similar post-treatment pain intensity and disability (VAS and NDI; one trial; Grade – low).

Massage – Low Back Pain. Subjects with nonspecific acute/sub-acute pain receiving massage had significantly better pain intensity (VAS, MPQ) and disability (Oswestry) compared to no treatment (one trial; Grade – low) or placebo (two trials; Grade –moderate) immediately or short-term after the end of treatment. In subjects with nonspecific chronic pain, massage did not significantly differ from no treatment or placebo in improving immediate or intermediate-term post-treatment pain intensity (VAS, MPQ; two trials; Grade – low), disability (Oswestry, RMDQ; two trials; Grade – low), general health perception (one trial; Grade – low), or health status (SF-36; one trial; Grade – low).

In two meta-analyses, massage was significantly better in reducing pain compared to relaxation (two trials; Grade – low; VAS score: -1.27, 95 percent CI: -2.46, -0.08) or physical therapy (two trials; Grade – moderate; VAS score: -2.11, 95 percent CI: -3.15, -1.07) immediately after treatment in subjects with chronic nonspecific pain. In another meta-analysis, massage was not significantly better than relaxation in improving immediate post-treatment ROM (two trials; Grade – low; trunk flexion: 2.21, 95 percent CI: -1.10, 5.52). In subjects with chronic nonspecific pain, massage was significantly more effective than physical therapy in reducing pain (SF-PQ, VAS), disability (RMDQ, modified Oswestry), and the number of days off work immediately or intermediate-term after the treatment (two trials; Grade - low). In subjects with chronic nonspecific pain, there was no significant difference between receiving massage and general practitioner care in improving pain (VAS score), disability (RMDQ), or well-being (SF-36) intermediate-term after the end of treatment (one trial; Grade – low).

Massage – Neck Pain. Subjects with acute/sub-acute, chronic, or unknown duration of nonspecific pain receiving massage had significantly improved pain (≥2-point decrease on NRS-11, VAS, Pressure Pain Threshold scores) compared to placebo (three trials; Grade – Low), immediately after treatment. In subjects with chronic specific pain, massage did not significantly differ from placebo in improving range of mobility (one trial; Grade – low) or well-being (SF-36, role physical, pain index; one trial; Grade - low).

Massage, compared to no treatment, significantly improved pain intensity (NPQ, VAS scores) but not ROM (flexion, extension) in subjects with chronic or unknown duration of nonspecific pain, immediately after the end of treatment (two trials; Grade – low).
In subjects with chronic nonspecific pain (one trial; Grade – Low), massage compared to exercise significantly improved disability (NPQ) but not ROM (flexion, extension).

Cost-effectiveness

This review included results from 10 studies of full economic evaluations of acupuncture (low back pain: two studies, neck pain: one study), spinal manipulation (low back pain: four studies, neck pain: two studies), and massage (one study) for low back and neck pain.

Acupuncture - Low back pain. Two economic evaluations showed that acupuncture was cost-effective compared to usual care and compared to no treatment in patients with chronic low back pain. However, in both studies health gains were small and one study used no treatment control group and had only 3 months followup.

Acupuncture - Neck pain. One study showed that in subjects with chronic neck pain acupuncture use was associated with significantly higher total costs compared to usual care ($1,565 versus $1,496).

Manipulation - Low back pain. There were no differences in costs between manual therapy, general practitioner care and intensive therapy for acute low back pain. Costs were higher for manipulation compared with medical care without producing better clinical outcomes for patients with mixed duration of LBP (acute, subacute and chronic). This was associated with significantly more visits to chiropractic care than medical care. Spinal manipulation in addition to general practitioner care was relatively cost-effective compared to general practitioner care alone for patients with sub-acute and chronic low back pain. In chronic LBP patients, there were no differences in costs between physician consultation, spinal manipulation plus stabilizing exercises, and physician consultation alone. Results are difficult to compare due to differences in health care systems, perspectives, interventions, populations, and methods used.

Manipulation - Neck pain. One study in subjects with neck pain found that pulsed short-wave diathermy was less cost-effective compared with manual therapy or exercise/advise. In another study, manual therapy was less costly and more effective than physiotherapy (functional, active and postural or relaxation exercises, and stretching) or general practitioner care.

Massage - Low back pain. One study reported an economic evaluation of therapeutic massage, exercise, Alexander technique, and usual general practitioner care in patients with chronic low back pain showing that massage was more costly and less effective than usual care by the general practitioner.

KQ1 a-c. Patient- and Trial-specific Factors Influencing Treatment Success

The amount of evidence regarding factors potentially influencing treatment effect (e.g., age, gender race, education, income, cause of pain, type of treatment provider, dose of treatment) was relatively limited.

There was no discernable pattern indicating that the effect of acupuncture was different in subjects with specific and nonspecific pain (neck and low back pain).

In one trial (Grade – Low), the subject's age, gender, symptom duration, or the therapist's years of experience did not have a significant effect on the mean change for Oswestry score between spinal manipulation in addition to exercise and exercise alone. In another trial (Grade - Moderate) the beneficial effect of massage compared to physical therapy (physical modalities, exercise and traction) was similar across age (≤ 50, and > 50 years) and gender groups.

Massage was significantly better in reducing pain intensity compared to physical therapy in subjects with severe pain at baseline. The reduction in pain intensity did not differ between the massage and physical therapy groups amongst subjects with lower baseline pain scores. The baseline severity did not modify the effect of massage (versus physical therapy) measured at intermediate-term after the end of treatment (i.e., massage was significantly better than physical therapy in reducing pain across the baseline pain severity groups).

This review identified evidence on utilization of conventional healthcare (e.g., routine visits to physician, use of analgesics, hospital stay) and work absenteeism.

The use of conventional healthcare was not different in acupuncture versus self care, usual care, or massage for subject with chronic LBP (two trials). Similarly, the use of conventional care did not differ between spinal manipulation and hospital outpatient management, or physician consultation for LBP (two trials). In contrast, the use of conventional care was significantly reduced for subjects receiving spinal manipulation in addition to exercise compared to exercise alone (one trial).

The use of analgesics was significantly reduced for acupuncture versus placebo, waiting list, TENS, or usual care in LBP (four trials); and between acupuncture and placebo in subjects with neck pain (one trial). In contrast, the use of analgesics did not significantly differ between acupuncture and self care in LBP (one trail); between acupuncture and placebo, self care, or other treatments for NP (five trials). Similarly, the use of analgesics did not differ between spinal manipulation and placebo, or conventional care in subjects with low back pain(five trials, Grade – Low); between spinal manipulation or mobilization and prescription medication, no treatment neck collar, or physiotherapy for subjects with neck pain (five trials).

The extent of work absenteeism was significantly greater in exercise alone versus acupuncture in LBP (one trial); between mobilization and no treatment or physiotherapy in neck pain (two trials). Sick leaves due to pain, did not differ between acupuncture and placebo or usual care in LBP (two trails); and between mobilization and neck collar or 'act as usual' in neck pain (one trial).

The sensitivity analysis, performed on acupuncture trials, found no evidence that treatment effect was strongly influenced by study quality. The pooled estimates of mean difference in pain intensity (VAS score) for 'lower risk-of-bias' and 'higher risk-of-bias' trials were -0.43 (95 percent CI: -0.76, -0.09) and -0.75 (95 percent CI: -1.39, -0.11), respectively.

KQ2. Harms of CAM Therapies

The reporting of harms was poor across studies of CAM interventions. Only very few trials reported any information on adverse events. The reported information was not detailed, lacked consistency, and was not comparable. No definitions were presented. Therefore, the rates of adverse events between the different interventions could not be meaningfully compared.

Acupuncture. The reported events in RCTs were mostly of moderate transient nature amongst these most commonly reported events were soreness/pain at the site of needling, bruising light headedness, minor bleeding, dizziness, or headache. The proportion of subjects with any adverse event did not reportedly differ in acupuncture versus TENS or usual care groups. In one nonrandomized trial, discomfort or soreness in the acupuncture, chiropractic therapy, and massage groups were 5.0 percent, 8.0 percent, and 7.0 percent, respectively.

Manipulation/Mobilization. The reported events in RCTs were mostly moderate in severity and of transient nature (e.g., increased pain). In one RCT, after 2 weeks of treatment, patients with neck pain receiving manipulation were not at significantly increased risk for having an adverse event compared to patients receiving mobilization (OR = 1.44, 95 percent CI: 0.83, 2.49). In another RCT, the proportion of patients with neck pain having adverse events was similar in manipulation versus Diazepam groups (9.5 percent versus 11.1 percent). In two case control studies, subjects ≤ 45 years of age with vertebro-basilar artery (VBA) stroke were more likely to visit a chiropractic or primary care physician than subjects without VBA stroke. This association was not observed in older subject visiting a chiropractic clinic. In one case control study, the excess risk of vascular accident was observed for both, subjects undergoing chiropractic care and subjects undergoing primary care treatments. In another case-control study, subjects with cervical artery dissection were more likely to have had spinal manipulation within 30 days (OR = 6.62, 95 percent CI: 1.4, 30.0). In one cohort study, rate of complications did not differ between subjects with low back pain receiving manipulation plus mobilization versus no treatment.

Massage. In few RCTs, subjects receiving massage experienced worsening of back/neck pain or soreness of mild and transient nature. One study reported allergic reactions (rashes and pimples) in five subjects due to massage oil.

In one RCT, the proportion of patients with neck pain having adverse events in massage group was lower (7.0 percent) compared to acupuncture (33.0 percent) or placebo-laser (21.0 percent).

Conclusions and Future Research

This review identified a large amount of evidence on comparative effectiveness of single mode CAM interventions for management of back and neck pain in subjects with a wide spectrum of causes (specific and nonspecific) and duration (acute to chronic) of pain. The reviewed evidence was of low to moderate grade and inconsistent probably due to substantial methodological and/or clinical diversity, thereby rendering some between-treatment comparisons inconclusive. The differences in the therapy provider's experience, training, and approaches (e.g., deep or superficial massage, choice of trigger points, needling techniques) may have additionally contributed to disparate results. Evidence for acute, sub-acute, and mixed specific pain was sparse compared to that for chronic nonspecific pain. Poorly reported harms data limited our ability to meaningfully compare rates of adverse events between the treatments.

Generally, CAM treatments were more effective in reducing pain and disability compared to no treatment, physical therapy, or standard care immediately or at short-term followup. Results of trials comparing CAM treatment to sham were less consistent either showing significant differences in favor of CAM or no significant differences between the treatments.

For chronic nonspecific back pain, acupuncture was better than placebo but only for improving pain intensity at immediately post-treatment. The long-term post-treatment disability and utilization of conventional healthcare did not differ between subjects with low back pain receiving acupuncture and usual care. Trials that applied sham-acupuncture tended to produce negative results (i.e., statistically nonsignificant) compared to trials that applied other types of placebo (e.g., TENS, medication, laser) between acupuncture and placebo groups. Acupuncture significantly decreased pain medication use compared with no treatment or placebo, but not so compared with self-care, Botulinum toxin, or Lidocaine injection. There was no statistically significant difference between acupuncture and control treatments for the number of visits to other healthcare providers.

Manipulation did not differ from pain medication in improving pain intensity. Manipulation was significantly more effective than acupuncture in reducing immediate post-treatment pain intensity. Results for pain intensity or disability were inconsistent regarding manipulation compared to massage or physiotherapy for treatment of LBP. Subjects receiving manipulation did not differ in healthcare utilization from subjects receiving exercise, physician consultation, medical care, or placebo.

In chronic or mixed duration of low back pain, mobilization was similar to placebo in reducing pain or to physiotherapy (which may include a combination of manual treatment and physical modality but not physical modalities alone) in improving immediately after or short term post-treatment.

For subjects with chronic neck pain, acupuncture was not different from sham-acupuncture, pain medication, mobilization/traction, or laser therapy in reducing pain or disability after the treatment. Subjects with neck pain benefited more with manipulation than placebo in terms of pain, disability, and neck flexibility.

Mobilization was more effective than placebo in improving acute/subacute neck pain but not chronic neck pain. In subjects with neck pain (chronic, mixed duration), mobilization was better than no treatment in reducing pain intensity, but not in reducing the intake of pain medication pills or the number of sick leave days immediately or short-term after the treatment. Mobilization was better than physiotherapy or massage in reducing pain intensity and disability in subjects with chronic nonspecific neck pain. Massage was not different from placebo in improving well-being or ROM in subjects with chronic neck pain.

In summary, the degree of clinical importance for the differences in pooled pain intensity observed between the treatment groups for low back pain was small (acupuncture versus placebo; mobilization versus physical therapy), medium (acupuncture versus no treatment; massage versus relaxation), or large (acupuncture versus manipulation, in favor of manipulation; massage versus physical therapy).

Due to the small number of economic evaluations, inconsistent standards of comparison, and substantial heterogeneity (diversity of healthcare payment systems across countries) it was not possible to reach clear conclusions about the cost-effectiveness of any of the CAM treatments. Spinal manipulation for back pain was not cost-effective relative to medical care. Acupuncture was cost-effective relative to usual care or no treatment in subjects with back pain. Evidence for massage was insufficient.

In several studies subjects receiving CAM therapies reported soreness or bleeding on the site of application (acupuncture groups) and worsening of pain/back pain (manipulation/massage groups).

More data from long term and large head to head trials with sufficient duration of CAM treatments and trials comparing CAM treatment to other widely used active treatments (e.g. comprehensive physiotherapy) reporting clinically relevant and validated outcomes (e.g. pain intensity, disability, direct and indirect costs, utility of conventional care, and adverse events) are needed for definitive conclusions.

Future studies should control for or examine the influence of treatment dose/duration, care provider-(e.g. certification, years of experience) and population-specific variables on treatment effect estimate.

Evidence Report

Chapter 1. Introduction

Background

Back and neck pain are important health problems with serious societal and economic consequences. One study published in 2007 showed that the 3 month prevalence of back and/or neck pain in U.S. was 31 percent (low back pain: 34 million, neck pain: nine million, both back and neck pain: 19 million).[1] Most of the acute back pain episodes resolve spontaneously within a few days or weeks with frequent recurrences. The burden related to back pain results from the minority of the acute cases that become chronic leading to low productivity, lost-time at work, permanent disability, and healthcare costs which are enormous. A recently published systematic review of 27 studies showed that the largest proportion of direct medical costs for low back pain was spent on physical therapy (17 percent) and inpatient services (17 percent), followed by pharmacy (13 percent) and primary care (13 percent). Among studies providing estimates of total costs, indirect costs resulting from lost work productivity accounted for the majority of overall costs associated with low back pain.

Complementary and Alternative Medicine (CAM) offers additional options for the management of back and neck pain problems. The number of people in Western society who seek the care with CAM therapies is increasing. The most prevalent CAM therapies for back and neck pain are spinal manipulation, acupuncture, and massage.[2] These interventions have the following aspects in common: a hands-on therapy, multiple visits, utilize primarily passive with some active modality elements, prolonged interaction with the healthcare practitioner and a naturalistic approach that avoids drugs or surgical interventions.

Most Commonly Used CAM Therapies for Back Pain

Acupuncture is one of the oldest forms of therapy and has its roots in ancient Chinese philosophy. According to the classic acupuncture theory all disorders are reflected at specific points, either on the skin surface or just below it. An appropriate choice of the 361 classic acupuncture points is believed to restore the balance in the body. Modern acupuncturists use not only traditional meridian acupuncture points, but also nonmeridian or extra-meridian acupuncture points. Many acupuncturists (particularly those with conventional medical training) practice without reference to traditional Chinese concepts. The exact mechanisms underlying the action of acupuncture remain unclear. It has been suggested that acupuncture might act by principles of the gate control theory of pain. Another theory relates to diffuse noxious inhibitory control (DNIC), which implies that noxious stimulation of heterotopic body areas modulates the pain sensation originating in areas where a patient feels pain. There is also some evidence that acupuncture may stimulate the production of endorphins, serotonin, and acetylcholine within the central nervous system, enhancing analgesia.[3] Acupuncture is a heterogeneous set of diverse practices and therefore some types of acupuncture maybe more effective than others.

Spinal manipulation therapy is defined as the application of high-velocity, low-amplitude manual thrusts to the spinal joints. The practice of spinal manipulation is frequently performed by chiropractors,[4] and also by osteopaths, and physical therapists. The mechanism of effect of spinal manipulation is unclear; it is hypothesized that spinal manipulation displaces and deforms the tissues, altering orientation or position of anatomic structures, unbuckling some structures,

releasing entrapped structures or disrupting adhesions. Other hypotheses focus on the neurological response of cell or matrix systems to the input forces of spinal manipulation. Evidence suggests that spinal manipulation impacts primary afferent neurons from paraspinal tissues, the motor control system, and pain processing.[5]

Spinal mobilization is another commonly used manual therapy that uses low grade/velocity , small or large amplitude passive movement and neuromuscular techniques within a patient's range of motion. The mechanism of action of spinal mobilization is also not entirely clear. It has been proposed that these spinal techniques improve signs and symptoms by directly facilitating the restricted mobility of the facet joints and simultaneously influencing the mobility of the intervertebral joint.[6] Spinal mobilization is frequently performed by chiropractors,[4] and also by osteopaths, and physical therapists.

Massage is a way of easing pain, while at the same time aiding relaxation and promoting a feeling of well-being and a sense of receiving good care by manipulation of local or remote soft tissue. The mechanisms by which massage exerts these multiple therapeutic effects are not yet known. It was hypothesized[7] that massaging affected muscles and fascia induces local biochemical changes that modulate local blood flow and oxygenation in muscle. These local effects may influence neural activity at the spinal cord segmental level and could modulate the activities of subcortical nuclei that influence mood and pain perception. Soft tissue massage may increase the pain threshold through the release of endorphins. Mechanistic studies are needed to delineate underlying biologic and psychological effects of massage and their relationship to outcomes.[3] It is important to note that manual therapies (massage and manipulation / mobilization) are practiced in different ways by different practitioners (e.g. chiropractic manipulation may be quite distinct from that practiced by a physical therapist).

Additionally, nonspecific effects of therapy (i.e. attention/touch/empathy) need to be also considered. For example, it is difficult to separate out specific effects from nonspecific effects of CAM treatment due to the inability to blind subjects to the treatment.

Back Pain and Treatment Approaches

The classification of back pain is not consistent within the clinical community. Generally, back pain treatments are aimed at specific anatomical regions (cervical, thoracic, and lumbar); there is variation in how the various CAM techniques actually affect the intended region currently being treated or other parts of the back. In addition to the body region, clinicians tend to define and develop treatment approaches for back pain based on the perceived underlying mechanical or pathological diagnosis; patients are generally categorized into specific back or nonspecific back pain groups. Specific back pain can include such patient diagnoses as radiculopathopathy, degenerative disc disease, disc herniation, spinal stenosis, or myofascial pain syndrome to name a few. Nonspecific back pain represents the largest clinical groups in which patients are categorized and generally reflects that no particular functional or structural factor is ascribed as the primary source of the current episode. Within both these categories of back pain, there is inconsistency in the manner in which patients are assigned to one or the other category. This problem is further compounded when considering that back pain is recurrent in nature; therefore, many patients with acute back pain may in fact have chronic back pain but are currently being treated for an acute exacerbation. All these factors are potentially key sources of heterogeneity across studies.

Given the inconsistency of grouping persons with symptomatic back pain, it is not surprising that there is significant variation in the treatment approaches used. Variation is further increased by the differing health professionals as well as differing philosophies of treatment within a specific health discipline. Finally, clinicians frequently employ mixed modalities when treating patients with back pain that can be within a specific CAM therapy (for example manipulation and mobilization) or across different types of CAM therapies (for example combining mobilization with acupuncture and exercise). Our primary focus in this systematic review is on evaluating the efficacy of the most prevalent CAM therapies, massage, manual therapy, and acupuncture; and as such, we limited combined treatments to those which would allow evaluation of each of these primary CAM therapies.

Chapter 2. Methods

Key Questions

The current systematic review is supported by (NCCAM) and (AHRQ) in order to better understand the status of research that has been done in treatment of back pain (cervical, thoracic, lumbar regions) with some of the most prevalent CAM interventions as identified by a recent review (CAM I)

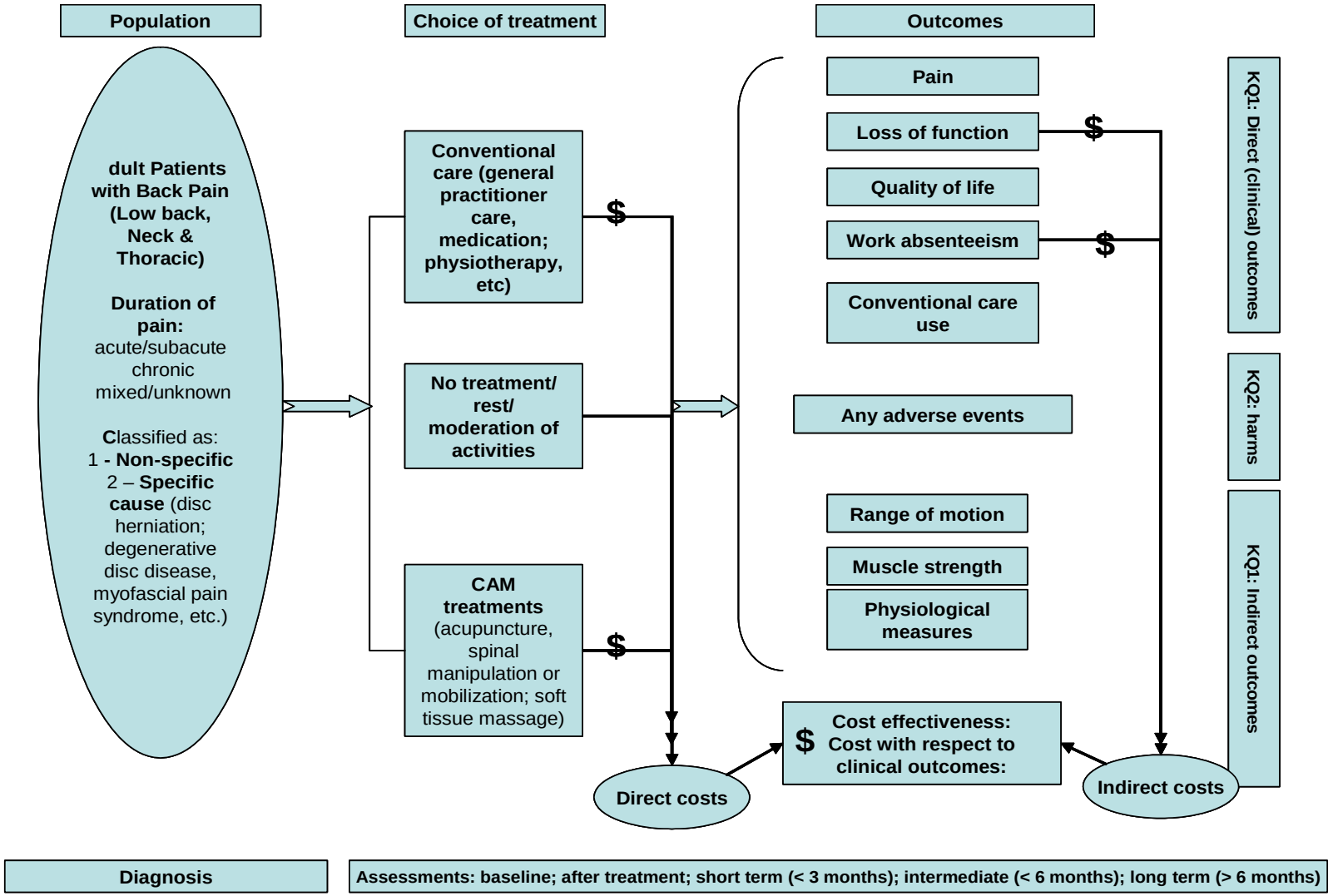
1. What is the efficacy, effectiveness and cost-effectiveness of the most prevalent types of practitioner-based manual CAM therapies (e.g., spinal manipulation, spinal mobilization, massage; acupuncture) compared to other CAM therapies, conventional therapies, placebo, no treatment, or wait list in improving outcomes (e.g., QoL, Pain, Function, progression of acute to chronic/ or disabling BP) in patients with nonspecific and certain specific (e.g. disc herniation, spinal stenosis, facet joint syndrome, whiplash) types of back and neck pain.
    a. For any of the CAM therapies found to be effective for BP, what factors influence success of treatments?
        i. Patient-specific factors:
        ii. Socio-demographics (e.g., age, gender, race, education, income)
        iii. Comorbidities
    b. Severity, specific causes (as identified in Q1), and duration of BP
        i. Treatment-specific factors (e.g., dose, frequency, duration)
        ii. Treatment provider-specific factors (e.g., training, specialization, experience)
    c. Does the use of any of the three most prevalent types of CAM for BP in adults result in a decreased or increased utilization of conventional management (diagnostic tests, number of visits & dose of medications, procedures)?

2. What are the contraindications and safety profile of the three most prevalent CAM therapies for BP in adults compared to that for other CAM therapies, conventional therapies, placebo or no treatment? Does the safety profile of these therapies change across subgroups of patients with co morbidities?

For a schematic view of the key questions that incorporates the relevant clinical context, please refer to Figure 1.

Analytical Framework

Figure 1. Analytical framework



Data Sources and Literature Search Strategies

Electronic search strategies were developed and tested through an iterative process by an experienced medical information specialist in consultation with the UO-EPC team. We searched the following electronic databases: MEDLINE (Ovid MEDLINE(R) In-Process & Other NonIndexed Citations); MEDLINE (Ovid MEDLINE(R): 1950 to 2010 February Week 1); the Cochrane Library 2010 Issue 1 including CENTRAL, Cochrane Database of Systematic Reviews, DARE, HTA, and NHSEED; EMBASE (1980 to 2010 Week 4); CINAHL (1982 to September Week 3 2008); AMED (Allied and Complementary Medicine: 1985 to January 2010); Mantis (1880 to October 2008); EBM Reviews - ACP Journal Club (1991 to August 2008). Specialized CAM databases were also searched, including the Index to Chiropractic Literature (ILC) October 2008; Acubriefs 2008 October; Complementary and Alternative Medicine (NZ) 2008; and the LILACS Database October 2008. Some of these databases provided extensive coverage of foreign language materials (e.g., Asian, South American studies). Bibliographic records of potentially relevant nonEnglish publications were retrieved in MEDLINE, EMBASE, Central, Acubriefs, AMED, LILACS, and Mantis. There was no unique database for foreign language records. We utilized strategies combining controlled vocabulary and keywords such as Acupuncture, Electroacupuncture, Needling, Acupressure, Moxibustion, and Manipulative Medicine. The searches were not restricted to any language or date. Additional potentially eligible references were sought through hand-searching the bibliographies of relevant items. (Appendix A)

We identified unpublished literature through searching the Web sites of relevant specialty societies and organizations, health technology assessment agencies, economic research institutions, guideline collections, trial registries, and conferences.

Study Selection

To assess relative benefits and harms as well as cost-effectiveness of CAM treatments' (i.e., acupuncture, manipulation, mobilization, massage, and flexion-distraction technique) use in adults (age ≥ 18 years) with back, neck, headache, or thoracic pain (acute, sub-acute, chronic, mixed duration), we selected primary reports of comparative efficacy/harms and economic evaluation from randomized controlled trials (RCTs). Trials including participants with pain due to specific or nonspecific causes were eligible for inclusion in the review. Additionally, nonrandomized controlled trials and observational studies (e.g., cohort, case-control, cross-sectional studies) reporting comparative data on long-term (> 6 months) harms were eligible for inclusion.

Control (comparator) treatments included no treatment, placebo (sham), or any other active treatment (e.g., CAM therapy, medication, physiotherapy, ultrasound, exercise, heat/cold therapy, electrotherapy, spinal mechanical traction, spinal injection, aquatic therapy). Trials using combination of CAM with other 'active therapy' versus the same 'active therapy' were included only if the effect of CAM alone was ascertained, based on the assumption of no interaction between the CAM and the 'active therapy'. Trials using a combination of manipulation and mobilization in an experimental arm were also included in the review.

The review of non-English publications was limited to German, Dutch, Chinese, Japanese, Italian, French, Portuguese, and Spanish. We included relevant unpublished literature in the

review. Systematic and narrative reviews, case reports, editorials, commentaries or letters to the editor were excluded.

The results of the literature search were uploaded to the software program TrialStat SRS version 4.0 along with screening questions developed by the review team and supplemental instructions. A calibration exercise was undertaken to pilot and refine the screening process. Initially, two independent reviewers screened titles and abstracts of all identified bibliographic records (screening level I). Then the same reviewers retrieved and reviewed full-text reports of all potentially eligible records (screening level II). Discrepancies at both screening levels were discussed and resolved by consensus.

The literature selection process, including reasons for exclusions, is presented in the PRISMA study flow diagram (Chapter 3, Figure 2).

Data Abstraction

Two reviewers independently abstracted relevant information from each included study using an a priori developed abstraction form. The abstracted data were crosschecked and conflicts were resolved by consensus. The abstracted data included study characteristics (study author, design, sample size, country), type of experimental treatment (e.g., acupuncture, spinal manipulation), type of control treatment (e.g., pain medication, neck exercise, traction, sham-acupuncture, advice, education, no treatment/waiting list), treatment-related factors (e.g., spine region of administration, frequency, number of sessions, dose, specific acupoints, depth/duration of needle insertion, electrical stimulation of needles, mechanically assisted manipulation, manual acupuncture), baseline population characteristics (e.g., age, gender, race, pain location/extension, duration of pain, cause of pain, pain severity, comorbidities), and treatment provider-specific factors (e.g., years of education/experience, specialization, training).

The abstracted data for each continuous outcome included: mean (or median), standard deviation (and/or standard error), and 95 percent confidence interval (95 percent CI). For dichotomous outcomes, proportions and corresponding 95 percent CIs were abstracted.

Primary efficacy/effectiveness outcomes that were abstracted were: pain intensity (e.g., Visual Analog Scale-VAS, Numerical Rating Scale-NRS, McGill Pain Questionnaire-MPQ, Von Korff Chronic Pain Grade Scale), function (Hannover Functional Ability Questionnaire-HFAQ) and disability (e.g., Roland Morris Disability Questionnaire-RMDQ: 0-24, Northwick Park Neck Pain Questionnaire-NPQ: 0-36, modified NPQ: 8 items 0-32, Oswestry Disability Index: 0-50, Activities of Daily Living-ADL, Neck Disability Index-NDI: 0-50, and Pain Disability Index-PDI) well being/quality of life (e.g., EQ-5D, SF-36 physical functioning or pain domains), global perceived effect (GPE), work related outcomes (e.g., work absenteeism, sick leave), and conventional health care utilization (e.g., number of visits to health care services, intake of pain medications).

Secondary efficacy/effectiveness outcomes considered for abstraction included spinal range of motion (ROM; flexibility, extension, rotation), straight leg raise (SLR), finger floor distance (FFD), and muscle strength.

The timing of post-treatment followup for each outcome was ascertained and then categorized into four groups: immediate, short- (< 3 months), intermediate-(3 months to 12 months), and long-term (> 12 months) post-treatment followup.

For cost-effectiveness analysis, the following data was extracted: a) costs in the health care sector, b) costs of production loss, c) costs in other sectors, d) patient and family costs, and e) total costs.

Any data on harms was also abstracted (i.e., proportion of patients with at least one event). We considered the following harms outcomes: any adverse events, serious adverse events, withdrawals due to adverse events, and specific adverse events (e.g., increase in pain, bruising, local bleeding, infection, punctured organs, swelling, allergies, cauda-equina syndrome).

Assessment of Study Quality and Reporting

The risk of bias for RCTs was assessed using the criteria list recommended in the Updated Method Guidelines for Systematic Reviews in the Cochrane Collaboration Back Review Group.[8] The tool is shown in Appendix F.

For each study, a criterion was rated as "yes", "no" or "don't know". The quality of individual studies were classified into three groups (i.e., good, fair, and poor), depending on the number of 'Yes' ratings across the following four domains (questions 2, 3, 4, and 9 of risk of bias tool): a) treatment allocation concealment (selection domain), b) balance of baseline characteristics between the groups (selection domain), c) patients' blinding status to the intervention they received (blinding domain), and d) number/reasons for dropouts/withdrawals (attrition domain). For example, studies with scores of 0-1, 2-3, and 4 (i.e., number of 'yes' ratings on four domains) were classified as having poor, fair, and good quality, respectively.

To explore overall bias, we constructed risk-of-bias graphs that are presented in the Results sections.[8]

Studies of other designs were assessed using the modified tool suggested by Downs and Black.[9] The items of this tool cover the following constructs: selection of study population, comparability of study groups (important confounders controlled for through either matching and/or adjusting in the analysis), and ascertainment of outcomes (independent blind assessment, sufficient length of followup).

Additionally, methodological quality of the included economic studies was determined using the CHEC list. This list consists of 19 items for the assessment of the quality of economic evaluations conducted alongside randomized clinical trials that were selected in a Delphi process by 23 experts in the field of health economics (see Appendix F).[10]

Rating the Strength of Evidence

We assessed the overall strength of evidence using the approach of grading system suggested by the Evidence-based Practice Center (EPC) program of the U.S. Agency for Healthcare Research and Quality (AHRQ).[11] This system is largely based on the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) working group approach.[12] The evidence grading method consists of four major domains: 1) risk of bias (aggregate measure of the overall quality or degree of bias of study/studies for a given outcome or comparison), 2) consistency (the degree to which results of studies for a given outcome or comparison are uniform in terms of effect direction and statistical significance), 3) directness (whether or not the interventions were compared in head-to-head trials; ultimate health outcomes

versus surrogate outcomes), and 4) precision (the degree of variability/uncertainty around the pooled effect estimate).

The overall quality of evidence (risk-of-bias) for a given outcome was derived from the quality scores of individual study or studies (poor, fair, or good) and was categorized in three groups (high, medium, or low). If evidence consisted of only one study (or multiple studies of the same quality rating), then the study quality corresponded to risk-of-bias for this evidence in the following manner: study quality (poor) = risk-of-bias (high), study quality (fair) = risk-of-bias (medium), and study quality (good) = risk-of-bias (low). In case of evidence consisting of multiple studies with different quality ratings (studies of poor, fair, and good quality mixed together), the mean quality score (i.e., mean number of 'Yes') was calculated. Evidence with mean quality score < 2 was labeled as having high risk of bias, 2 ≤ mean quality score < 4 was labeled as having medium risk of bias, and the mean quality score of 4 was labeled as low risk of bias. The relationship between the risk of bias for evidence and mean quality score based on individual study (or studies) is presented in Table 1.

Table 1. Study quality and risk-of-bias

Quality score*	Study Quality	Risk of Bias
0 ≤ N < 2	Poor	High
2 ≤ N < 4	Fair	Medium
N = 4	Good	Low

* Number of 'Yes' on 4 domains; in case of a single study, N is a whole number (0, 1, 2, 3, 4); in case of multiple studies, N is a mean number which may be whole number or fraction

Depending on ratings for four domains (risk of bias, consistency, directness, and precision), the grade of evidence was high, moderate, low, or insufficient (Table 2). The initial high grade was reduced by one level (from high to moderate; from moderate to low grade) for each of the domains not met: risk of bias (medium), consistency (inconsistent, single trial-not applicable), precision (imprecise), and directness (indirect). The grade was reduced by two levels from high to low in case of high risk of bias. Although we ascertained and presented ratings for 'precision' in the tables for specific outcomes, we did not downgrade the strength of evidence based on this domain simply due to the absence of a pooled estimate and 95 percent confidence intervals. The absence of evidence was graded as 'insufficient'. Results were considered consistent when statistically significant or nonsignificant effects in the same direction were observed across trials. The pooled estimate with relatively narrow range of effect sizes (95 percent confidence intervals) with clear direction leading to clinically uniform conclusion was considered as 'precise evidence'. Clinical outcomes such as pain, disability or function, quality of life, proportion of subjects who improved, time to (or duration of) analgesic effect, and use of analgesics were considered as 'direct evidence'. Other measures such as range of motion (ROM), pressure pain threshold (PPT), utilization of conventional healthcare system (e.g., general practitioner visits, imaging studies), sick leave (e.g., length, proportion of subjects), and proportion of subjects cured were considered as 'indirect evidence'. The grading results for strength of evidence are presented throughout the Results section (Chapter 3, Tables 5, 7, 9, 12, 13, 15, 17, 19, and 21). For reasons of brevity, these tables do not include trials comparing benefits/harms of CAM treatments combined with other therapies (except for manipulation plus mobilization in experimental arm), or trials comparing different modalities of the CAM treatments (manipulation daily versus manipulation weekly; deep acupuncture versus superficial acupuncture).

The graded evidence is presented in the results section. (Chapter 3)

Table 2.Grading of evidence

Grade	Domain
High	**All 4 domains are met (e.g., low risk of bias, precise, direct, consistent)**
Moderate	**1 of the domains is not met (e.g., medium risk of bias, precise, direct, consistent)**
Low	**2-4 of the domains are not met (e.g., high risk of bias, precise, indirect, inconsistent)**
Insufficient	**No evidence/absence of evidence**

Evidence Synthesis and Analysis

The results (both quantitative and qualitative parts) of this review were grouped according to a type of experimental intervention (e.g., acupuncture, manipulation, mobilization, massage), pain location in spinal region (low back, neck, head, thorax), duration of pain (acute/sub-acute, chronic, mixed, unknown), and cause of pain (specific versus nonspecific).

The results of all analyses for any given outcome (e.g., pain, global measure, function, disability, harms, medication use) were presented within subgroups defined by location, duration, and cause of pain, and were presented separately with respect to control intervention (e.g., no treatment, placebo, other CAM treatment, medication, other treatment) and timing of outcome ascertainment during post-treatment followup (immediate, short-, intermediate-, and long-term).

Qualitative Analysis

For each study, information on sample size, demographics (e.g., age, gender, race), settings (e.g., population-based, primary care, hospital), treatments (type, dose, frequency, and experience of the caregiver), outcomes (e.g., pain, disability, function, medication use), and source of funding (e.g., industry, government) were summarized in text and/or summary tables. The results of one or more trials that compared two or more treatments with respect to change in any given outcome were summarized in text as well as in numerous tables. (Refer to Chapter 3).

Quantitative Analysis

The decision to pool individual study results was based on clinical judgment with regards to comparability of study populations, treatments, and outcome measures. We considered studies suitable for pooling if they used the same design (RCT), enrolled similar populations (e.g., chronic specific neck pain), evaluated the same types of treatments (e.g., acupuncture versus placebo; manipulation versus no treatment), and reported the same outcomes measured with identical scale and ascertained in similar post-treatment followup periods (e.g., pain intensity on VAS immediately after the treatment). The meta-analyses of pain were based on 1-10 visual analogue scale. We used DerSimonian and Laird random-effects models to generate pooled estimates of relative risks (RRs) and weighted between-group end point mean differences (WMDs) with 95 percent CIs.[13] Statistical heterogeneity was evaluated using a chi-square test and the I^2 statistic (low: 25.0 percent; moderate: 50.0 percent; high: 75.0 percent).[8]

When studies did not report summary statistics (e.g., mean score, standard deviation, standard error) adequately, we calculated the needed parameters if data for individual patients were reported. If a study reported only a standard error of the mean response, we converted it to a standard deviation. Trials were not incorporated into meta-analyses if the needed data (e.g.,

mean and standard deviation) could not be derived. Trials with obvious between-group baseline imbalances in the outcome were not pooled unless the mean change from baseline and corresponding SDs for the compared study groups were reported.

If data allowed, the statistically significant pooled estimates of post-treatment pain intensity and disability were planned to be examined in order to determine the degree of clinical importance for the observed differences between the treatment groups. The assessment of the degree of clinical importance was based on the criteria from the updated methods guideline for systematic reviews suggested by the Cochrane Back Review Group which were defined as small (WMD < 10 percent of the VAS or a disability scale), medium (10 percent ≤ WMD < 20 percent of the VAS or a disability scale), and large (WMD ≥ 20 percent of the VAS or a disability scale).[14]

We examined the extent of publication bias through visual inspection of funnel plot asymmetry with respect to contours of statistical significance (Moreno et al. 2009)[15] and the Egger's regression-based method.[16]

Subgroup and Sensitivity Analyses

We planned to conduct subgroup and sensitivity analyses to explore statistical heterogeneity, if the collected data allowed. The a priori defined population subgroups were based on patient-specific factors (age, gender, race, education, comorbidity). Trial-specific factors were study quality (risk-of-bias) and type of treatment provider. To explore the impact of study quality on the pooled effect estimate between two treatments, trials were categorized into two groups: 'higher risk-of-bias' and 'lower risk-of-bias.' If for a trial, seven or more items of the risk-of-bias tool were rated as 'Yes' this trial was categorized into 'lower risk-of-bias' group, otherwise into 'higher risk-of-bias' group. Afterwards, the pooled treatment effect estimates across the two strata of trials with 'lower risk-of-bias' and 'higher risk-of-bias' were compared in terms of their effect size, direction, statistical significance, and 95 percent CI.

We performed all analyses using R software, version 2.4.0 (www.r-project.org).

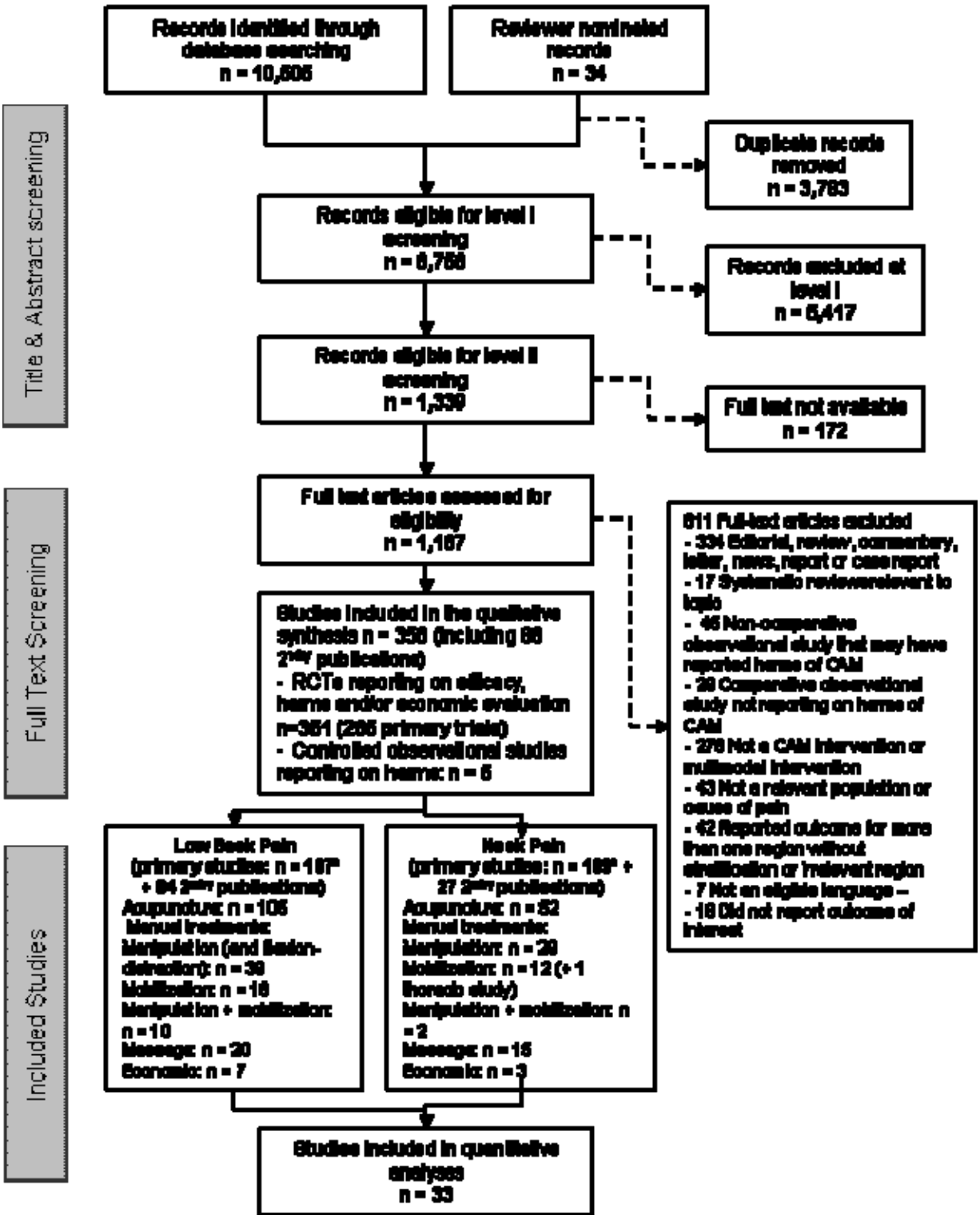
Chapter 3. Results

Literature Search Results

The original (Oct. 2008) and updated (Feb. 2010) search of MEDLINE, and all other sources (including expert nominated records) for primary studies yielded 10,505 citations. After removing 3,783 duplicate records, titles and abstracts of 6,756 records were screened. Of these, 1,339 were potentially relevant records. We were able to retrieve full text articles for 1,167 records. The remaining 172 records were not further screened since full texts for them could not be obtained.

In total, 811 records did not meet eligibility criteria applied during the full text screening, and therefore were excluded (Appendix D); thus a total of 356 records were included in this report. Of these 356 records, only 33 were quantitatively analyzed. Figure 2 outlines the study flow process for this review.

Figure 2. PRISMA chart for study retrieval and selection



General Characteristics of the Included Studies

Of the 356 included records, 86 were identified as multiple publications of the primary studies. In this review, multiple publication is defined as a single study results published more than once, or part of data from an original report was republished separately. In general, a publication that provided the most comprehensive report of the original trial was used as the primary study. If multiple publications included the same data, the report published earlier was regarded as the main study.

The publication date of primary studies ranged from 1976 to 2009. The included records were published in English (273), Chinese (72), German (10), Japanese (nine), Spanish (one), and Italian (one) language.

In total, 270 unique studies were included in this report. Table 3 outlines the included original and secondary publications. Of the 270 primary studies, 265 were RCTs and five were cohort or case-control studies.

The CAM interventions in the 265 RCTs (351 publications) were acupuncture (155 trials), spinal manipulation (66 trials), spinal mobilization (29 trials), spinal manipulation + mobilization (11 trials), and massage (33). There were few studies in which both regions of pain, or more than one CAM interventions were studied. Ten trials of economic evaluation of CAM treatments were also included.

Table 3. Primary records with companion reports

Primary Record	Secondary record(s)
Aigner 1999 [17]	Aigner 1998 [18]; Aigner 1998 [19]
Alaksiev 1996 [20]	Alaksiev 1994 [21]
Brinkhaus 2006 [22]	Brinkhaus 2003 [23]
Witt 2006 [24]	Witt 2005 [25]; Witt 2006 [26]
Carlsson 2001 [27]	Carlsson 1993 [28]
Cherkin 2001 [29]	Kalaukalani 2001 [30]
Childs 2004 [31]	Childs 2003 [32]; Childs 2006 [33]; Fritz 2005 [34]; Whitman 2004 [35]; Childs 2004 [36]
Endres 2007 [37]	Haake 2007 [38]
Ferreira 2007 [39]	Ferreira 2009 [40]
Franke 2000 [41]	Franke 2000 [42]
Fryer 2005 [43]	Hodgson 2006 [44]
Ga 2007 [45]	Ga 2007 [46]
Gallacchi 1983 [47]	Gallacchi 1981 [48]
Garvey 1989 [49]	Garvey 1990 [50]
Giles 2003 [51]	Muller 2005 [52]
Grant 1999 [53]	Grant 1998 [54]
Hadler 1987 [55] Hancock 2007 [56] Hoiriss 2004 [57]	Hadler 1990 [58] Hancock 2008 [59]; Badgett 2008 [60] Hoiriis 2002 [61]
Hoving 2006 [62]	Kothals-de-Bos 2003 [63]; Kothals-de-Bos 2005 [64]
Hurwitz 2002 [65] Hurwitz 2006 [66]	Hurwitz 2006 [67]; Hurwitz 2004 [68]; Hurwitz 2005 [69] Hertzman-Miller 2002 [70]; Hurwitz 2005 [71]; Kominski 2005 [72]; Goldstein 2002 [73]; Hurwitz 2002 [74]; Hurwitz 2002 [75]; Hurwitz 2002 [76]
Irnich 2001 [77]	Irnich 2000 [78]; Konig 2003 [79]
Irnich 2002 [80]	Irnich 2002 [82]

Primary Record	Secondary record(s)
Jull 2005 [81]	Jull 2002 [83]
Koes 1992 [84] Koes 1993 [85]	Koes 1993 [85]; Koes 1992 [86] Koes 1992 [86]; Koes 1992 [87]
Kothals-de-Bos 2003 [63]	Hoving 2006 [62]
Lehmann 1983 [88] Lewis 2007 [89] Little 2008 [90]	Lehmann 1986 [91] Dziedzic 2005 [92] Little 2008 [93]; Hollinghurst 2008 [94]
Meade 1991 [95]	Meade 1995 [96]; Meade 1990 [97]; Meade 1990 [98]
Molsberger 2002 [99]	Molsberger 1998 [100]
Pope 1994 [101]	Hsieh 1992 [102]; Pope 1993 [103]
Rupert 1985 [104]	Rupert 1985 [105]
Seidel 2002 [106]	Seidel 2003 [107]
Sims-Williams 1979 [108]	Jayson 1981 [109]
Thomas 2005 [110]	Thomas 2006 [111]; Ratcliffe 2006 [112]; Thomas 2009 [113]; Thomas 2003 [114]; Thorpe 2002 [115]; Thorpe 2002 [116]; MacPherson 2004 [117]; MacPherson 2002 [118]
Triano 1995 [119]	Triano 1994 [120]
Tsukayama 2002 [121]	Tsukayama 2000 [122]
UK BEAM Trial Team 2004 [123]	Farrin 2005 [124]; UK BEAM Trial Team 2004 [125]
Venancio 2008 [126]	Venancio 2009 [127]
White 2004 [128]	White 2002 [129]
Willich 2006 [130]	Witt 2006 [131]
Witt 2006 [131]	Becker-Witt 2004 [132]; Walsh 2005 [133]; Willich 2006 [130]
Yuan 2006 [134]	Yuan 2004 [135]
Yuan 2009 [136]	Yuan 2006 [137]
Zhang 2008 [138]	Zhang 2007 [139]

Assessment of Risk of Bias

RCTs reporting efficacy and harms. The risk of bias was assessed for 242 studies. The remaining RCTs were reported in abstract form and were not suitable for this assessment. Overall, the metrological quality of the RCTs were poor (median score = 5/13; Inter-quartile range: 3, 7). Only 94 (39 percent) of the studies scored six or higher from the total of 13 items of risk of bias tool. We found that 99 (41 percent) studies described an adequate method of randomization. The remaining studies either did not report the method used for randomization (7.0 percent) or the method used was not clearly described (52.0 percent). Concealment of treatment allocation was judged as adequate in 21.1 percent of RCTs and inadequate in 10.3 percent. More information on rating of risk of bias is provided in Table 4 and Appendix G.

Table 4. Risk of bias assessment of RCTs

Quality components	N studies (%)
Adequate method of randomization	99 (40.9%)
Adequate method of allocation concealment	51 (21.1%)
Similarity at baseline regarding the most important prognostic indicators	158 (65.3%)
Appropriate patient blinding to the intervention	43 (17.8%)
Appropriate care provider blinding to the intervention	7 (2.9%)
Appropriate outcome assessor blinding to the intervention	85 (35.1%)
Similar or no cointerventions between groups	103 (42.6%)
Acceptable compliance in all groups	82 (33.9%)
Described and acceptable drop-out rates	132 (54.5%)
Similarity of timing of the outcome assessment in all groups	214 (88.4%)
Inclusion of an intention-to-treat analysis	84 (34.7%)
Absence of selective outcome reporting	127 (52.5%)
Absence of other potential bias	12 (5.0%)
Total Risk of Bias scores (max 13); median (IQR)	5 (3, 7)

RCTs reporting economic evaluation. Three studies collected costs appropriate to their chosen perspective. Two studies did not state the perspective adopted for the economic evaluation. Most studies measured costs using diaries, questionnaires, or practice or insurance records, and valued costs appropriately using published sources. Where appropriate, most studies conducted an incremental cost-effectiveness analysis. The length of followup for all of the studies was at least 1 year. In one study whose length of followup was more than 1 year, discounting was undertaken. Appendix G – Tables 5.1 & 5.2 shows the results of the assessment of the quality of the economic evaluations.

Controlled observational studies (cohort, case-control). Assessment of quality of reporting in observational studies was done by using the modified Downs and Black tool. In general, the objective, and the main outcome of the studies were well described and the studies were of large sample size providing sufficient power to detect clinically important effects. Detail information could be found in Appendix G, table 6.1.

Risk of bias of RCTs by CAM intervention. In this review the results are presented for CAM interventions for treatment of low back pain, thoracic pain, and neck pain. For each of these pain regions, the CAM interventions are organized by the following order:

- Acupuncture
- Spinal manipulation
- Flexion distraction technique (only for LBP)
- Spinal mobilization
- Spinal manipulation + mobilization
- Massage

Summary of the results of risk of bias assessment for these CAM interventions within each pain region (LBP, NP) is presented in the respective sections of the results (Figures 3, 24, 27, 28, 29, 30, 31, 42, 43, and 47). Here we attempted to compare the risk of bias in the included studies across the five CAM interventions. The summary of findings regarding the most relevant items of risk of bias are outlined in Table 5. In summary, the items related to randomization, concealment of treatment allocation, differences in baseline prognostic indicators, blinding of outcome assessor, imbalance in use of cointervention, reporting of intention to treat analysis, and

selected outcome reporting bias was the focus of this comparison. As judged by median and inter quartile ranges of total score (13 items), trials in manual therapies of LBP had slightly lower risk of bias (median 7, 8, and 6 for spinal mobilization, manipulation + mobilization, and massage, respectively) with the exception of manipulation therapy (median score = 2, IQR 1, 3) compared with acupuncture (median score = 4, IQR 1, 3). In the trials on treatment of neck pain, there was no difference in the total scores (median scores = 4, 3, 3, and 5 for acupuncture, manipulation, mobilization, and massage, respectively).

Table 5. Selected risk of bias tool assessment items in RCTs by CAM treatment type

Selected Items of Risk of Bias tool	Acupuncture		Spinal manipulation		Spinal mobilization		Manipulation+ mobilization	Massage	
	LBP	NP	LBP	NP	LBP	NP	LBP	LBP	NP
Appropriate method of randomization	44 (43.1)	14 (26.4)	6 (18.2)	15 (51.7)	6 (37.5)	4 (44.4)	6 (66.7)	10 (50.0)	6 (37.5)
Inappropriate method of randomization	10 (9.8)	4 (7.5)	4 (12.1)	2 (6.9)	1 (6.3)	1 (11.1)	0	1 (5.0)	0
Appropriate concealment of treatment allocation	20 (19.6)	8 (15.1)	3 (9.1)	10 (34.5)	3 (18.8)	5 (55.6)	4 (44.4)	4 (20.0)	3 (18.8)
Inappropriate concealment of treatment allocation	11 (10.8)	2 (3.8)	7 (21.2)	4 (13.8)	2 (12.5)	1 (11.1)	1 (11.1)	3 (15.0)	0
Dissimilarity of baseline prognostic indicators	8 (7.8)	6 (11.3)	3 (9.1)	4 (13.8)	1 (6.3)	0	1 (11.0)	1 (5.0)	5 (31.3)
Appropriate outcome assessor blinding	29 (28.4)	14 (26.4)	15 (45.5)	10 (34.5)	10 (62.5)	5 (55.6)	5 (55.6)	4 (40.0)	7 (43.8)
Inappropriate outcome assessor blinding	10 (9.8)	0	2 (6.1)	2 (6.9)	0	5 (55.6)	0	2 (10.0)	1 (6.3)
Imbalance in use of cointerventions between groups	5 (4.9)	1 (1.9)	1 (3.0)	3 (10.3)	2 (12.5)	0	0	0	0
Described and acceptable drop out rates *	47 (46.1)	27 (50.9)	12 (36.4)	19 (65.5)	10 (62.5)	5 (55.6)	7 (77.8)	14 (70.0)	10 (62.5)
Unacceptable drop out rates	45 (44.1)	14 (26.4)	6 (18.2)	3 (10.3)	2 (12.5)	1 (11.1)	1 (11.1)	2 (10.0)	1 (6.3)
Similarity of timing in assessment of outcomes between groups	92 (90.2)	41 (77.4)	27 (81.8)	24 (82.8)	15 (93.8)	9 (100.0)	8 (88.9)	19 (95.0)	14 (87.5)
Reporting of intention-to-treat analysis	30 (29.4)	13 (24.5)	10 (30.3)	12 (41.4)	5 (31.3)	2 (22.2)	4 (44.4)	10 (50.0)	7 (43.8)
Absence of selected outcome reporting	39 (38.2)	26 (49.1)	17 (51.5)	20 (69.0)	10 (62.5)	6 (66.7)	5 (55.6)	13 (65.0)	11 (68.8)
Selected outcome reporting bias	17 (16.7)	8 (15.1)	10 (30.3)	5 (17.2)	2 (12.5)	3 (33.3)	4 (44.4)	4 (20.0)	4 (25.0)
Total Score of Risk of Bias (max 13) Median (IQR)	4 (1, 3)	4 (3, 6)	2 (3, 6)	3 (4, 7)	7 (4, 7)	3 (5, 7)	8 (3, 6)	6 (5, 8)	5 (3, 6)

* Item number # 9 of the Cochrane risk of bias tool: the number of participants who were included in the study but did not complete the observation period or were not included in the analysis must be described and reasons given. If the percentage of withdrawals and drop-outs does not exceed 20% for short-term follow-up and 30% for long-term follow-up and does not lead to substantial bias a "yes" is scored. (N.B. these percentages are arbitrary, not supported by literature).

Population Characteristics of RCTs

The majority of trials included adult men and women aged 18 – 65 years. Three trials included only male and three trials included only female participants. Nine trials included older adults aged 55 and older.

Acupuncture. In total, 15,187 participants were included in the LBP and NP trials. The largest trial was conducted in Germany and included a total of 3,093 participants with chronic nonspecific low back pain. This trial reported efficacy and cost effectiveness and is discussed in detail in respective sections of the review. In 97 trials, subjects had nonspecific pain and in the remaining 91 trials subjects had specific pain.

Ninety-two trials enrolled subjects with identified or specific cause of pain such as disc perturbation, whiplash, cervicogenic headache, or underlying neurological causes. Details of these conditions can be found in Tables 1.1 – 1.8 (low back pain) and 2.1- 2.8 (neck pain) in Appendix C, and throughout the results section.

Manual treatments (spinal manipulation, mobilization and combined treatment). In total, 22,638 subjects were included in 100 trials. The majority of these trials (90 trials) included subjects with nonspecific pain. Details of these conditions can be found in Tables 1.9 – 1.34 (low back pain) and 2.9- 2.18 (neck pain) in Appendix C, and throughout the results section.

Massage. In total, 4,050 subjects were included in 35 trials for treatment of LBP or NP. In 24 of the trials, subjects had nonspecific pain and in the remaining 11 trials subjects had specific pain (whiplash, myofascial pain, and other causes). Details of these conditions can be found in Tables 1.35 – 1.40 (low back pain) and 2.19- 2.26 (neck pain) in Appendix C, and throughout the results section.

Interventions and Control Treatments

Acupuncture. In 155 acupuncture trials, a large variety of methods of acupuncture treatments were used to compare the effect of acupuncture versus control treatments. The control treatments in these trials included active (i.e. physical modalities and exercise) or inactive treatments (i.e. placebo, no treatment). Details of treatment techniques and controls used can be found in Tables 1.1 – 1.8 (low back pain) and 2.1- 2.8 (neck pain) in Appendix C. The treatment providers for acupuncture trials were trained or licensed acupuncturists (27 trials), general practitioners or physicians with especial training in acupuncture (41 trials), neuropathy physicians (nine trials), general practitioners (five trials), and trained physiotherapists (four trials). In the majority of foreign language publications, particularly in Chinese trials, the treatment provider was referred as “therapist” (17 trials). The information about treatment provider was not reported for 85 trials. Specific details about treatment providers, years of experience (when reported), treatment duration, and outcomes assessed in each trial are presented in Appendix I.

Manual treatment (spinal manipulation, mobilization and combined treatment). In total, 101 primary trials used techniques of manipulation, mobilization or combination of both for treatment of low back, thoracic and neck pain. The details of treatment techniques and control interventions (active and inactive) used in these trials can be found in Tables 1.9 – 1.34 (low back pain) and 2.9- 2.18 (neck pain) in Appendix C. In 32 trials, spinal manipulation or mobilization was provided by experienced and licensed chiropractors. In the remaining studies manipulation or mobilization was provided by physical therapists (17 trials), general

practitioners (five trials), licensed or qualified manual therapy practitioners (six trials), physical therapists with manual therapy training (three trials), clinicians or experienced clinicians (four trials), neurologists or rheumatologists with chiropractic training (three trials), folk healers (one trial), and osteopaths (one trial). The information regarding treatment provider was not reported for the remaining 29 trials. Specific details about treatment providers, years of experience (when reported), treatment duration, and outcome assessed in each trial, are presented in Appendix I.

Massage. In total, 35 studies used massage for treatment of LBP, or NP. Details of treatment techniques and control interventions (active and inactive) used in these trials can be found in Tables 1.35 – 1.40 (low back pain) and 2.19- 2.26 (neck pain) in Appendix C. In eight trials, treatment providers were licensed or experienced massage therapists. In the remaining trials, treatment of massage was provided by physical therapists (five trials), reflexologists, acupressure therapists, folk healers (four trials), general practitioners (four trials), manual therapists (two trials), experienced bone setters (one trial), and chiropractic students (one trial). For the remaining 10 trials, the information on treatment providers was not reported. Specific details about treatment providers, years of experience (when reported), treatment duration, and outcome assessed for each trial are presented in Appendix I.

KQ1. What is the Efficacy, Effectiveness and Cost-effectiveness of the Most Prevalent Types of Practitioner-based Manual CAM Therapies Compared to Other CAM Therapies, Conventional Therapies, Placebo, no Treatment, or Wait List in Improving Outcomes in Patients With Nonspecific and Certain Specific Types of Back and Neck Pain?

Efficacy & Effectiveness

1 - Acupuncture for Treatment of Low Back Pain

We included 105 trials in this section. Results of 15 trials were reported in multiple publications (Table 3).

Population/trial characteristics. The studies were conducted in Australia (four)[52,140-142], Austria (one)[143], Canada (two)[144,145], China (54)[134,138,146-174 175-197], Germany (six)[22,24,37,99,198,199], Hong Kong (one)[200], Iran (one)[201], Ireland (four)[136,146,202,203], Italy (two)[204,205], Japan (15)[121,206-215,215-218], Korea (one)[219], Norway (one),[220] Pakistan (one)[221], Sweden (two)[27,222], UK (three)[53,110,223], and United States (eight)[29,49,88,224-228].

The proportions of men and women were similar in 46 studies (40 percent - 60 percent). In 14 studies there were a greater proportion of men (> 60 percent) and in 15 studies women were the majority (> 60 percent). One study recruited only women,[219] and another one only men.[144] In six studies the proportion of men and women between the arms was not similar.[140,197,209,209,218,228]

The majority of trials (94 percent) recruited general adult age population (18 – 60 years old). Seven studies recruited only elderly subjects (60 years or older).[53,207,208,216,217,226,227]

Information on racial composition or ethnicity was reported for six studies.[29,110,198,224,226,228] The Asian trials (72 studies) did not report the racial composition and was assumed to be 100 percent Asian.

In total 15,162 participants with LBP were randomized to acupuncture or control groups. The sample size in these trials varied from nine[217] to 2841[24] participants.

In the majority of trials (90 percent), acupuncture (various methods of needling techniques including electro-acupuncture) was used alone (95 studies), whereas in the remaining trials, it was used in combination with 'other treatments' (11 studies).[99,144,158,161,172,185,193,198,200,216,226] The comparison arm in these trials was the same 'other treatment.' Table 6 presents the control interventions in the included studies.

Table 6. Acupuncture for treatment of low back pain- Control interventions

Type of control group	Cause of Pain	N studies	Detail of Control intervention
1- Nonactive Control treatments			
Placebo/sham	Nonspecific	20	Non penetrating needling [202,206,207] Superficial needling [37], with injection of anesthetics and no stimulation[142] Superficial needling at nonacupuncture points [22,99,203] without stimulation or 'de qi'[198] Guided tube: with tapping on the tube [206,210,212,213], without tapping[156], with toothpick inside the tube[228] Needling at nonacu points[145,218] Sham TENS[27,88,223] Sham EMG[225] Not described[197]
	Specific	3	Superficial needling with injection of lidocaine at nonacu points[141] Sham TENS[201] Gentle tapping[162]
No-treatment or waiting list	Nonspecific	4	No acupuncture[24] Waiting list[22,222] Delayed acupuncture [227]
2- Active Controls			
Exercise/ physical activity	Nonspecific	1	Standard exercise program[200]
	Specific	0	NA
Physical modalities	Non Specific	5	TENS: Home treatment applied at acu-points[121,209], details not reported [53], applied over centre of pain,[88] TENS with acupuncture[216]
	Specific	1	TENS on selected tender points alone[176],
Physiotherapy	Nonspecific	2	Posture training aimed to remove muscle imbalance- according to Bruegger-concept[198] Physical modalities such as light, electricity or heat[163]
	Specific	1	Physical modalities such as hot packs, ultrasound, short-wave diathermy, and TENS in addition to muscle strengthening[201]
Traction	Nonspecific	0	NA
	Specific	1	Traction,[158,193,229] and rotatory manipulation[159]
Education/Self care	Non Specific	1	Self care education booklet and videotapes[29,228]
	Specific	0	NA
Manual treatment	Non Specific	6	Massage (acupressure) and ethyl chloride spray[49], Swedish massage[29] Manipulation and/or mobilization[224] Manipulation[52,140] Massage and mobilization[161] Mobilization or manipulation (and oral medication)[164]
	Specific	0	NA
Standard care or GP	Non Specific	5	Physiotherapy/exercise, medication, and advise[37,99,110,224,226]
	Specific	1	Standard care (specific methods not reported)[144]
Medication	Non Specific	7	Oral analgesics, [52,140,214,220,221] Chinese herbal medication, [175] topical analgesics [216]

	Specific	**6**	**Oral analgesics, [134,138,146,186] intramuscular injection of analgesics[154,195]**
Other method of acupuncture	**Non Specific**	**17**	**Various method of needling on acu-points, [27,49,218,219,225,230] alternative acu-points, [153,168,174,204,211,215,217] addition or use of warming needle/Moxibustion, [215] non local points, superficial/deep needling, [143] various dosing regiment, [136,204,227] auricular, or alternative auricular technique [143] dry needling (vs. two techniques of trigger point injection with lidocaine) [49], personalized (vs. standard), [231]**
	Specific	**30**	**Needling on muscle tendons, [147], various method of needling on acu-points, [150,162,166,170,194] alternative acu-points [148,149,151,157,160,165,169,171,182,183,190,195,219] addition or use of warming needle/Moxibustion, [152,177,181] non local points, [154,179,184,187] superficial/deep needling, [178,205,208] fly-probing [189]**
Active treatment when compared with combination of same active treatment with acupuncture	**Non Specific**	**6**	**Standard care (continued usual care: NSAIDs, muscle relaxant, paracetamol and back exercises), [226] orthopedic therapy, [99] exercise, [200] physiotherapy (not described), [198] TENS, [216]**
	Specific	**9**	**Standard care (physiotherapy, remedial exercises, and occupational therapy) [144] Traction, [158,159,192,193] Massage, [161,172,185,232]**
Acupuncture in combination with another treatment	**Non Specific**	**1**	**TENS [216]**
	Specific	**5**	**Traction, [159,188] massage, [232] injection and massage, [191] cupping, [192]**

Acu=acupuncture; EMG=electromyography; GP=general practitioner care; NA= not applicable; TENS=transcutaneous electrical nerve stimulation

Treatments were scheduled for one, two or three courses, each course ranging from 5 to 15 days in duration. The frequency of treatments in most studies was once a day consecutively for the duration of the study course. The number of acupuncture treatments across the studies was fewer than 10,[160,168,170,181] 10 - 20,[138,149,153,162-164,166,167,171,174-177,194,197] and 21 - 45.[134,150,184,190] The number of treatments in Chinese studies varied. Three of these studies did not report this information.[156,180,195]

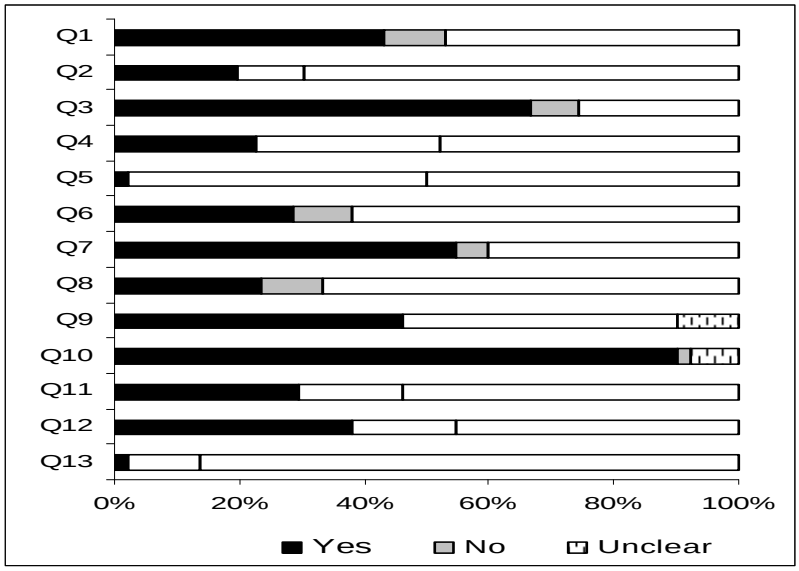
The frequency of treatment in the remaining studies that reported this data were the following: One treatment, [49,206,210,212,213,218,225] One to two sessions per week (up to 18 treatments in total),[22,24,37,52,88,121,121,136,140-142,144,145,155,160,199,202,205,208,209,211,211,214,214,217,222,224,228,233] three sessions per week (up to 15 treatments in total),[151,197,200,201,207,207,219] four sessions per week (12 treatments in total),[99] and five sessions per week (up to 21 treatments in total).[150,163,198,226]

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 3. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for about 44.0 percent and 20.0 percent of the trials, respectively. In 68.0 percent of the trials, the subjects' baseline characteristics distribution across the treatment arms was similar (i.e., balanced). In one trial,[53] the baseline distribution of VAS score was higher in the acupuncture versus TENS group (140 versus 101). For at least half of the trials, it was unclear whether or not the subjects and assessors were blinded to the type of treatment. About 47.0 percent of the trials reported acceptable drop-out rate. In one trial,[140] the

drop out rate in acupuncture group was very high (52.0 percent). Results based on intention-to-treat analysis were explicitly reported for about 30.0 percent of the trials.

The data for selected items of the risk of bias tool across the CAM interventions (acupuncture; spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.1 of Appendix G.

Figure 3. Risk of bias score (%)



1. Was the method of randomization adequate?
2. Was the treatment allocation concealed?
3. Were the groups similar at baseline regarding the most important prognostic indicators?
4. Was the patient blinded to the intervention?
5. Was the care provider blinded to the intervention?
6. Was the outcome assessor blinded to the intervention?
7. Were cointerventions avoided or similar?
8. Was the compliance acceptable in all groups?
9. Was the drop-out rate described and acceptable?
10. Was the timing of the outcome assessment in all groups similar?
11. Did the analysis include an intention-to-treat analysis?
12. Are reports of the study free of suggestion of selective outcome reporting?
13. Is this study free of any other bias?

Efficacy results. A summary of the key results is presented in Table 7. For further detail of the trials please see the evidence tables. (Appendix C, table 1.1 – table 1.8)

Table 7- Key results – Acupuncture treatment in patients with low back pain

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Acu vs. No Tx	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C	M	Precise (3) £ [24,222,227]	Yes	Direct	> SS	Moderate
			PDI: B [22]	L	-	NA	Direct	> SS	Moderate
			HFAQ: B [22,24]	M	-	Yes	Direct	> SS	Moderate
			SF-36: B [22,24]	M	-	Yes	Direct	> SS	Moderate
			ROM (ext, flx): B, D [222]	M	-	NA	Indirect	> SS	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. PL	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C [202,212]	M	-	Yes	Direct	= S-NS	Moderate
			RMDQ: C [202]	M	-	NA	Direct	= S-NS	Low
			Use of medication: B [202]	M	-	NA	Direct	> SS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B	M	Precise (10) [22,37,99,141,156,197,198,203,206,228]	Yes	Direct	> SS	Moderate
			VAS: C	M	Precise (3) [27,37,99]	Yes	Direct	= S-NS	Moderate
			VAS: D	M	Precise (3) [22,27,228]	Yes	Direct	= S-NS	Moderate
			VAS: E	M	Precise (4) [22,27,198,228]	Yes	Direct	= S-NS	Moderate

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			SF-36: B [22,203]	M	-	No	Direct	=>	Low
			SF-36: D [22]	L	-	NA	Direct	= S-NS	Moderate
			MPQ: B [141,203]	M	-	Yes	Direct	= S-NS	Moderate
			Use of medication: B [141]	M	-	NA	Indirect	= S-NS	Low
			RMDQ: B	M	Imprecise (2) [197,228]	Yes	Direct	= S-NS	Moderate
			% pts on sick leave: B	M	Imprecise (2) [27,99]	Yes	Indirect	= S-NS	Low
			% pts with global improvement: C	M	Imprecise (2) [27,99]	No	Direct	= S-NS	Low
			% pts with global improvement: D	M	Imprecise [37,203]	Yes	Direct	= S-NS	Moderate
			HFAQ: B	L	Precise (2) [22,37]	No	Direct	< SS	Moderate
			HFAQ: D	L	Precise (2) [22,37]	No	Direct	< SS	Moderate
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [210,218]	M	-	Yes	Direct	> SS	Moderate
			% pts who improved: B[145]	H	-	NA	Direct	= S-NS	Low
E-Acu vs. PL	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS: B [201]	H	-	NA	Direct	> SS	Low
		NS	Trunk ext: C [88]	H	-	NA	Indirect	> SS	Low

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			Trunk ext: C [88]	H	-	NA	Indirect	> SS	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Med	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B	H	Precise (4) [51,140,216,221]	No	Direct	= S-NS	Low
			Oswestry: B	H	Imprecise (2) [51,140]	No	Direct	= S-NS	Low
	Mixed	S	% pts cured: B [134,146]	H	-	Yes	Indirect	=>	Low
			Time (in min) to analgesic effect: B [154,195]	M	-	Yes	Direct	> SS	Moderate
			Duration (in hr) of analgesic effect: B [154,195]	M	-	Yes	Direct	> SS	Moderate
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	% pts who improved: B [49]	M	-	NA	Direct	= S-NS	Low
E-Acu vs. Med	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [221]	H	-	NA	Direct	> SS	Low
	Mixed	S	% pts who improved: B [138,139]	M	-	Yes	Direct	> SS	Moderate
			Raising straight leg: B [138]	M	-	NA	Indirect	> SS	Low
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	% pts who improved: B [186]	H	-	NA	Direct	> SS	Low

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
		NS	-	-	-	-	-	-	Insufficient
Acu vs. PT	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	Oswestry: B [163]	M	-	NA	Direct	> SS	Low
			% pts cured: B [163]	M	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
E-Acu vs. PT	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS: B [201]	H	-	NA	Direct	> SS	Low
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. ST	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	RMDQ: B, C, D [224]	M	-	NA	Direct	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	RMDQ: C, D [226,228]	M	-	Yes	Direct	> SS	Moderate
			VAS: C, D [226,228]	M	-	Yes	Direct	> SS	Moderate
			HFAQ: D [37]	L	-	NA	Direct	> SS	Moderate
			SF-12: D [37]	L	-	NA	Direct	> SS	Moderate
			SF-36-bodily pain: E [110]	M	-	NA	Direct	> SS	Low

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			Oswestry: E [110]	M	-	NA	Direct	= S-NS	Low
			MPQ: E [110]	M	-	NA	Direct	= S-NS	Low
			Utilization of conventional care [110,112]	M	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Man	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B	H	Precise (2) [51,140]	No	Direct	< SS	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Ma	**Acute/subacute**	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	RMDQ: B, D [29]	M	-	NA	Direct	< SS	Low
			VAS: B, D [29]	M	-	NA	Direct	< SS	Low
			% pts using medication: D [29]	M	-	NA	Direct	= S-NS	Low
			Conventional care (number of provider visits): D [29]	M	-	NA	Indirect	= S-NS	Low
			Conventional care (number of imaging studies): D [29]	M	-	NA	Indirect	= S-NS	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. TENS	**Acute/subacu**	S	-	-	-	-	-	-	Insufficient

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
	te	NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B	M	Imprecise (2) [53,216]	No	Direct	= S-NS	Low
			VAS: C	M	Precise (2) [53,216]	No	Direct	= S-NS	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
E-acu vs. TENS	Acute/subacute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [121,209]	M	-	No	Direct	=>	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. E-acu	Acute/subacute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [143]	M	-	NA	Direct	< SS	Low
			N of analgesic tablets: B, C [143]	M	-	NA	Direct	< SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	% pts cured: B [186]	M	-	NA	Indirect	< SS	Low
		NS	-	-	-	-	-	-	Insufficient

S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo; Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable

Ψ Grade (High, moderate, low, and insufficient)
£ Number of pooled trials

B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium
- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

Population with acute/subacute pain. There were nine trials of patients with acute or subacute LBP included in this sub-section.[152,160,167-169,202,212,220,224] Of these, five trials studied patients with nonspecific LBP[167,202,212,220,224] and four trials – patients with LBP due to disc protrusion or lumbar sprain.[152,160,168,169]

Subjects with specific pain.

Acupuncture versus placebo. No relevant studies were identified.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). In three trials, different modalities of electro-acupuncture (local single-point versus conventional)[160] and acupuncture (needling Xi-Cleft points versus conventional needling;[169] warming needle moxibustion versus conventional needling[152]) were compared in treating subjects with LBP due to disc protrusion. In all three trials, experimental treatment modalities (local single-point electro-stimulation, needling Xi-Cleft points, and needle warming moxibustion) were shown to be more effective than conventional acupuncture (or electro-acupuncture) in improving immediate post-treatment pain (VAS score, therapeutic effect – the absence of pain) or disability (Oswestry Disability Index score).[152,160,169] In one trial,[168] in subjects with pain due to lumbar sprain, needling at Yanglao (S16) was associated with a numerically higher response rate (percent subjects free of lumbar pain with tenderness relieved by 80.0 percent, lumbar flexion 110°, extension 30°, free and unlimited squatting) compared to needling at paravertebral or Ashi acu-points (94.4 percent versus 69.7 percent, $p < 0.01$). In the same trial, earlier administration of treatment tended to produce better response rates irrespective of the type of acupuncture. No pain intensity or disability outcomes were reported.

Acupuncture versus other treatments. No relevant studies were identified.

Acupuncture versus medication. In one trial,[220] there was no difference immediately, short-term, or intermediate-term after the end of treatment between acupuncture and Naproxen 500 mg, taken twice daily for 10 days, in measures of pain (VAS).

Acupuncture + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Acupuncture versus placebo. The effects of acupuncture and placebo (nonpenetrating needling, or guided tube) were compared in two trials.[202,212] Although in the first trial,[202] immediately or 3 months after the treatment subjects in the acupuncture group had numerically improved degree of disability (RMDQ score) and pain (mean VAS score: 1-100) compared to subjects who received placebo (sham acupuncture), these differences were not statistically significant due to a low power of this trial (RMDQ score difference at 3 months: 2.6, 95 percent CI: -0.7, 5.9 and VAS score difference at 3 months: 10.6, 95 percent CI: -4.1, 25.3). In the same trial, at the end of treatment, subjects randomized to acupuncture were taking significantly fewer pain medication tablets for LBP compared to those in the placebo-treated group (1.0 ± 0.3 versus 4.2 ± 0.6, $p < 0.05$).

In the other trial,[212] acupuncture, compared to placebo, was associated with a nonsignificantly lower pain intensity VAS score (49.9 ± 22.2 versus 51.8 ± 26.1, $p > 0.05$).

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture versus another type/method of the same CAM. No relevant studies were identified.

Acupuncture versus other treatments. In one trial,[224] the addition of patients' choice for acupuncture to usual care did not improve the degree of disability (RMDQ score) compared to usual care alone immediately, shortly, or intermediate-term post-treatment.

Acupuncture versus medication. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). The combination of acupuncture, pricking collateral, cupping, and moxibustion was shown to be associated with greater improvement in complete curative effect (i.e., complete relief of the severe pain and positive symptoms, recovery of motility and other functions, and ability to engage in normal work and life) compared to acupuncture alone or combined with cupping.[167]

Population with chronic pain. A total of 42 trials were included in this section, the majority of which studied subjects with nonspecific LBP (36 studies).[22,24,27,29,37,52,53,88,99,136,140-143,155,156,163,174,197,198,200,203,204,206,207,211,213,214,216,217,222,223,225-228] The remaining six trials included subjects with LBP due to specific causes (e.g., myofascial pain syndrome, spondylitis, disc protrusion, sciatica, injuries/fractures).[144,162,201,205,208,221]

Subjects with specific pain.

Acupuncture versus placebo. One trial compared the effects of electro-acupuncture and placebo (sham TENS) on the reduction of pain intensity in subjects with sciatica.[201] The use of electro-acupuncture was significantly more effective in reducing pain or sciatica at short term followup compared to placebo.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture versus another type/method of the same CAM. No relevant studies were identified.

Acupuncture versus other treatments. One trial compared the effects of electro-acupuncture to that of physiotherapy (hot packs, ultrasound, short wave diathermy, TENS, muscle stretching) in subjects with sciatica.[201] The use of electro-acupuncture was found to be clinically and significantly more beneficial in reducing short-term post-treatment pain compared to physiotherapy [201]

Acupuncture versus medication. In one trial,[221] the use of electro-acupuncture in patients with herniated lumbar disc was shown to be significantly beneficial in reducing pain intensity immediately after the treatment compared to 50 mg diclofenic (mean VAS, 1-100: 25.7 ± 2.3 versus 33.3 ± 2.5, $p < 0.05$).

Acupuncture (type 1) versus acupuncture (type 2). In two trials, different needling techniques were compared in subjects with spondylitis, and lumbar strain (soft tissue injury),[162] or myofascial pain syndrome.[205] In the first study,[162] for the subgroup of patients with lumbar strain (soft-tissue injury) dermal needling was better than only acupuncture. For the subgroup of patients with hyperplastic spondylitis, body acupuncture was better than dermal needling.[162] In the other study,[205] in-depth needling[205] had significantly better analgesic effect at 3 months followup compared to superficial needling in patients with myofascial pain syndrome. This beneficial effect was not apparent at the end of 8 treatment sessions.

In one additional trial,[208] standard, deep, and superficial needling modalities applied to the trigger points were compared (insertion depth: 20 mm, 23 mm, 3 mm, respectively) with respect to immediate post-treatment reductions in pain intensity (VAS: 1-100) and disability (RMDQ scores) in elderly subjects with spondylosis, osteoporosis, or trauma. Although there was a numerical preponderance in favor of deep needling for pain intensity, the observed between-group differences were not statistically significant (VAS: 56.8 ± 25.1 versus 44.4 ± 19.1 versus

50.1 ± 32.5, p > 0.05). The mean RMDQ disability score was similar across the groups (4.2 ± 4.3 versus 4.2 ± 1.2 versus 4.3 ± 2.2).[208]

In one trial of higher risk of bias (20 patients), [211] distal point needling for low-back pain of any duration was no different from local lumbar area needling for measures of pain, function and range of motion.

Subjects with nonspecific pain.

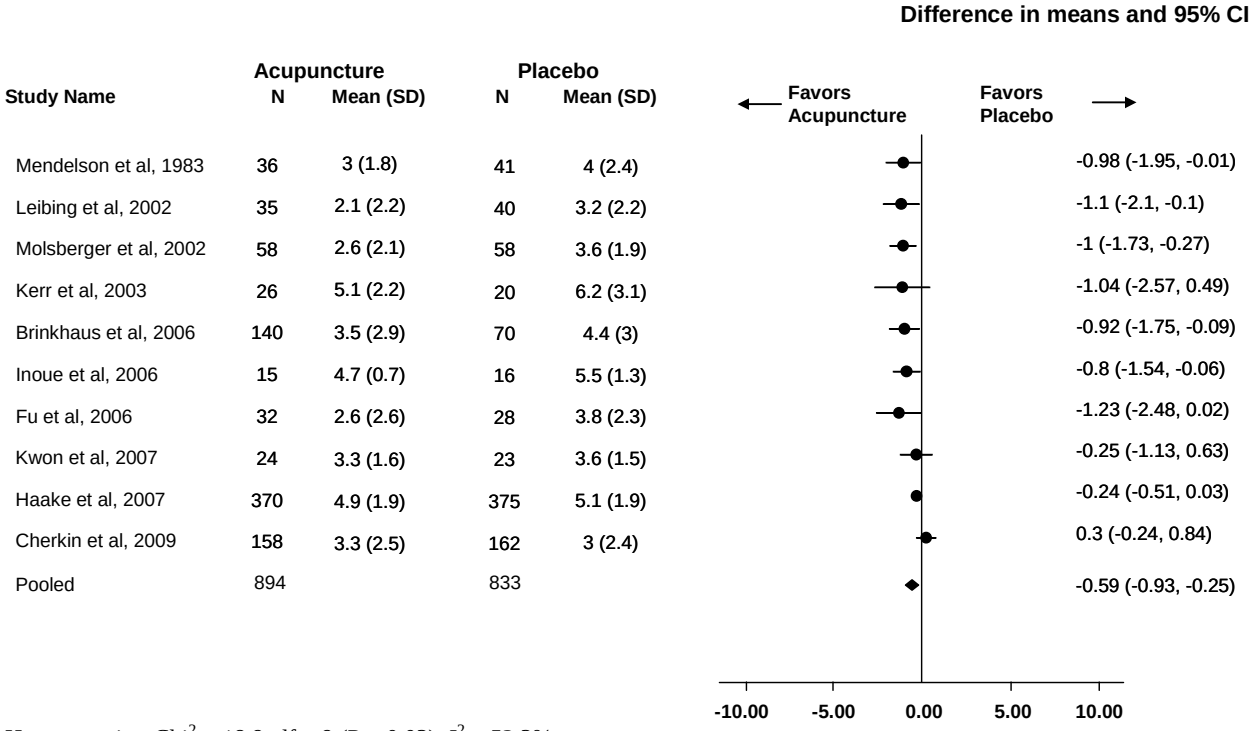
Acupuncture versus placebo. The effects of acupuncture and placebo were compared in 16 trials.[22,27,37,88,99,141,142,156,197,198,203,206,207,213,223,228] The results of these trials were conflicting. In nine trials,[27,88,99,156,206,207,213,223,228] acupuncture was significantly better than placebo in reducing pain intensity (VAS scores, percent subjects with improved pain or with relief ≥ 50 percent)[27,88,99,206,207,223] or disability levels (RMDQ scores)[207,228] immediately or shortly after the end of treatment. For example, in one trial,[156] Fu's subcutaneous needling was compared to placebo (sham-acupuncture) with respect to post-treatment reduction in motion-related pain (MRP score) and pain under pressure (PUP)., Fu's subcutaneous needling compared to placebo produced significantly greater immediate post-treatment reductions on both MRP (2.66 ± 2.42 versus 0.54 ± 1.14) and PUP (2.38 ± 2.39 versus 0.36 ± 0.99). The placebo treatments used in these trials were toothpick inside the tube,[228] sham TENS,[27,88,223] nonpenetrating needling,[206,207] superficial needling at nonacupuncture points,[99] and guided tube. [156,213]
In contrast, results from six other trials indicated that acupuncture was not significantly better than placebo in reducing back pain (VAS scores: 0-100, modified MPQ, Von Korff Chronic Pain Grade Scale: 0-10), disability (PDI, HFAQ), or improving quality of life (SF-12 physical score) immediately or shortly (3 months) after the end of treatment.[37,141,142,197,198,203] For example, in one of these trials [141] although immediate mean post-treatment VAS score was numerically lower in the acupuncture versus placebo group, the between-group difference was not statistically significant (30.2 ± 3.0 versus 40.0 ± 3.8, p > 0.6). The degree of pain measured by MPQ also yielded nonsignificant between-group difference. In general, the use of analgesic medication and degree of disability (scale not specified) decreased, but did not differ between the two groups. The placebo used in these trials were superficial needling with injection of Lidocaine at nonacupuncture points,[141] superficial needling at nonacupuncture points,[198,203] superficial needling [37], and injection of anesthetics and no stimulation.[142] The placebo was not described for one trial.[197]

Moreover, in one trial,[22] immediately after the end of treatment, acupuncture produced significantly greater improvements in pain (VAS scores: 34.5 versus 43.7, p = 0.03) and quality of life (SF-36 physical health domain: 40.5 versus 36.2, p < 0.004) compared to placebo, the differences in pain (VAS score: 38.4 versus 42.1, p = 0.39) and quality of life (SF-36 physical health domain: 39.3 versus 37.6, p = 0.27) were no more significant at four and 10 months post-treatment followup.[22] The effects of acupuncture and placebo TENS were compared in two trials,[27,203] in one of which acupuncture was shown to be similar to placebo-TENS in terms of pain relief (MPQ, VAS scores) or quality of life (SF-36),[203] while the other trial[27] showed that in short term post-treatment reduction in pain (VAS scores) was significantly greater in the acupuncture versus placebo-TENS group. There was no significant difference in pain intensity between the two groups at 4 months after the end of treatment (p = 0.12).

The meta-analyses indicated statistically significant pooled mean differences between the effects of acupuncture and placebo in reducing pain intensity (VAS scores) immediately (-0.59, 95 percent CI: -0.93, -0.25).[22,37,99,141,156,197,198,203,206,228] (Figure 4). However, the short-term (-1.11, 95 percent CI: -2.33, 0.11),[27,37,99] intermediate (-0.18, 95 percent CI: -0.85, 0.49),[22,27,228]

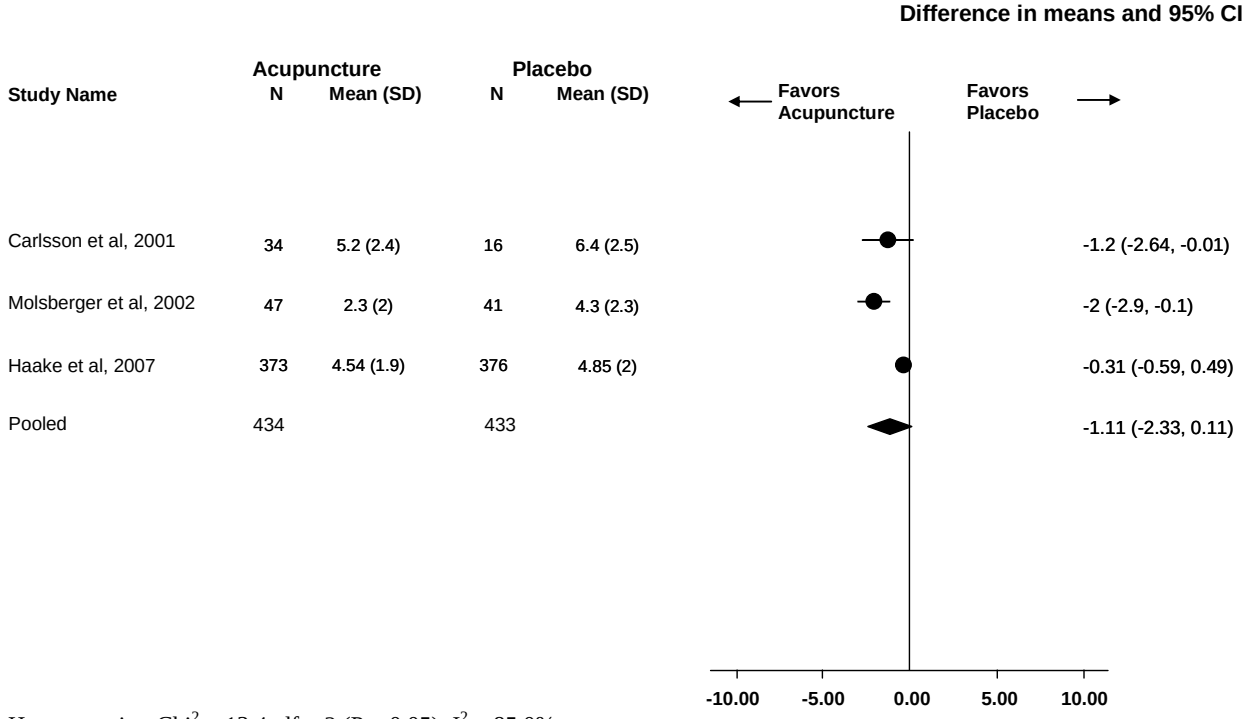
and long-term (-0.21, 95 percent CI: -0.64, 0.22)[22,27,198,228] post-treatment mean VAS differences between acupuncture and placebo groups were not statistically significant (Figures 5-7). Note that the degree of heterogeneity for immediate and short-term post-treatment pooled estimates for the mean VAS score (Figures 4-5) is substantial (I^2 range: 52.3 percent-85.0 percent), and therefore, these results warrant cautious interpretation.

Figure 4. Pain intensity (VAS score) – Immediate post-treatment



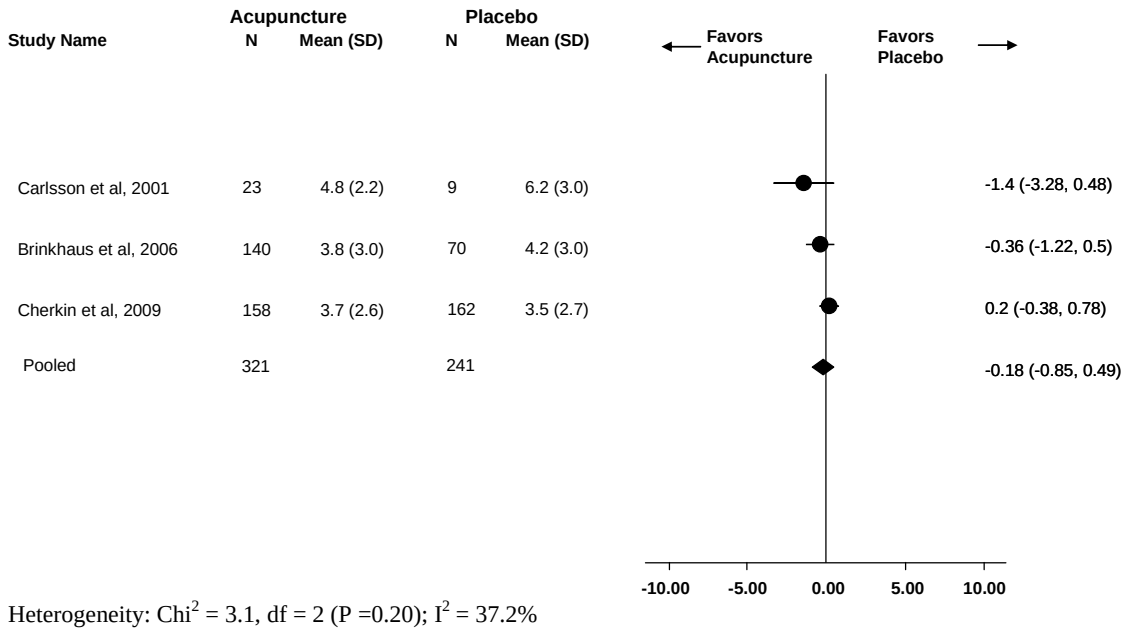
Heterogeneity: $Chi^2 = 18.9$, df = 9 (P = 0.03); $I^2 = 52.3\%$

Figure 5. Pain intensity (VAS score) – Short-term post-treatment



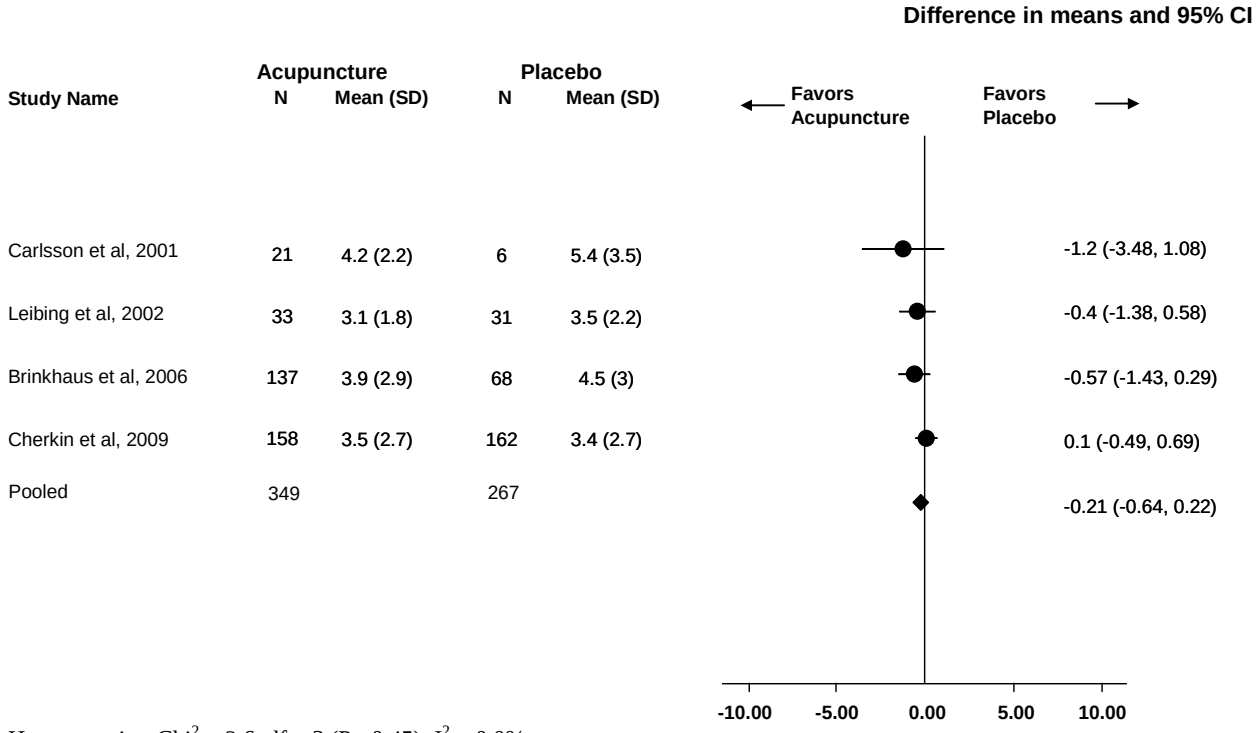
Heterogeneity: $Chi^2 = 13.4$, df = 2 ($P < 0.05$); $I^2 = 85.0\%$

Figure 6. Pain intensity (VAS score) – Intermediate-term post-treatment



Heterogeneity: $Chi^2 = 3.1$, df = 2 ($P = 0.20$); $I^2 = 37.2\%$

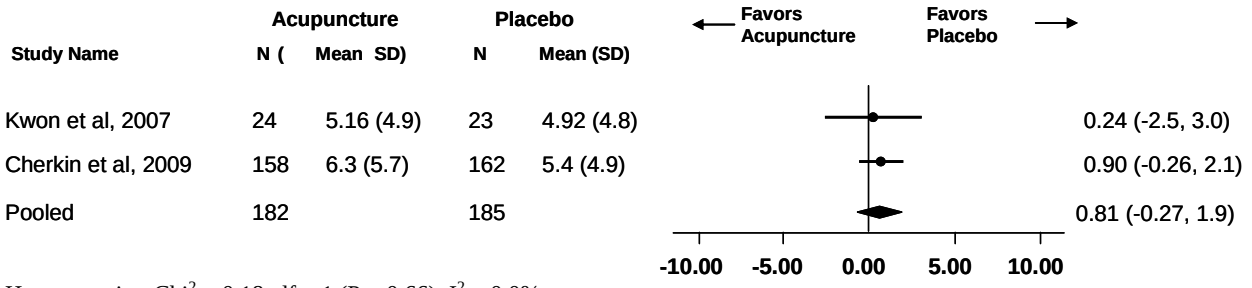
Figure 7. Pain intensity (VAS score) – Long-term post-treatment



Heterogeneity: $Chi^2 = 2.6$, df = 3 (P =0.45); $I^2 = 0.0\%$

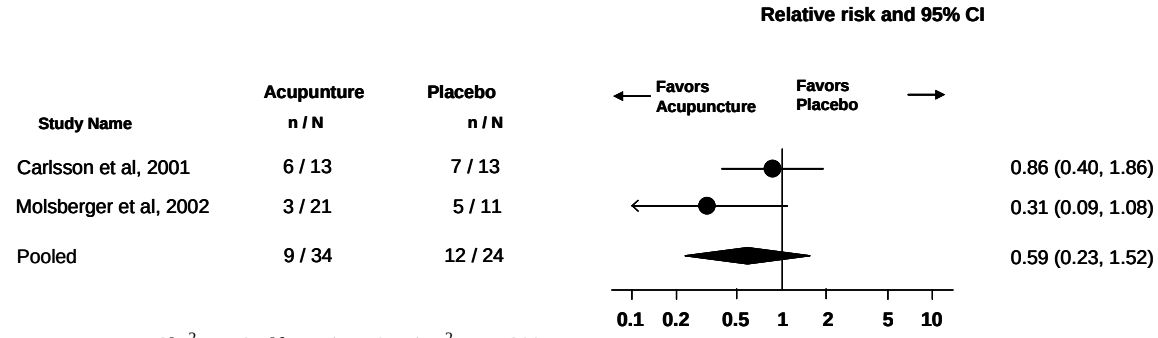
Based on our meta-analyses, there were no significant differences between acupuncture and placebo in improving disability (pooled mean RMDQ difference score; 0.81, 95 percent CI: -0.27, 1.9)[197,228] and reducing proportion of subjects on sick leave (pooled RR = 0.59, 95 percent CI: 0.23, 1.52),[27,99] immediately after the treatment (Figures 8-9). Similarly, the proportion of patients with global improvement did not significantly differ in acupuncture and placebo groups in short- (pooled RR = 1.89, 95 percent CI: 0.93, 3.83)[27,99] or intermediate-term (pooled RR = 1.10, 95 percent CI: 0.96, 1.26)[37,203] post-treatment period (Figures 10-11). Moreover, two meta-analyses showed statistically significantly improved degree of functional disability on HFAQ score in favor of acupuncture over placebo at post-treatment immediate (4.00, 95 percent CI: 1.30, 6.80)[22,37] or intermediate-term of followup (4.00, 95 percent CI: 1.10, 6.80) [22,37] (Figures 12-13).

Figure 8. Disability (RMDQ score) – Immediate post-treatment



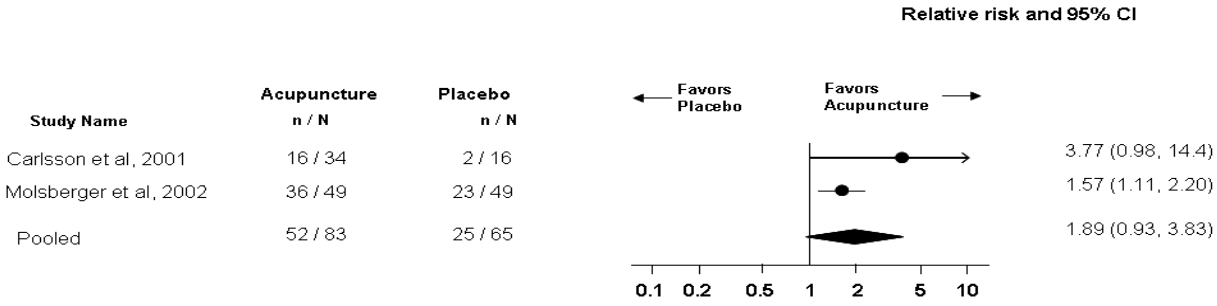
Heterogeneity: $Chi^2 = 0.18$, df = 1 ($P < 0.66$); $I^2 = 0.0\%$

Figure 9. Proportion of subjects on sick leave - Immediate post-treatment



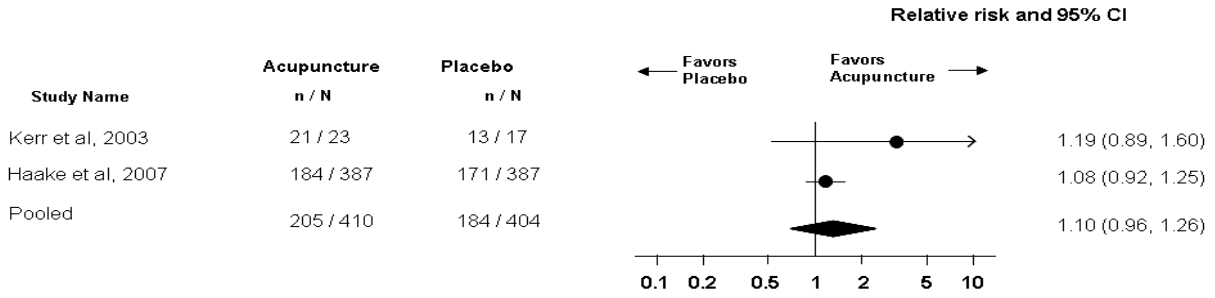
Heterogeneity: $Chi^2 = 1.8$, df = 1 ($P = 0.17$); $I^2 = 45.3\%$

Figure 10. Proportion of subjects with global improvement – Short-term post-treatment



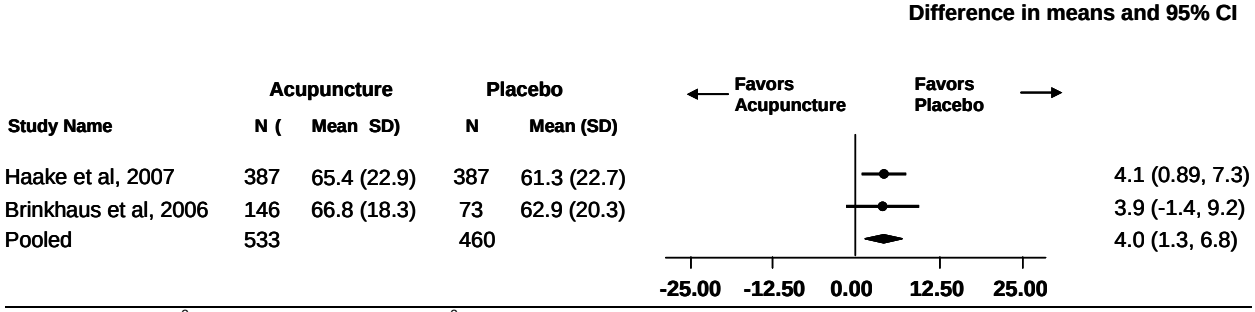
Heterogeneity: $Chi^2 = 4.5$, df = 1 ($P = 0.03$); $I^2 = 77.9\%$

Figure 11. Proportion of subjects with global improvement – Intermediate-term post-treatment



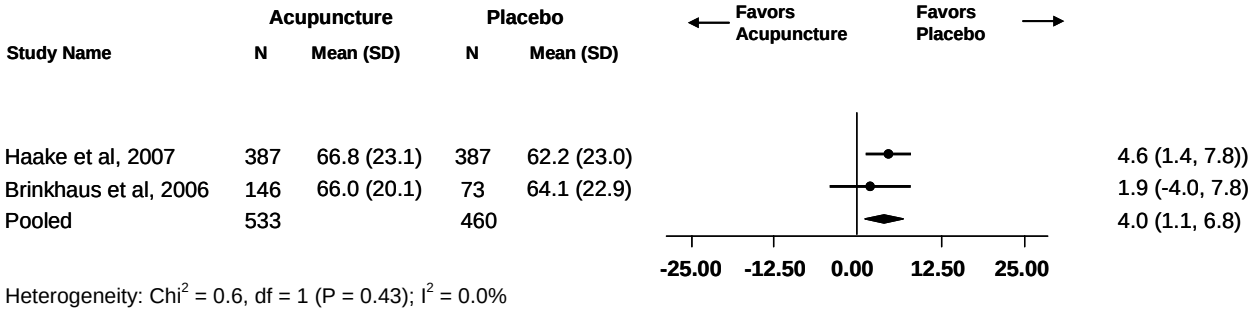
Heterogeneity: $Chi^2 = 1.4$, df = 1 (P = 0.24); $I^2 = 25.9\%$

Figure 12. Functional disability (HFAQ score) – Immediate post-treatment



Heterogeneity: $Chi^2 = 0.004$, df = 1 (P = 0.94); $I^2 = 0.0\%$

Figure 13. Functional disability (HFAQ score) – Intermediate post-treatment



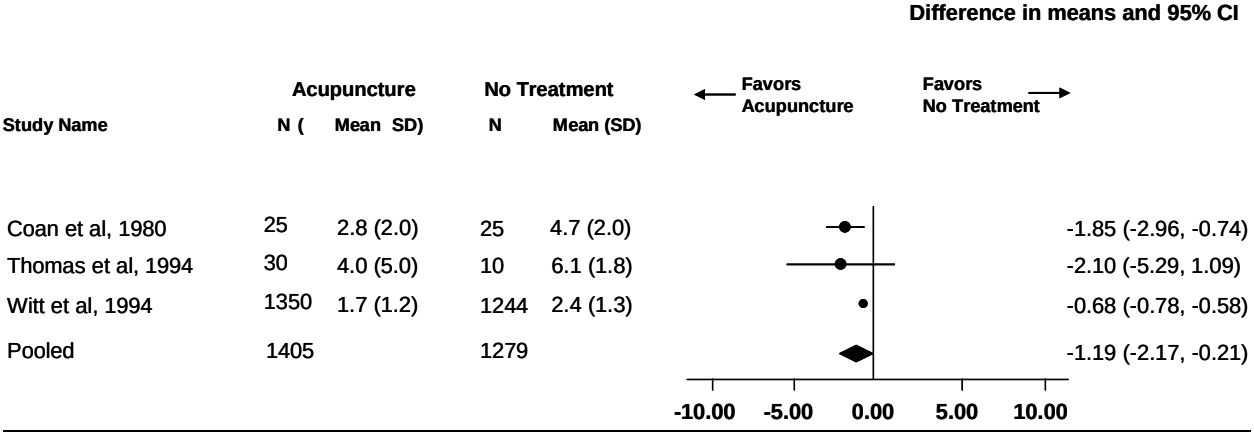
Heterogeneity: $Chi^2 = 0.6$, df = 1 (P = 0.43); $I^2 = 0.0\%$

Acupuncture versus no treatment. There were four trials in which acupuncture was compared to no treatment in relation to low back pain intensity, back function, and overall quality of life.[22,24,222,227] The results from these trials were consistent in showing a significant immediate, short, and intermediate-term post-treatment benefit of acupuncture compared to no treatment. For example, in three trials,[22,24,227] subjects who received acupuncture experienced greater

improvements in pain (VAS score: 0-10),[22,24,227] pain disability index (PDI score),[22] back function (Hannover Functional Ability Questionnaire, HFAQ),[22,24] or quality of life (SF-36, physical health and pain subscale domains)[22,24] compared with those in 'no treatment' groups immediately or intermediate-term after the end of treatment. In the remaining one trial,[222] there was statistically significantly better scores for pain (VAS scores) and mobility in the acupuncture (or electro-acupuncture) versus 'no treatments' group immediately or short-term after the treatment.[222]

The pooled estimate for short-term post-treatment pain intensity was statistically significant in favor of acupuncture (Figure 14; weighted mean difference on VAS score: -1.19, 95 percent CI: -2.17, -0.21).[24,222,227]

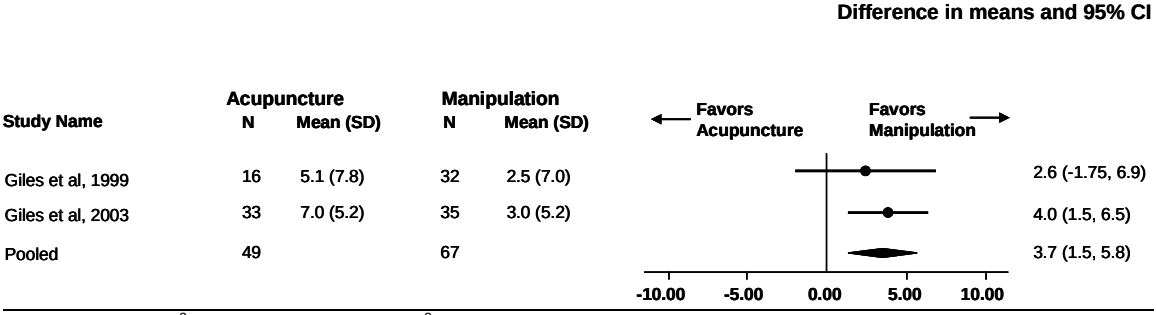
Figure 14. Pain intensity (VAS score) – Short-term post-treatment



Acupuncture versus other CAM treatment. Subjects who received manipulation,[51,52,140] massage,[29] or electro-acupuncture[143] had significantly lower post-treatment pain intensity (VAS, MPQ scores) or disability (RDI, Oswestry, NDI scores) compared to subjects who received manual acupuncture. However, results from intermediate-term followup (3 months post-treatment) of one of these trials[51,52] indicated numerically similar pain intensity in the manipulation group (median VAS score: 3.7) compared with acupuncture group (median VAS score: 3.9). The use of pain medication was significantly decreased in electro-acupuncture group compared to manual acupuncture group (six tablets versus 150 tablets, $p < 0.001$).[143] In another trial,[29] the use of pain medication did not differ in the acupuncture versus massage group (51.0 percent versus 47.0 percent, $p > 0.05$).

The meta-analysis comparing the effects of acupuncture and manipulation on immediate post-treatment pain intensity (Figure 15) indicated significant reductions in favor of manipulation over acupuncture (pooled mean difference in VAS score: 3.70, 95 percent CI: 1.5, 5.8).[51,140] Although both trials[51,140] reported immediate-term post-treatment disability data (Oswestry scores), they were not pooled due to obvious between-group baseline imbalance in this outcome scores.

Figure 15. Pain intensity (VAS score) – Immediate post-treatment

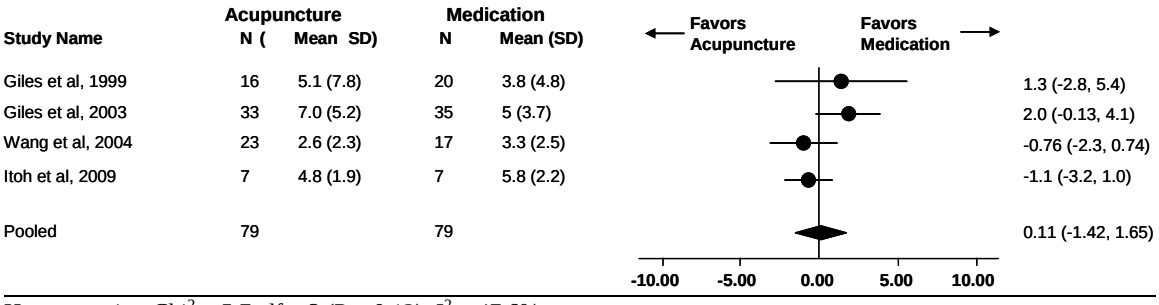


Heterogeneity: $Chi^2 = 0.3$, df = 1 (P = 0.58); $I^2 = 0.0\%$

Acupuncture versus usual care. The effect of acupuncture compared to usual care (e.g., pain medication, antiinflammatory pills, general practitioner visits, exercise, and lifestyle modifications) was studied in three trials.[37,226,228] In these trials subjects who received acupuncture improved in pain intensity, degree of disability, or quality of life compared to subjects in usual care groups.[37,226,228]

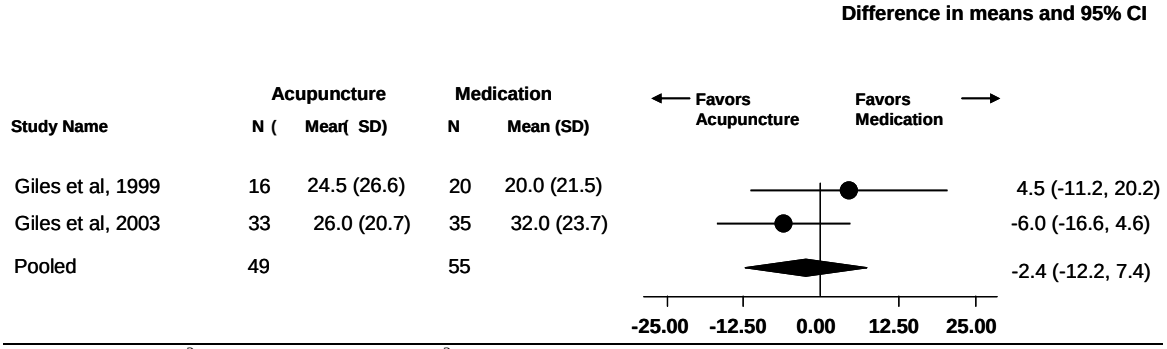
Acupuncture versus medication. The effect of acupuncture was compared to that of medication in four trials.[51,140,214,216] In three studies[51,52,140,216] acupuncture did not have a significantly different effect from that of medication in reducing immediate, or short term post-treatment pain intensity or disability (RMDQ, Oswestry score). In one of these trials[51,52] acupuncture group achieved numerically better median Oswestry disability score than medication (13 versus 24) in intermediate term post treatment followup. This trial failed to report test results for between-group comparisons. In two meta-analyses (Figures 16-17) the immediate post-treatment effects of acupuncture and medication were not significantly different with respect to reductions in pain intensity (pooled mean difference in VAS score: 0.11, 95 percent CI: -1.42, 1.65)[51,140,216,221] and disability (pooled mean difference in Oswestry score: -2.40, 95 percent CI: -12.20, 7.40).[51,140]

Figure 16. Pain intensity (VAS score) – Immediate post-treatment



Heterogeneity: $Chi^2 = 5.7$, df = 3 (P = 0.12); $I^2 = 47.6\%$

Figure 17. Disability (Oswestry score) – Immediate post-treatment

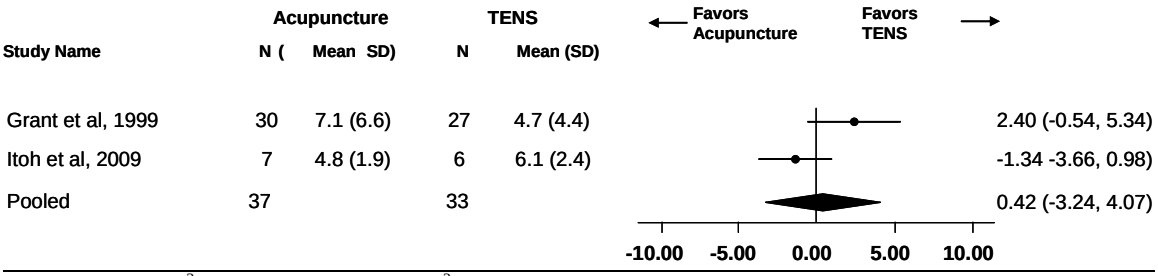


Heterogeneity: $Chi^2 = 1.2$, df = 1 (P = 0.27); $I^2 = 15.3\%$

Acupuncture versus other treatment. In three trials,[53,163,216] the use of manual acupuncture was shown to be significantly superior to physiotherapy (consisted of light, electricity, and/ or heat therapy) in improving the degree of disability (Oswestry score)[163] and similar to TENS in decreasing pain intensity (VAS scores).[53,216] In one of these trials, the reduction in the use of pain medication was greater for the acupuncture versus TENS group (50.0 percent versus 33.0 percent, $p < 0.05$).[53]

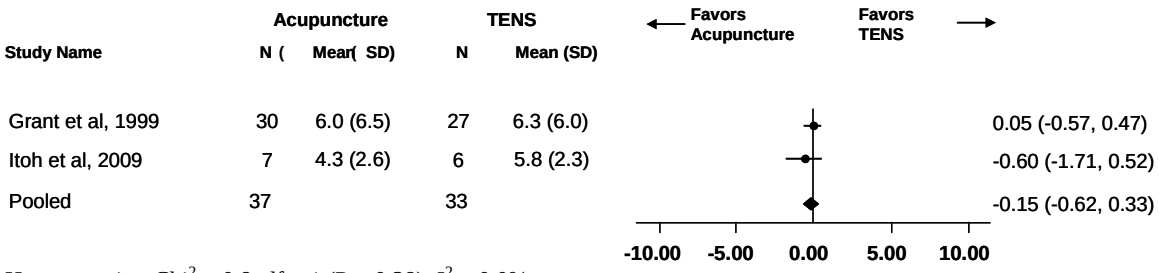
The meta-analyses results from two trials in elderly (Figures 18-19) showed nonsignificant differences between acupuncture and TENS in reducing immediate (pooled mean difference in VAS score: 0.42, 95 percent CI: -3.24, 4.07)[53,216] or short-term (pooled mean difference in VAS score: -0.15, 95 percent CI: -0.62, 0.33)[53,216] post-treatment pain intensity.

Figure 18. Pain intensity (VAS score) – Immediate post-treatment



Heterogeneity: $Chi^2 = 3.8$, df = 1 (P = 0.05); $I^2 = 74.0\%$

Figure 19. Pain intensity (VAS score) – Short-term post-treatment



Heterogeneity: $Chi^2 = 0.8$, df = 1 (P = 0.38); $I^2 = 0.0\%$

In one trial,[29] the post-treatment RMDQ scores did not differ between acupuncture and 'self-care' groups immediately (7.9 versus 8.8, p = 0.75) and also 1 year after the treatment (8.0 versus 6.4, p = 0.10). Another trial,[216] demonstrated statistically significantly greater immediate post-treatment improvements for subjects treated with combination of acupuncture and TENS compared to those treated with acupuncture alone with respect to pain intensity (VAS: 36.6 ± 8.0 versus 37.4 ± 26.0, p < 0.008) and disability (RMDQ: 3.8 ± 0.8 versus 5.4 ± 3.4).

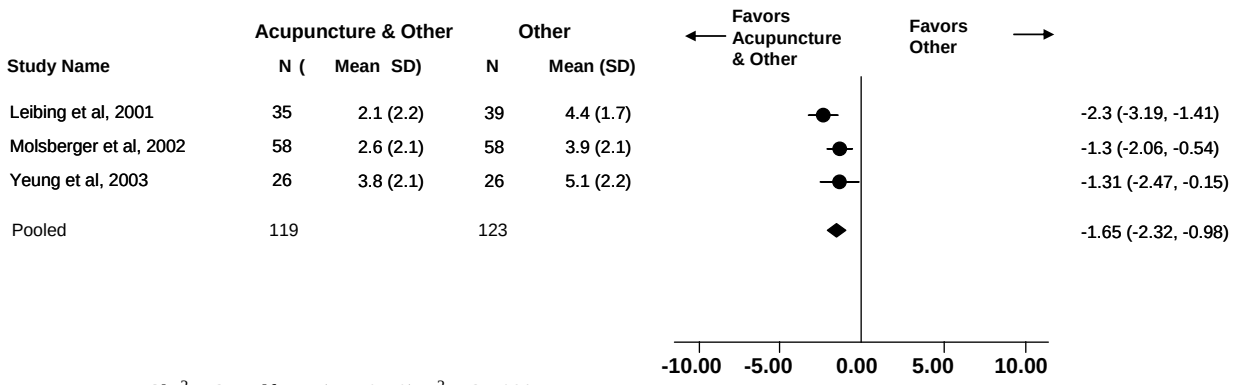
In two trials, subjects in electro-acupuncture groups had significantly lower post-treatment pain intensity scores (VAS, Numerical Rating Scale of Pain-NPRS)[88,155] or increased trunk strength extension[88] compared with subjects who received TENS[88] or exercise sessions.[155]

Acupuncture + other treatment versus other treatment. There were five trials,[99,198,200,216,226] in which both acupuncture and control (i.e., no treatment) groups were given either orthopaedic treatment,[99] usual care (e.g., NSAIDs, muscle relaxants, Paracetamol, and back exercises),[226] TENS,[216] exercise,[200]or physiotherapy (method use was aimed to remove a muscle imbalance using the Bruegger-concept and special training of proper posture and motion)[198] The addition of acupuncture to the above-mentioned therapies resulted in significant improvements in pain intensity (VAS mean scores) and disability (Pain Disability Index, Modified Roland Disability Score) compared to the control treatments (i.e., orthopaedic, usual care, or physiotherapy alone), immediately [99,198,226] or short-term[99] after the end of treatment. In one of the trials,[226] the patterns of pain medication use did not differ significantly between the acupuncture and control groups (p = 0.07).

In one trial,[200] subjects receiving a combination of electro-acupuncture and exercise had significantly improved pain intensity (NRS scores), disability (Aberdeen Low Back Pain scale), and spinal angular ROM (flexion and extension) compared with subjects receiving exercise alone at 3 months post-treatment. The use of analgesics was similar across the two groups (p = 0.385).[200]

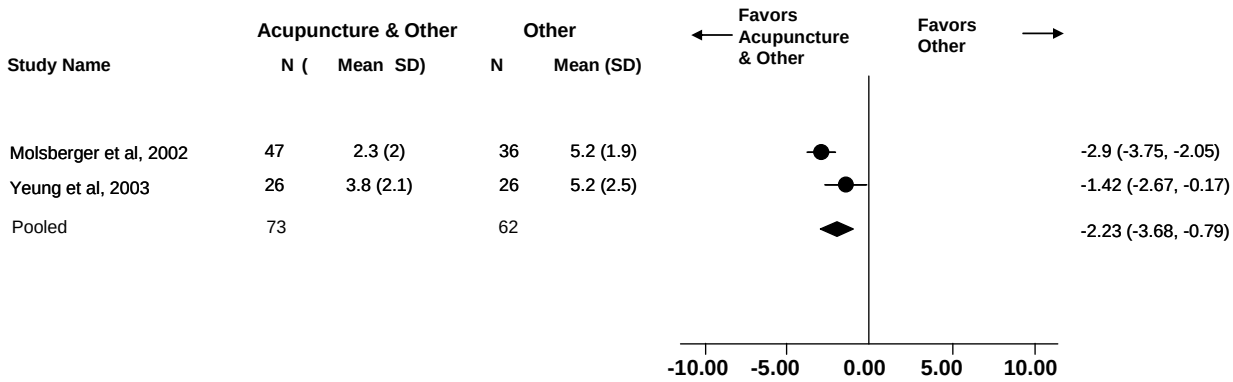
In three meta-analyses (Figures 20-22) statistically significant differences in favor of combination of acupuncture with other treatment over other treatment were shown in the reduction of pain intensity immediately (pooled mean difference in VAS score: -1.65, 95 percent CI: -2.32, -0.98),[99,198,200] short-term (pooled mean difference in VAS score: -2.23, 95 percent CI: -3.68, -0.79), [99,200] and intermediate-term (pooled mean difference in VAS score: -1.55, 95 percent CI: -2.29, -0.81)[198,200] after the end of treatment. In one meta-analysis based on two studies in elderly (Figure 23), there was no statistical significant difference in short-term post-treatment disability between the two intervention groups (pooled mean difference in RMDQ score: -3.15, 95 percent CI: -7.16, 0.87).[216,226]

Figure 20. Pain intensity (VAS score) – Immediate post-treatment



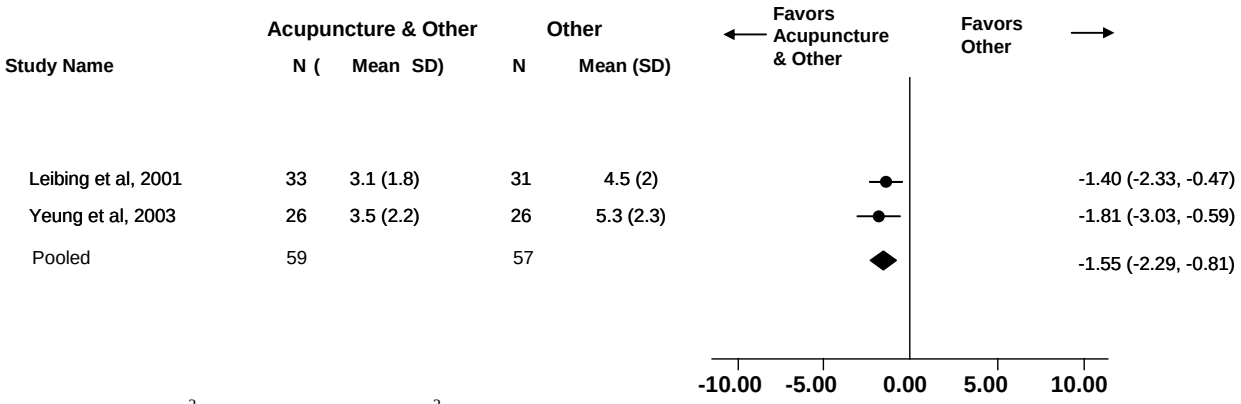
Heterogeneity: $Chi^2 = 3.2$, df = 2 (P = 0.20); $I^2 = 37.0\%$

Figure 21. Pain intensity (VAS score) – Short-term post-treatment



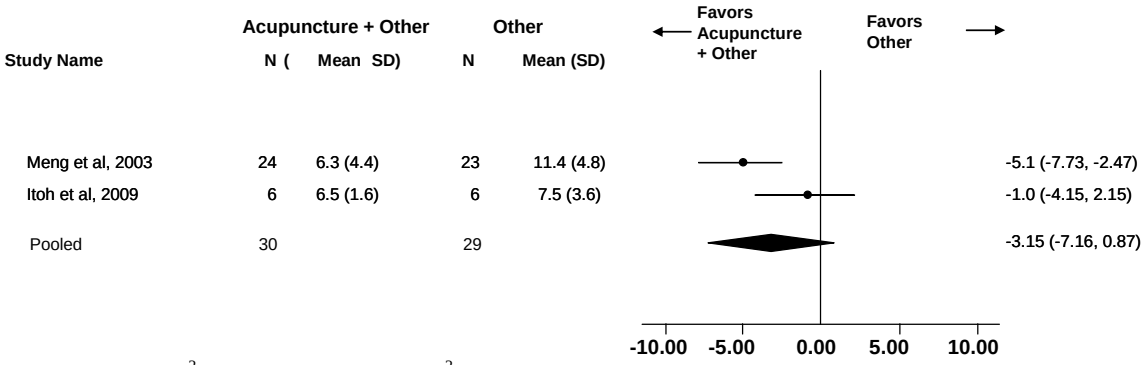
Heterogeneity: $Chi^2 = 3.7$, df = 1 (P = 0.05); $I^2 = 72.8\%$

Figure 22. Pain intensity (VAS score) – Intermediate-term post-treatment



Heterogeneity: $Chi^2 = 0.3$, df = 1 (P = 0.6); $I^2 = 0.0\%$

Figure 23. Disability (RMDQ score) – Short-term post-treatment



Heterogeneity: $Chi^2 = 3.8$, df = 1 (P = 0.05); $I^2 = 73.9\%$

Acupuncture (type 1) versus acupuncture (type 2). In one trial,[225] two modalities of needle insertion levels (muscle and overlying skin) were compared to electrical twitch-obtaining intramuscular stimulation (ETOIMS). Two weeks post-treatment, subjects in ETOIMS group had significantly lower mean VAS score (3.7 ± 1.9) compared with those in subjects in the two other groups of muscle and skin stimulation (4.2 ± 1.9 and 4.3 ± 2.3, respectively).

In two trials,[136,204] different weekly frequencies of acupuncture were compared (high - five times versus low – twice). In one of these trials,[136] post-treatment pain intensity (VAS scores) and degree of disability (RMDQ scores) were similar in groups of subjects randomized to high frequency (1 year VAS score: 1.41, 95 percent CI: 0.58, 2.24; 1 year RMDQ score: 13.10, 95 percent CI: 10.10, 16.11) versus low frequency (1 year VAS score: 1.35, 95 percent CI: 0.52, 2.18; 1 year RMDQ score: 12.33, 95 percent CI: 10.35, 14.31) at all points of post-treatment followup (5 weeks, 3 months, and 1 year).

The immediate and delayed acupuncture treatments were compared in three trials showing subjects to have similar post-treatment pain intensity (VAS score)[22,24,227] or quality of life (SF-36: physical and mental components).[24]

In one trial,[217] two groups of subjects receiving trigger point acupuncture versus tender point acupuncture were compared with respect to pain intensity (VAS) and disability (RMDQ)

immediately after the treatment, showing significant improvements for both endpoints in the trigger point group compared to the tender point group.

In another trial,[155] subjects in the electro-acupuncture and electrical heat acupuncture groups had similar pain intensity (NPRS: 2.43 ± 1.87 versus 2.27 ± 2.15, $p > 0.05$) and disability degree (RMDQ: 5.93 ± 3.79 versus 8.00 ± 5.66, $p > 0.05$).

In one trial,[174] patients with chronic LBP responded better to electroacupuncture at local points than to acupuncture at local point in addition to weizhong point (curative effect rate: 96.1 percent versus 88.7 percent, $P < 0.05$) at similar needle retention duration (30 minutes).

Population with mixed duration of pain. A total of 44 trials with subjects having LBP of mixed duration were included in this section.[110,121,134,138,146-151,153,154,157,158,161,164-166,170-173,175,177-185,187-195,209] The majority of these trials (39 studies) enrolled subjects with LBP due to specific causes (e.g., sciatica, disc protrusion, myofascial pain syndrome, lumbar transverse process syndrome, and spondylosis).[134,138,146-151,154,157-159,161,164-166,170-173,177-185,187-195,232] Only five trials studied subjects with nonspecific LBP.[110,121,153,175,209]

Subjects with specific pain.

Acupuncture versus placebo. No relevant studies were identified.

Acupuncture versus other treatment. In one trial, the use of electro-acupuncture was more effective in reducing pain and increasing range of motion (straight leg raising) than manual therapy (manipulation or mobilization) or oral medication,[164] In two other trials, the combinations of warming needle and moxibustion produced significantly better results than acupuncture alone.[146,181]

Acupuncture (type 1) versus acupuncture (type 2). There were 23 trials conducted predominantly in Chinese subjects with lumbar intervertebral disc protrusion,[148-151,154,157,165,166,170,171,177-179,181-184,187,189,190,194,195] and myofascial pain,[147]which compared routine acupuncture (or electro-acupuncture) alone or in combination with other treatments (e.g., cupping, moxibustion, massage, traction, laser knife, hypodermic catgut embedding therapy, polarized light) to acupuncture of different modalities (e.g., abdomen-/body-acupuncture, round sharp/filiform needle, point-through-point, superficial needling, deep puncture), or needle-knife. Outcomes used in these studies were curative effect (definition varied across trials), VAS for pain intensity,[154,157,165,166,195] and well being.[170,171,177,178,182,184,187,189,190,194,195]

In four trials,[149,165,178,183] deep or point-through-point needling produced significantly greater therapeutic effect (i.e., being free of pain symptoms) compared with conventional acupuncture. The use of round sharp needle,[194] contralateral needle,[171] or along channel needle[148] produced better therapeutic effect than conventional acupuncture. In two trials,[179,187] abdominal acupuncture showed a significantly better effect compared with body acupuncture. Electro-acupuncture was worse than hypodermic catgut as shown in one study.[182]

Acupuncture versus other treatments. No relevant studies were identified.

Acupuncture versus medication. Elongated needling acupuncture,[134] warming needle acupuncture,[146] and electro-acupuncture[138] were reported to result in better curative effects than that of medication for patients with disc herniation. The medication used in these trials included oral Fenbid, Mobic, and Nimeisulide. For example the clinical cure rate for one study was 56.67 percent in acupuncture versus 26.67 percent in oral medication group.[146] Similarly acupuncture at Gentong ankle points,[154] or huaisanzhen point,[195] was better than intramuscular injection of Aspirin-DL-lysine + saline,[154] or Bilinfen (0.9g) + physiological saline (2 ml)[195] shown by higher curative effects. In one trial,[138] the application of electro-acupuncture, compared to 7.5 mg/d mobic, significantly improved LBP pain, walking ability, raising straight leg, or muscle strength.

Acupuncture + other treatments versus the same other treatments. In two trials, scalp acupuncture in addition to traction[193] or massage[185] was shown to be more effective than traction or massage alone immediately after treatment. For example, in one study, [193] the rates of clinically cured subjects in the combination and single treatment groups were 21.4 percent (acupuncture + traction) and 13.5 percent (traction alone), respectively.

The combination of acupuncture and traction,[158] or manual therapy[161,172,185] had a significantly better analgesic effect compared to traction or manual therapy alone in patients with disc herniation.[158,161,172,185] In one of these studies, mean post-treatment VAS scores were statistically significantly different: 1.91 ± 0.93 (acupuncture + traction) versus 3.58 ± 1.52 (traction alone).[158]

Similarly, abdominal acupuncture in addition to body acupuncture and traction was also found to be more effective than body acupuncture or traction alone in patients with disc herniation (effective rate: 96.88 percent versus 89.29 percent, $P < 0.05$).[180]

In several other trials, acupuncture (or electro-acupuncture) in combination with another therapy (e.g., moxibustion, laser knife, massage) was shown to be more beneficial than acupuncture, laser knife, traction, or massage alone.[150,158,172,177,193]

Subjects with nonspecific pain.

Acupuncture versus placebo .No relevant studies were identified.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture versus usual care. In one trial,[110,112] a long-term post-treatment SF-36 bodily pain score was significantly improved in acupuncture group versus usual care group (mean between-group difference: 8.0, 95 percent CI: 2.8, 13.2). There were statistically nonsignificant differences in favor of acupuncture for disability (Oswestry score: -3.4, 95 percent CI: -7.8, 1.0) and pain intensity (MPQ: -0.2, 95 percent CI: -0.6, 0.1). There were no significant differences between the acupuncture and usual care groups in the long-term post-treatment mean hospital stay (days), general practitioner visits (3.78 ± 3.36 versus 4.26 ± 4.74), and outpatient visits (0.50 ± 1.62 versus 0.41 ± 1.95).[112]

Acupuncture (type 1) versus acupuncture (type 2). In one trial,[153] O^3 acupoint injection had a significantly greater therapeutic effect compared to electro-acupuncture.

Acupuncture versus other treatments. In two trials, the effect of electro-acupuncture was compared to that of TENS[121,209] for LBP treatment. In the first trial,[209] electro-acupuncture and TENS did not significantly differ in pain relief. However, in the other trial,[121] electro-acupuncture was associated with a significantly lower pain intensity (VAS scores) compared to TENS (mean between-group VAS score difference: 21, 95 percent CI: 4.12, 37,95).

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus the same other treatments. No relevant studies were identified.

Population with unknown duration of pain. Nine trials were included in this sub-section.[49,145,176,186,199,210,215,218,219] Six trials were restricted to subjects with nonspecific LBP[49,145,199,210,215,218] and three trials enrolled patients with low back pain due to specific causes (sciatica, lumbar vertebrae hyperplasia, intervertebral disk herniation).[176,186,219]

Subjects with specific pain.

Acupuncture versus placebo. No relevant studies were identified.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture versus another type/method of the same CAM. No relevant studies were identified.

Acupuncture versus other treatments. In one trial,[186] the rate of cure (i.e., pain was absent) was significantly greater in electro-acupuncture (52.0 percent) versus medication group (42.0 percent). In another trial,[176] the rate of cure (i.e., absence of pain) was significantly better in the electro-acupuncture versus TENS (80.0 percent versus 44.9 percent, $p < 0.005$).

Acupuncture versus medication. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). One trial,[219] showed that subjects who received acupuncture at Kuesu point had immediate greater decrease in pain intensity score (PRS) than those who received acupuncture at nonKuesu point (PRS score: 5.30 versus 2.40, $p = 0.003$) and improvement in ROM extension (73.0 percent versus 40.0 percent). In one trial,[186] the rate of cure (i.e., pain was absent) was significantly greater in electro-acupuncture (52.0 percent) versus acupuncture (40.0 percent).

Subjects with nonspecific pain.

Acupuncture versus placebo. In one trial, there were no significant differences in the proportions of subjects with improved pain (not specified) between the acupuncture versus placebo (sham-acupuncture).[145] Either real needling[210] or total body acupuncture [218] was superior to sham needling in reducing LBP pain intensity immediately post treatment. For example, in one study,[210] the mean pain intensity (VAS score) was 37.3 in acupuncture group and 64.1 in the placebo group.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). In two trials[199,215] different methods of acupuncture were compared. In one trial,[199] insertion of needles within the affected segment near typical acu-points showed to have better analgesic effect than insertion of the needles within the affected segment but far away from the acu-points (mean VAS score: 41.0 versus 83.0) In the other trial,[215] needle retention for about 10 minutes was more effective than the removal immediately after the insertion.

Acupuncture versus other treatments. In one trial, there was no significant difference in the proportion of subjects with improved pain between subjects in dry needling acupuncture (61 percent improved) and subjects in acupressure + vapocoolant spray group (66 percent).[49]

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus the same other treatments. In one trial,[49] there was no significant difference in the proportion of subjects with improved pain between the dry needling acupuncture + Lidocaine injection (40 percent) and Lidocaine injection alone (45 percent) groups immediately after the end of treatment. In this trial, although the rate of pain improvement was numerically in favor of acupuncture (dry needling, or trigger point injection) compared to Lidocaine, the observed differences did not reach the statistical significance (61.0 percent versus 40.0 percent-45.0 percent, $p > 0.05$).

2 - Acupuncture for Treatment of Neck Pain

This section included 52 trials. Results of 10 trials were reported in multiple publications (Table 3).

Population/trial characteristics. The trials were conducted in Australia (three)[51,140,234], Austria (two)[17,235], Brazil (one)[126], South Korea (one)[46], China (20)[229,236-254], Germany (four)[77,80,106,131], Italy (one)[255], Japan (two)[256,257], Korea (one)[45], New Zealand (one)[258], Spain (one)[259], Sweden (two)[260,261], Switzerland (one)[47], Taiwan (one)[262], Turkey (one)[263], United Kingdom (four)[128,264-266], and United States (six).[267-272]

Most trials included adults whose age ranged from 18 to 60 years. One study recruited elderly adults only (60 years of age or older).[45]

The proportion of women was greater in 23 studies[45,77,80,106,126,128,131,140,235,240,241,245,255-257,259,264-269,272], similar to that of men in 13 studies,[51,229,234,236-239,242,244,247,249,251,252] smaller to that of men in two studies,[258,270] and not reported in 10 studies.[17,47,248,250,253,254,260-262,271] One study included only women.[263]

Racial composition of the study population was not reported in the majority of trials.

In total 8,515 participants with neck pain were randomized to acupuncture or control groups. Sample size for these trials ranged from 13[258] to 3,451 participants.[131]

Acupuncture alone (various methods of needling techniques) was used in 47 studies.[45-47,51,77,79,80,106,126,128,140,229,234-246,248-263,265,266,268,269,271,272] Acupuncture was used in combination with other intervention in the experimental arm in seven studies.[17,46,131,247,264,267,270] The control treatment for these trials was the same treatment included in the acupuncture arm (i.e. experimental treatment). Table 8 presents the control interventions in the included studies.

Table 8. Acupuncture for treatment of neck pain- Control interventions

Type of control group	Cause of Pain	N studies	Detail of Control intervention
Placebo/sham	**Non Specific**	**8**	**Non penetrating needling at [47,256,257] sham TENS at [128], TENS (not at acu or not specified),[258,259,266] needling at nonacu points[47]**
	Specific	**8**	**Laser pen,[17,77,80,106,263] needling at nonacu-points,[234,248] superficial needling at [260,261]**
No-treatment/ waiting list	**Non Specific**	**0**	**NA**
	Specific	**1**	**No treatment[264]**
2- Active Controls			
Exercise/physical activity	**Non Specific**	**0**	**NA**
	Specific	**0**	**NA**
Cervical Collar (specific pain: whiplash injury)	**Non Specific**	**1**	**Collar and analgesics[17]**
	Specific	**0**	**NA**
Usual care	**Non Specific**	**2**	**Medication, massage, recommended exercise,[267] conventional treatment as needed,[131]**
	Specific	**1**	**Cervical collar, medication (Chlormezanon, Paracetamol) with or without laser[17]**
Physiotherapy	**Nonspecific**	**1**	**standard localized mobilization techniques, most commonly Maitland (rotation, postero-anterior oscillatory movement and longitudinal traction)[265]**
	Specific	**0**	**NA**

Traction	**Nonspecific**	**0**	**NA**
	Specific	**2**	**Traction alone[229]; traction and massage,[252]**
Physical modalities	**Nonspecific**	**3**	**TENS bilaterally (no details provided),[272] Low level laser therapy (7, and -30 mW) on [106] laser acupuncture at classical [47]**
	Specific	**1**	**Laser at trigger points of upper trapezius muscle,[263]**
Manual therapy	**Nonspecific**	**1**	**Traction and massage[252]**
	Specific	**4**	**Spinal manipulation[51,140,244], massage, [245]**
Medication	**Nonspecific**	**2**	**Rofecoxib/Vioxx followed by Paracetamol/Acetaminophen,[51] Tenoxican and Ranitidine, [140]**
	Specific	**4**	**Lidocaine alone or in combination with Decadron,[45,126] NSAIDs,[268], Diazepam[260]**
Other methods of acupuncture	**Nonspecific**	**3**	**Superficial vs. trigger point, [256], needling along vs. across muscle fibers,[240], with/out electrical stimulation,[46,235]**
	Specific	**24**	**Alternative techniques on acu-point needling (Shu)[236] Acu with thrusting, or twirling manipulation,[80,237] auricular needling at alternative oto-points,[238] long vs. short duration needle retention,[239] trigger point injection with Lidocaine, [262] , alternative ,[46,241,242,253,254,268,269,271] addition of auricular acu,[255], acu with/out electrical stimulation,[243,261,271] Moxibustion in addition to electro-acupuncture,[245,251], alternative needling method,[249,250,252-254]**
Other active treatment (also in acupuncture group)	**Nonspecific**	**3**	**Conventional care by GP,[131,270] medication, massage, recommended exercise [267]**
	Specific	**6**	**Stretching exercise,[264] usual care,[270] spinal manipulation,[244] cervical collar, medication and medication[17] manual therapy[247] massage[246]**
Acupuncture in combination with another treatment (vs. acupuncture alone)	**Nonspecific**	**0**	**NA**
	Specific	**3**	**Spinal manipulation,[244] cervical collar and medication,[17] spinal manipulation + massage, [247]**

Acu=acupuncture; EMG=electromyography; GP=general practitioner care; NA= not applicable; NSAIDs= nonsteroid antiinflammatory drugs; TENS=transcutaneous electrical nerve stimulation

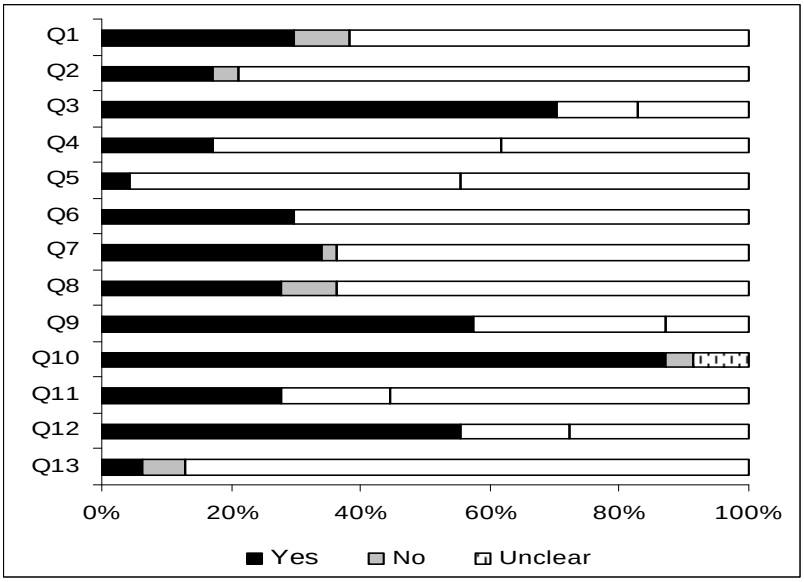
The number of treatments in Chinese studies varied from one to three courses, each course ranging 5-15 days in duration. The frequency of treatments in the majority of studies was once a day consecutively for the duration of the study course. The number of treatments ranged from < 10 sessions,[234,237,247] 10-20 sessions,[241-243] up to 21-45 sessions.[229,236,239,245,246,250,253] Two of the Chinese studies did not report the frequency or number of treatments.[254,273]

The frequency of treatment in the remaining studies reporting this information was a single treatment,[80,238,240,248,260-262] one to two sessions per week (up to 12 treatments in total),[79,131,235,244,255-257,263,265,267] two sessions per week (up to 18 treatments in total),[47,51,77,106,128,140,249,258,259,266,268,272] three sessions per week (up to nine treatments in total),[45,46,271] and four sessions per week (> 24 treatments in total).[270]

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 24. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for about 26.0 percent and 15.0 percent of the trials, respectively. In 62.0 percent of the trials, the subjects' baseline characteristics distribution across the treatment arms was similar (i.e., balanced). For at least 15.0 percent of the trials, it was

unclear whether or not the subjects and assessors were blinded to the type of treatment. That subjects were blinded was reported for only 62.0 percent of the trials. Half of the trials reported acceptable drop-out rates (i.e., < 20.0 percent).[9] Results based on intention-to-treat analysis were explicitly reported for 25.0 percent of the trials. The data for selected items of the risk of bias tool across the CAM interventions (acupuncture; spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.2 of Appendix G.

Figure 24. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in Table 9. For further detail of the trials please see the evidence tables.(Appendix C, table 2.1 – table 2.8)

Table 9 – Key results – Acupuncture treatment in patient with neck pain & cervicogenic headaches

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Acu vs. No Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic/Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	SF-MPQ: B [264]	M	-	NA	Direct	= S-NS	Low
			PPT: B [264]	M	-	NA	Indirect	= S-NS	Low
			SF-MPQ: C [264]	M	-	NA	Direct	> SS	Low
			PPT: C [264]	M	-	NA	Indirect	= S-NS	Low
		NS	-	-	-	-	-	-	Insufficient
Acu vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS: B	M	Precise (2)£ [80,234]	Yes	Direct	= S-NS	Moderate
		NS	VAS: B	M	Precise (3) [256,257,266]	No	Direct	= S-NS	Low
	Mixed	S	VAS: B [263]	H	-	NA	Direct	= S-NS	Low
			NHP: B, D [263]	H	-	NA	Direct	= S-NS	Low
			Use of analgesics (mean N of pills per day): B, D [263]	H	-	NA	Direct	= S-NS	Low
			ROM (flx, rot): B, D [263]	H	-	NA	Indirect	= S-NS	Low
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	% pts without symptoms: B [248]	H	-	NA	Direct	> SS	Low
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Med	Acute/sub-	S	-	-	-	-	-	-	Insufficient

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
	acute	NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS: B [45,126,268]	H	-	No	Direct	=>	Low
		NS	VAS: B [51,260]	H	-	Yes	Direct	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	VAS: C [249,262]	H	-	Yes	Direct	> SS	Low
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Mob	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, D [265]	M	-	NA	Direct	= S-NS	Low
			NPQ: B, D [265]	M	-	NA	Direct	= S-NS	Low
			GHQ: B, D [265]	M	-	NA	Direct	= S-NS	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. ST	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	NPQ: B [267]	M	-	NA	Direct	= S-NS	Low
			% pts using medication: B [267]	M	-	NA	Direct	> SS	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Man	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS-C [244]	H	-	NA	Direct	= S-NS	Low
		NS	VAS: C [51,140]	H	-	Yes	Direct	>< (NR)	Low

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			VAS: D [51,52]	H	-	NA	Direct	= (NR)	Low
			Oswestry: C, D [51,140]	H	-	Yes	Direct	< (NR)	Low
			NDI: C, D [51,140]	H	-	Yes	Direct	< (NR)	Low
			SF-36: C, D [51]	H	-	NA	Direct	< (NR)	Low
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Ma	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	ROM (flx, ext, rotation): C [77]	H	-	NA	Indirect	= S-NS	Low
			VAS: C [77]	H	-	NA	Direct	> SS	Low
		NS	-	-	-	-	-	-	Insufficient
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. Laser Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C [47,106]	L	-	-	Direct	= S-NS	Moderate
			ROM: C [47,106]	L	-	-	Indirect	= S-NS	Low
	Mixed	S	VAS: B [263]	H	-	NA	Direct	< SS	Low
			ROM: B [263]	H	-	NA	Indirect	< SS	Low
			NHP: B [263]	H	-	NA	Direct	< SS	Low
			Use of analgesics (mean N of pills per day): B [263]	H	-	NA	Direct	< SS	Low

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			VAS: D [263]	H	-	NA	Direct	= S-NS	Low
			ROM: D [263]	H	-	NA	Indirect	= S-NS	Low
			NHP: D [263]	H	-	NA	Direct	= S-NS	Low
			Use of analgesics (mean N of pills per day): D [263]	H	-	NA	Direct	= S-NS	Low
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Acu vs. E-acu	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS: B [261]	H	-	NA	Direct	= S-NS	Low
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	% pts who improved: B [243]	H	-	NA	Direct	< SS	Low
			Time to effect (days): B [243]	H	-	NA	Direct	< SS	Low
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Headache									
Acu vs. TrP Injection	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS: B [126]	H	-	NA	Direct	= S-NS	Low
			N of analgesics ingested weekly: C [126]	H	-	NA	Direct	= S-NS	Low
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient

Acupuncture therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
		NS	-	-	-	-	-	-	Insufficient
Acu vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo; Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; GHQ=general health questionnaire; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable

[Ψ] Grade (High, moderate, low, and insufficient)
[£] Number of pooled trials

B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium

- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

Population with acute/subacute pain. This sub-section included only one trial conducted in subjects with specific neck pain (whiplash injuries).

Subjects with specific pain.

Acupuncture versus placebo. One trial[17] evaluated the effects of acupuncture, laser acupuncture, and no treatment randomly given to patients with acute whiplash injuries. In all three groups, patients additionally received the combination of cervical collar and medication (450 mg Paracetamol and 100 mg Chlormezanon in a dose of three tablets a day). Patients who received acupuncture experienced numerically greater improvements in cervical ROM, shortened duration of acute pain and sick leave as compared to those in the other two treatment groups.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture versus another type/method of the same CAM. No relevant studies were identified.

Acupuncture versus other treatments. No relevant studies were identified.

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Acupuncture versus placebo. No relevant studies were identified.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture versus another type/method of the same CAM. No relevant studies were identified.

Acupuncture versus other treatments. No relevant studies were identified.

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus the same other treatments. No relevant studies were identified.

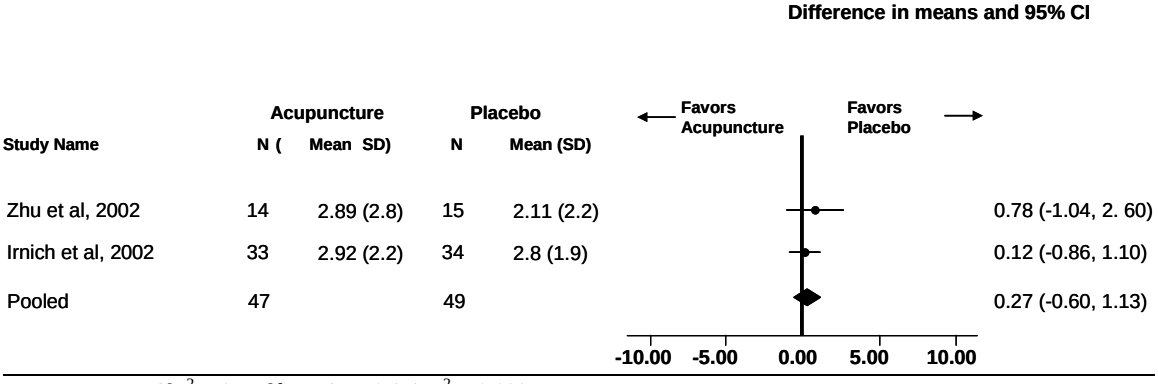
Population with chronic pain. A total of 31 trials evaluated the efficacy and/or harms of acupuncture in patients with chronic neck pain.[45-47,51,77,80,106,126,128,131,140,234,235,241,244,251,254-261,265-268,270-272] Of these, 13 trials included patients with specific neck pain (e.g., myofascial pain syndrome, spinal canal stenosis, cervical disc disease)[45,46,77,80,126,234,241,244,251,254,255,268,271] and the remaining 18 trials included patients with nonspecific neck pain.[47,51,106,128,131,140,235,256-261,265-267,270,272]

Subjects with specific pain.

Acupuncture versus placebo. In three trials, acupuncture[77,234] or dry needling[80] were similar to sham acupuncture[234] or laser acupuncture[77,80]) for immediate/short-term post-treatment pain intensity (VAS, PPT),[77,80,234] disability (NDI),[234] and cervical ROM[77,80,234] in patients with disc space narrowing/joint arthritis[234] or myofascial pain syndrome.[77,80] For example, in one of these trials,[80] post-treatment mean VAS values in dry needling and sham laser acupuncture groups were 29.2 (± 21.9) and 28.0 (± 19.4), respectively. The corresponding mean ROM values were 48.1 (± 7.0) versus 47.4 (± 7.1).[80] In the same trial,[80] distant acupuncture led to significantly lower pain intensity on VAS compared to sham (19.1 ± 16.1 versus 28.0 ± 19.4). No formal statistical test results for between-group comparisons were reported (e.g., p-value, 95 percent confidence interval).[80]

Results of one meta-analysis indicated no significant difference between acupuncture and placebo in the reduction of pain intensity, immediately after the end of treatment (pooled mean difference in VAS score: 0.27, 95 percent CI: -0.60, 1.13)[80,234] (Figure 25).

Figure 25. **Pain intensity (VAS Score) – Immediate post-treatment**



Heterogeneity: $Chi^2 = 0.4$, df = 1 (P = 0.81); $I^2 = 0.0\%$

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). In seven trials,[46,80,241,251,254,268,271] different modes of acupuncture were evaluated. These included electro-acupuncture local points,[271] electro-acupuncture remote points,[271] intramuscular stimulation (IMS)-acupuncture,[46] turtle probing needling,[241] local dry needling,[80] acu-point sticking therapy,[254] and relevant versus irrelevant points.[268]

In one trial,[271] the use of electro–acupuncture (a local percutaneous electrical nerve stimulation) at local points was superior to acupuncture alone or electro–acupuncture at remote points in patients with cervical disc disease. The immediate post-treatment percent change on VAS for acupuncture versus local electro-acupuncture was 9.0 percent versus 38.0 percent; and the percent decrease in need for analgesics across these groups was 6.0 percent versus 37.0 percent. In another trial,[80] distant acupuncture led to a significantly lower pain intensity on VAS (19.1 ± 16.1) compared with dry needling (29.2 ± 21.9) in patients with myofascial pain syndrome. There was a slight benefit of using Japanese acupuncture over irrelevant acupuncture (i.e., targeting nonspecific points) in immediate-/short-term post-treatment levels of pain intensity (SF-MPQ) in patients with myofascial pain syndrome ($p < 0.05$).[268] In one trial,[254] acupoint sticking therapy produced a greater effect rate (percentage of patients with no symptoms, able to work, without relapse) compared to standard acupuncture (93.5 percent versus 72.4 percent, $p < 0.05$). In one trial, standard acupuncture did not differ from turtle-probing needling in producing immediate post-treatment analgesic effect (VAS pain post treatment mean 34.0 versus 36.0).[241] Similarly, addition of IMS to dry needling in patient with myofascial pain syndrome did not have a significant effect on relieving pain when compared to dry needling alone (mean VAS post treatment: 4.54 ± 1.82 versus 4.69 ± 2.05).[46] In one trail, there was either numerically or statistically significant greater benefit for the combination of acupuncture + Moxibustion, compared to acupuncture alone in improving immediate/short-term post-treatment pain intensity (NRS, VAS, FACES, PPT).[251]

Acupuncture versus other treatments. In two trials acupuncture was compared either to massage[77]or spinal manipulation.[244] In the first trial,[77] which enrolled 177 patients with whiplash injuries and myofascial pain syndrome, acupuncture was shown to produce statistically significantly greater reduction in pain intensity (VAS score scale: 0-100) compared to massage in a short-term post-treatment period (mean change in VAS score from baseline: 24.22 versus 7.89, $p = 0.005$). The difference in efficacy with respect to pain intensity between acupuncture and massage was more pronounced in patients with myofascial pain syndrome or those with longer duration of disease (> 5 years). Although short-term post-treatment cervical ROM

(flexion, extension, and rotation) in the acupuncture group was significantly greater than that in the massage group (mean degrees: 19.8 ± 38.0 versus 5.1 ± 22.2, p = 0.031), this difference between the two groups decreased at a later followup (mean ± SD: 8.9 ± 30.1 versus 5.5 ± 37.2, p = 0.81). No significant between-group difference was noted for PPT at any followup point.[77] The combination of warm acupuncture and spinal manipulation had a better analgesic effect than acupuncture or spinal manipulation alone, in patients with neck pain due to spinal stenosis (mean VAS at short-term followup: 2.36 ± 2.8 versus 4.46 ± 3.11 versus 4.43 ± 2.51).[244]

Acupuncture versus medication. Three trials [45,126,268] compared acupuncture to medications or medical injections. In two trials,[45,126] subjects with myofascial pain syndrome and headache [126] or chronic neck pain with headache [45] treated with acupuncture did not differ from those treated with injection of Lidocaine,[45,126] Lidocaine plus corticoid,[126] or Botulinum toxin[126] for short-term post-treatment improvements in pain (Symptom Severity Index, VAS, Wong-Baker FACES pain scale)[45,126] or cervical ROM (flexion, extension, tilting, and rotation).[45] For example, in one of these trials,[45] 2 week post-treatment mean VAS values (scale: 0-10) for acupuncture and Lidocaine groups were 3.82 ± 2.47 and 3.46 ± 2.47, respectively (p > 0.05). The ROM flexion and extension values in the acupuncture group were 68.89 ± 11.19 and 67.72 ± 14.06, respectively. The corresponding ROM values in the Lidocaine injection group were 68.33 ± 14.78 and 65.00 ± 13.87. Although the number of ingested ibuprofen pills over 3 months numerically increased in all three intervention groups (needle, Lidocaine, Lidocaine plus corticoid, Botulinum toxin),[126] there was no significant between-group difference at any time during the study periods (12 weeks: 32.93 ± 61.17 versus 35.28 ± 45.20 versus 17.85 ± 25.80 versus 15.53 ± 21.93, respectively). In one trial,[268] relevant acupuncture was found to be modestly more effective than NSAIDs in reducing pain intensity (VAS, SF-MPQ) for myofascial pain syndrome.

Acupuncture + other treatments versus the same other treatments. Two trials,[244,255] compared the efficacy and/or harms of acupuncture alone to combination of acupuncture with other treatments. These treatments included acupuncture + traction manipulation, [244] and acupuncture + auriculotherapy.[255]

There was either numerically or statistically significant greater benefit for the combination of acupuncture with traction manipulation, compared to acupuncture alone in improving immediate/short-term post-treatment pain intensity (NRS, VAS, FACES, PPT).[244] In one trial,[255] amongst patients with myofascial pain syndrome, there was no statistically significant difference between short-/intermediate-term post-treatment effects of acupuncture alone versus acupuncture plus auricular acupuncture therapy on pain intensity (MPQ mean ± SD: 15.6 ± 11.4 versus 12.9 ± 13.9, p > 0.05; VAS pain mean ± SD: 18.9 ± 15.6 versus 21.0 ± 19.9, p > 0.05).

Subjects with nonspecific pain.

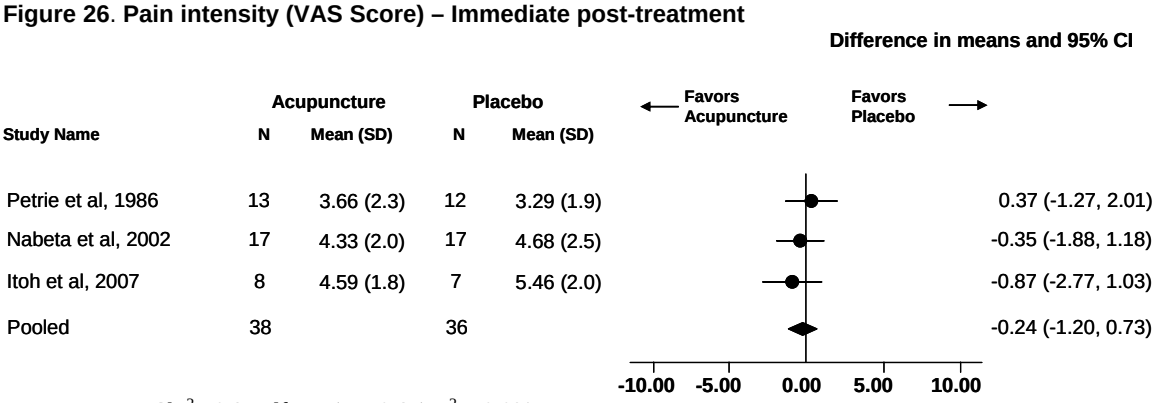
Acupuncture versus placebo. Standard acupuncture and placebo were compared in 10 trials,[47,106,128,256-261,266] of which six found no significant difference between the two treatments in reducing post-treatment (immediate, short, or intermediate) pain (VAS, PPT, MPQ),[47,256,257,260,261,266] or increasing cervical ROM.[266] In most these trials placebo was represented by sham-acupuncture,[47,256,257,260,261] and in one trial placebo was transcutaneous nerve stimulation (TENS).[266]

In contrast, in five trials,[106,128,258-260] acupuncture was significantly better than placebo in improving pain intensity (VAS, NPQ, five-point scale)[106,128,258-260] disability (NDI),[128] the proportion of patients not taking analgesic medication,[259] cervical mobility (active, passive; ROM),[106,259] or quality of life (SF-36 physical component).[128,259] The placebo treatments used in

these trials were sham TENS at acupuncture points[128], TENS (not at acu-points or not specified),[258,259] or placebo-Diazepam.[260]

The meta-analysis showed no significant difference between acupuncture and placebo (sham-acupuncture) in reduction of immediate post-treatment pain intensity (pooled mean difference in VAS score: -0.24, 95 percent CI: -1.20, 0.73)[256,257,266] (Figure 26). Trials comparing acupuncture to other types of placebos (e.g., TENS, drug)[128,258-260] could not be pooled due to heterogeneity across outcomes, followup periods, or missing data.

Figure 26. Pain intensity (VAS Score) – Immediate post-treatment



Heterogeneity: Chi^2 =0.97, df = 2 (P = 0.61); I^2 = 0.0%

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). In five trials, different modes of acupuncture were compared.[47,235,240,256,261] The following techniques were compared as follows: standard acupuncture versus trigger point acupuncture,[256] standard acupuncture versus electro-acupuncture,[235,261] classical acupuncture versus laser acupuncture,[47] needle insertion across the muscle fibers versus needle insertion along the muscle fibers.[240]

Authors of one trial[256] found standard acupuncture to be clinically less beneficial than trigger point acupuncture but similar to nontrigger acupuncture in decreasing pain intensity (VAS: 51.6 ± 22.0 versus 11.0 ± 9.3 versus 57.6 ± 18.0, respectively) and disability (NDI: 10.9 ± 6.6 versus 3.1 ± 3.2 versus 12.0 ± 4.5, respectively) immediately after treatment. In another trial,[235] the addition of electro-acupuncture produced significantly greater improvements in VAS scores compared to standard acupuncture alone immediately and short-term after the treatment ($p < 0.05$). In one trial, [47] laser acupuncture at classical acupuncture points and conventional needle acupuncture at classical acupuncture points did not differ in pain relief. There was no significant difference between standard acupuncture and nontraditional acupuncture (i.e., inconsistent with Chinese practice) as reported in this trial.[47] In one trial,[240] there were no significant differences between insertion of needles along the muscle fibers towards trigger points and insertion of needles across muscle fibers, in reducing motion related pain (mean VAS score), pain under pressure, or ROM. The standard acupuncture did not differ from electro-acupuncture in producing immediate post-treatment analgesic effect (VAS pain post-treatment mean ±SD: 1.8 ± 1.0 versus 1.4 ± 1.5, $p > 0.05$).in patients with cervical osteoarthritis.[261]

Acupuncture versus other treatments. Results from three trials indicated that there was no significant difference between standard acupuncture as compared to standard localized mobilization techniques,[265] or laser therapy (three separate doses),[47,106] in reducing immediate/short-term post-treatment pain intensity (VAS, PPT),[106,265] disability (NPQ),[265] cervical ROM (extension, flexion),[106,265] or improving general health (General Health

Questionnaire 28).[265] In one of two trials,[51,140] acupuncture was better than manipulation in reducing pain intensity (VAS score: percentage decrease) short-term after the end of 9 weeks treatment (50.0 percent versus 42.0 percent).[51] In the same trial,[51,52] intermediate-term followup results (3 months post-treatment) indicated numerically similar pain intensity in the acupuncture group compared with manipulation group (VAS median scores: 2.5 versus 2.8). This trial failed to report test results for between-group comparisons. In the other trial,[140] immediate post-treatment reduction in pain intensity (VAS: 33.0 percent) and neck disability (NDI score: 25.0 percent) was significantly greater in manipulation versus acupuncture group.

Acupuncture versus medication. Acupuncture and medication (e.g., NSAIDs, analgesics) were compared in three trials.[51,140,260]
In the first trial,[260] with a limited statistical power, there was no statistically significant difference in pain VAS scores immediately post-treatment between the acupuncture and Diazepam (orally, five mg) groups of subjects with osteoarthritis. The second trial[140] did not report between group differences in pain and disability scores. Calculation of median effect size suggested no difference in pain and disability at immediate post-treatment followup. The proportion of patients crossing over to another intervention was statistically significantly different ($p = 0.002$) across the three interventions: manipulation (22.2 percent), acupuncture (60.0 percent), and NSAIDs (62.0 percent).[140] In the third trial,[51] acupuncture group appeared to have a significantly improved neck pain (mean VAS scores) compared to medication group immediately post intervention. For example, mean VAS ± SD scores in the acupuncture and medication groups were 4.0 ± 4.4 and. 6.0 ± 4.4, respectively.[51] *Intermediate-term followup results (3 months post-treatment) from one of these trials* [51,52] showed numerically better pain intensity for acupuncture compared to medication (VAS median scores: 2.5 versus 4.7). This trial failed to report test results for between-group comparisons.

Acupuncture + other treatments versus the same other treatments. This sub-section included three trials.[131,267,270] In two trials,[131,267] acupuncture was added to either general practitioner care [267] or conventional care,[131] and in one trial,[270] acupuncture and waiting list control groups were compared.

In the first trial,[131] treatment with acupuncture added to routine – conventional care was shown to produce a significantly reduced pain intensity (VAS scores), disability (Neck Pain and Disability scale; NPAD), and physical functioning scores (SF-36) compared to treatment with routine care alone immediately after the end of treatment. The between-group differences for SF-36 (physical functioning: 1.3, 95 percent CI: 0.1, 2.5) and NPAD (2.9, 95 percent CI: 0.8, 4.9) were statistically significant at 3 months post-treatment. In the other trial,[267] acupuncture was added to general practice care and showed no difference in pain and disability (NPQ) compared to general practice care alone immediately post-treatment. The proportion of patients reporting the use of medication in the acupuncture group decreased from baseline to 3 months (from 40.0 percent to 11.1 percent) as opposed to the general practitioner group in which it did not change over the same period of time (from 43.0 percent to 42.0 percent). In the third trial,[270] there was no significant difference in the mean pain scores (3.6 versus 5.4) or mean number of pills taken per week (7.5 versus 8.7) between the combined acupuncture and other treatment alone at 12 weeks post-randomization.

Population with mixed duration of pain. A total of 14 trials evaluating the efficacy and/or harms of acupuncture in patients with neck pain of mixed duration were included in this section.[229,236-238,240,242,243,245-247,252,253,263,269] All except for one trial[240] enrolled patients with specific neck pain (e.g., spondylosis, spondylopathy, myofascial pain syndrome, whiplash

injuries). Please, see the results of two trials[246,247] in the Massage section, Mixed Duration Neck Pain sub-sections.

Subjects with specific pain.

Acupuncture versus placebo. In one trial,[263] 60 patients with myofascial pain syndrome had similar post-treatment pain intensity (VAS, PPT), cervical ROM, functional status (Nottingham Health Profile - pain scale), and the use of analgesics in the acupuncture versus placebo (laser pen) group and the observed differences were statistically nonsignificant at all followup time points.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). In six trials, acupuncture was compared to electro-acupuncture,[243] deep needling,[236] lifting-thrusting needling,[237] penetrative needling,[238] needle-knife,[242] or centro-square needling.[252] One additional trial compared most tender points and nonselective points.[269]

Two trials demonstrated that in patients with spondylopathy or spondylosis, the use of electro-acupuncture had significantly better therapeutic effect (percentage of the relative mean score change between baseline and post-treatment followup) compared to routine acupuncture.[243] Different modalities of acupuncture were compared in six Chinese trials.[236-238,242,252,269] The results indicated numerically or statistically significantly better therapeutic effects (defined differently across the trials as dichotomous outcome) of deep needling,[236] lifting-thrusting needling,[237] penetrative needling,[238] needle-knife,[242] or centro-square needling[252] compared with routine acupuncture (at Jiaji, Cuchi points). In one trial,[269] there was a greater proportion of patients with myofascial pain syndrome having pain relief (‘yes’ or ‘no’ answer) amongst those needled at most tender points as opposed to those needled at nonselective points.

Acupuncture versus other treatments. In three trials, acupuncture was compared to laser,[263] traction-massage,[252] or traction.[229] In the first trial,[263] patients immediately after being treated with laser therapy, had significantly improved pain intensity (VAS: 2.05 ± 1.43 versus 3.71 ± 2.33, $p < 0.05$; PPT: 3.99 ± 1.22 versus 2.51 ± 1.57, $p < 0.001$), cervical ROM (flexion: 64.16 ± 9.25 versus 59.67 ± 10.52, $p < 0.001$; extension: 81.95 ± 10.84 versus 72.86 ± 12.18, $p < 0.001$), and functional status (Nottingham Health Profile - pain scale: 13.51 ± 14.07 versus 33.86 ± 28.37, $p < 0.001$) compared to those treated with acupuncture. However, 5 months post-treatment, the observed between-group differences in the above mentioned outcomes got numerically diminished and were no longer statistically significant ($p > 0.05$). Although the use of analgesics immediately after the treatment was significantly lower in the laser therapy versus acupuncture group (0.85 ± 1.53 versus 3.62 ± 4.41, $p < 0.05$), 5 months later the use of analgesics between the two groups differed no more (1.41 ± 3.43 versus 2.53 ± 2.74, $p > 0.05$).[263] In the second trial,[252] acupuncture was shown to have a greater effect on well being (no numerical data reported) compared to traction-massage in patients with spondylosis. In one trial,[229] it was demonstrated that in patients with spondylopathy or spondylosis, the use of electro-acupuncture had significantly better therapeutic effect (percentage of the relative mean score change between baseline and post-treatment followup) compared to traction.

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus other treatments. In one small Chinese trial,[245] the combination of electro-acupuncture and acupuncture did not differ from electro-acupuncture alone in producing curative therapeutic effect (percentage of patients with no symptoms who were able to work without relapse).

Subjects with nonspecific pain.

Acupuncture versus placebo. No relevant studies were identified.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture (type 1) versus acupuncture (type 2). In one trial of 47 patients,[240] two modalities of Fu's subcutaneous needling were compared, needling along the local muscle fibers pointed to the myofascial trigger points, and needling across the local muscle fibers pointed to the myofascial trigger points.

Although post-treatment pain intensity (VAS; motion-related, pain under pressure) and cervical ROM improved significantly in both groups, there were statistically nonsignificant differences with respect to pain intensity (motion-related: 3.59 versus 2.76, $p = 0.95$; pain under pressure: 3.82 versus 3.28, $p = 0.38$) and cervical ROM (flexion, extension, and rotation: 1.36 versus 1.12, $p = 0.38$) between the two groups of patients.

Acupuncture versus other treatments. No relevant studies were identified.

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus the same other treatments. No relevant studies were identified.

Population with unknown duration of pain. A total of six trials were included in this sub-section.[239,248-250,262,264]

Subjects with specific pain.

Acupuncture versus placebo. In one trial,[248] acupuncture was shown to be associated with a significantly greater effective rate (percentage of patients with no symptoms or relapse: 75.5 percent versus 52.8 percent, $p < 0.05$) compared to placebo (needling at non acupuncture points) right after the treatment.

Acupuncture versus no treatment. In one trial,[264] acupuncture was shown to be significantly more effective than no treatment in improving pain intensity (short form MPQ) and PPT shortly after the end of treatment.

Acupuncture (type 1) versus acupuncture (type 2). In three Chinese trials,[239,249,250] different modalities of acupuncture were compared. These included needle pricking,[249] long-time needle retention,[239] or point-through-point needling.[250] In all three trials the short-term post-treatment results indicated numerically or statistically significantly better therapeutic effects (defined differently across the trials as dichotomous outcome) of needle pricking,[249] long-time needle retention,[239] or point-through-point needling[250] compared to routine acupuncture.

Acupuncture versus other treatments. In three trials,[249,262,264] acupuncture was shown to be significantly more effective than injection of Lidocaine,[249,262] or exercise[264] in improving pain intensity (VAS, SF-MPQ, PPT) and/or disability (neck pain disability VAS) shortly after the end of treatment.

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Acupuncture versus placebo. No relevant studies were identified.

Acupuncture versus no treatment. No relevant studies were identified.

Acupuncture versus another type/method of the same CAM. No relevant studies were identified.

Acupuncture versus other treatments. No relevant studies were identified.

Acupuncture versus medication. No relevant studies were identified.

Acupuncture + other treatments versus the same other treatments. No relevant studies were identified.

3 – Spinal Manipulation for Treatment of Low Back Pain

We included 28 studies using manipulation alone and six studies using manipulation plus other treatments.[31,57,123,274-276] Note that one trial[277] reported results for subjects with acute and chronic pain separately, therefore this trial appears in two sub-sections of acute and chronic pain. Results of nine trials were reported in multiple publications (Table 3).

Population/trial characteristics. The studies were conducted in Australia (three),[51,140,274] Bulgaria (one),[20] Canada (four),[278-281] China (two),[275,282] Denmark (three),[276,283,284] Egypt (one),[104] Italy (one),[277] South Africa (one),[285] UK (five),[123,230,286-288] and United States (13).[31,55,57,101,119,289-296]

The proportion of men and women was similar in 19 studies (40 percent to <60 percent).[20,31,51,55,57,119,123,140,275-279,285,288,289,291,295,296] In five studies, there was a greater proportion of men (> 60 percent)[101,280,281,284,290] and in five studies women were the majority (> 60 percent).[274,282,283,286,293] For the remaining studies, this information was not reported.[104,230,287,292,294]

The included studies consisted of adults aged 18 years or older. The racial composition or ethnicity was reported for only four studies.[123,275,289,290] In three trials, the majority of subjects were Caucasians.[123,289,290] This information was not reported for the remaining trials.

In total 15,969 participants with LBP were randomized to manipulation (alone or combined with other treatment) or control groups. One large RCT accounted for 11,128 patients during its 11 years of recruitment between 1986 and 2007.[275] Table 10 presents the control interventions in the included studies.

Table 10. Spinal Manipulation for Treatment of low back pain- Control Interventions

Type of control group	Cause of Pain	N studies	Detail of Control intervention
1 – Inactive treatments			
Placebo/sham	**Non Specific**	**9**	**Sham adjustment + placebo medication,[57] sham adjustment and muscle relaxation,[57] sham adjustment,[119,293] light physical contact at lumbar spine,[291] sham mobilization,[20] similar palpation and positioning as manipulation group + nontherapeutic massage to site unrelated to pain,[104] no physical contact[281] simulated short wave,[284] placebo gel,[277]**
	Specific	**0**	**NA**
No-treatment/ waiting list/ bed rest	**Non Specific**	**4**	**No treatment,[288,288,291] bed rest,[277]**
	Specific	**0**	**NA**
2- Active treatments			
Exercise/physical activity	**Non Specific**	**1**	**low-stress aerobic and lumbar spine strengthening,[123]**
	Specific	**0**	**NA**
Usual care	**Non Specific**	**3**	**Base on UK National Acute Back Pain Guidelines,[123] analgesic medication prescription, local analgesic-anesthetic injections(also bed rest and or physiotherapy including ultrasound and diathermy and ergonomic advice),[283] physician consultation, medication,[296]**
	Specific	**0**	**NA**

Corset	**Non Specific**	**1**	**Lumbo-sacral corset,[101]**
	Specific		
Education	**Non Specific**	**4**	**Back school program,[280,290] education booklet,[278] educational material, and presentation by therapist,[119]**
	Specific		
Physiotherapy	**Nonspecific**	**2**	**McKenzie approach,[278] massage, electrotherapy, infrared,[277]**
	Specific	**0**	**NA**
Physical modalities	**Nonspecific**	**3**	**TENS,[101] ultrasound,[286] Infrared lamp over the most painful area of the low back,[230]**
	Specific	**0**	**NA**
Other Manual therapy	**Nonspecific**	**7**	**Myofascial therapy,[290] massage,[101,292,295] post isometric relaxation,[20] spinal mobilization[55,296]**
	Specific	**0**	**NA**
Medication	**Nonspecific**	**5**	**Paracetamol/Acetaminophen,[51] Tenoxican and Ranitidine,[140] medication and bed rest,[104] Naprosyn,[287] Diclophenac,[277]**
	Specific	**0**	**NA**
Other methods of manipulation	**Nonspecific**	**3**	**Not described,[282] full spine adjustment, or combination of full spin and cervical adjustment,[294] application of activator adjusting instrument,[285]**
	Specific	**0**	**NA**
Other active treatment (also in manipulation group)	**Nonspecific**	**4**	**Exercise,[31,123,274,276]**
	Specific	**1**	**Lumbar traction and physical modalities,[275]**
Spinal manipulation in combination with another treatment (vs. acupuncture alone)	**Nonspecific**	**2**	**Physical modalities (heat/ ice, ultrasound, electrotherapy, massage and/or trigger point therapy) in 3, 6, 9, or 12 treatment sessions,[289] myofascial therapy,[290]**
	Specific	**0**	**NA**

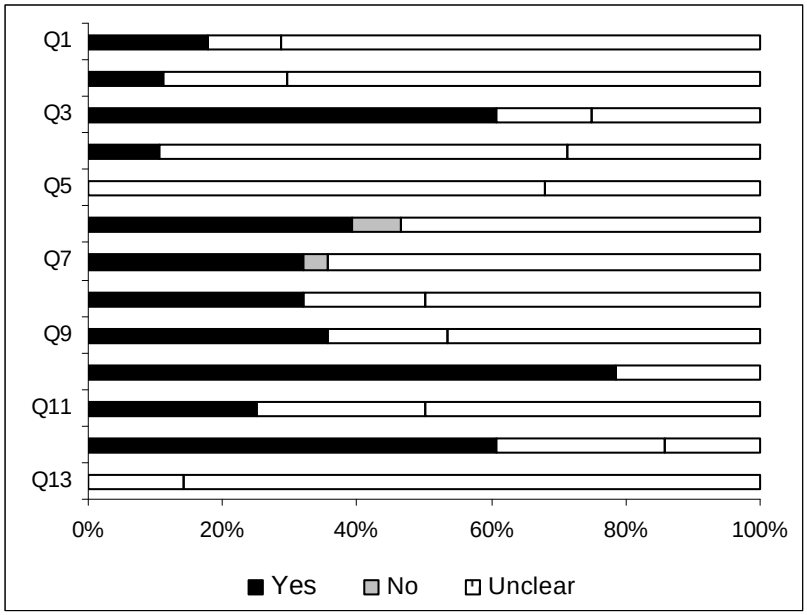
GP=general practitioner care; NA= not applicable; TENS=transcutaneous electrical nerve stimulation; UK=United Kingdom

The treatment in studies was administered with the following frequency: single treatment,[279,281,291,295,297] less than once a week for total duration of 12 weeks,[95] once a week for a total duration of 1 to 3 weeks,[288,290]one-two sessions per week for a duration to 12 weeks,[39,123,286,298] twice a week for duration of to 12 weeks,[51,274,282,285,289] three or four times per week for a duration of 2-3 weeks,[20,57,101,104,230,284] and four to seven times per week for a duration of 2-6 weeks.[119,140,275,277] In one trial, the frequency of treatment administration varied.[295] The information regarding the frequency or duration of treatment was not reported for two trials.[31,294]

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 27. All trials were randomized. One trial, was reported in an abstract format and was not included in the assessment of risk of bias.[287] The adequate method of randomization and treatment allocation concealment was reported for 18.0 percent and 11.0 percent of the trials, respectively. Up to 61.0 percent of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. The subjects were reported to be blinded in only 11.0 percent of the trials. About 36.0 percent of the trials reported acceptable drop-out rate. Results based on intention-to-treat analysis were explicitly reported for 25.0 percent of the trials. The data for selected items of the risk of bias tool across the CAM interventions (acupuncture;

spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.1 of Appendix G.

Figure 27. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in Table 11. For further detail of the trials please see the evidence tables. (Appendix C, table 1.9 – table 1.16)

Table 11 – Key results –Spinal manipulation therapy for low back pain

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Man vs. No Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [291]	M	-	NA	Direct	> SS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	ROM: B [281]	H	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [288]	H	-	NA	Direct	> NR	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [20,57,277,284,291]	M	-	Yes	Direct	> SS	Moderate
			Oswestry: B, C [57]	M	-	NA	Direct	= S-NS	Low
			ROM (schober's test): B, C [20,57,284]	M	-	No	Indirect	=>	Low
			Number of analgesics ingested weekly: B [57]	M	-	NA	Indirect	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [119,277,293]	M	-	No	Direct	=>	Low
			Oswestry: C [119]	M	-	NA	Direct	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [104]	H	-	NA	Direct	> NR	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man** vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [56]	M	-	NA	Direct	= S-NS	Low
			RMDQ: B [56]	M	-	NA	Direct	= S-NS	Low
			SF-36 [56]	M	-	NA	Direct	= S-NS	Low
	Chronic/Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE [Ψ]
		NS	ROM (flx, ext, SLR): B, C, D [108]	H	-	NA	Indirect	= S-NS	Low
Man vs. Med	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [287]	NA[#]	-	NA	Direct	= S-NS	Low
			RMDQ: B, C [287]	NA[#]	-	NA	Direct	= S-NS	Low
			VAS: D [277]	H	-	NA	Direct	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [51,140]	H	-	Yes	Direct	> SS	Low
			VAS: C, D [277]	H	-	NA	Direct	= S-NS	Low
			Oswestry: B [51,140]	H	-	Yes	Direct	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	% pain-free pts: B, C [283]	H	-	NA	Indirect	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C [277]	H	-	NA	Direct	> SS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C [277]	H	-	NA	Direct	< SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [278]	H	-	NA	Direct	= S-NS	Low
			RMDQ: B, C [278]	H	-	NA	Direct	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man** vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [84]	M	-	NA	Direct	> SS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			Physical functioning (10-point scale): B, C [84]	M	-	NA	Direct	> SS	Low
			GPE: B, C [84]	M	-	NA	Direct	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. ST	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S							
		NS	VAS: B, C [296]	L	-	NA	Direct	= S-NS	Low
			RMDQ: B, C [296]	L	-	NA	Direct	> SS	Low
			SF-36: B, C [296]	L	-	NA	Direct	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man** vs. ST	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C, D, E [66]	M	-	NA	Direct	= S-NS	Low
			RMDQ: C, D, E [66]	M	-	NA	Direct	= S-NS	Low
			% pts using NSAIDs or muscle relaxants: D [66]	M	-	NA	Indirect	> SS	Low
	Unknown	S	-	-	-	NA	-	-	Insufficient
		NS	Oswestry: E [95]	M	-	NA	Direct	> SS	Low
			SLR (right): E [95]	M	-	NA	Indirect	> SS	Low
			SLR (left): E [95]	M	-	NA	Indirect	= S-NS	Low
			% pts taking analgesics: E [95]	M	-	NA	Indirect	= S-NS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			% pain-free pts: E [95]	M	-	NA	Indirect	= S-NS	Low
			ROM (flx): E [95]	M	-	NA	Indirect	= S-NS	Low
Man vs. Ma	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [101]	H	-	NA	Direct	= S-NS	Low
			ROM (etx, flx): B [101]	H	-	NA	Indirect	= S-NS	Low
			SLR: B [101]	H	-	NA	Indirect	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	N days of pain relief: B, C [292]	M	-	NA	Indirect	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	ROM (walking, bending, twisting): B [295]	H	-	NA	Indirect	.= S-NS	Low
			ROM (sitting, reaching, dressing): B [295]	H	-	NA	Indirect	> SS	Low
			SLR: B [295]	H	-	NA	Indirect	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. TENS	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [101]	H	-	NA	Direct	= S-NS	Low
			ROM (etx, flx): B [101]	H	-	NA	Indirect	= S-NS	Low
			SLR: B [101]	H	-	NA	Indirect	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed/ Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man** vs. Ex	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C, D [299]	M	-	NA	Direct	> SS	Low
			Oswestry: B, C, D [299]	M	-	NA	Direct	> SS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			% pts on sick leave: B, D [299]	M	-	NA	Indirect	> SS	Low
			Patient-Specific Functional Scale: C [39]	M	-	NA	Direct	> SS	Low
			Global perceived Effect: C [39]	M	-	NA	Direct	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo; Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable

Ψ Grade (High, moderate, low, and insufficient)
** Manipulation in combination with mobilization
£ Number of pooled trials
# Abstract
B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium
- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

Population with acute/subacute pain. This sub-section included 11 trials.[20,55,57,101,123,274,277,284,287,290,291] All trials enrolled subjects with nonspecific LBP. Results from two trials, comparing manipulation to massage,[101] or manipulation to mobilization[55] are presented in the Acute or Sub-Acute LBP sub-sections of Massage and Mobilization sections.

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus another type/method of the Same CAM. No relevant studies were identified.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation versus placebo. In five trials,[20,57,277,284,291] manipulation was compared to placebo at immediate or short-term post-treatment followup, indicating significantly greater improvements for manipulation versus placebo groups in reducing immediate or short-term post-treatment pain intensity (VAS). In contrast, there were no between-group differences in disability (Oswestry),[57] flexibility/mobility,[20,57] or pain medication use.[57] For example, in one trial,[277] manipulation was significantly superior to placebo in relieving pain in subjects with or without neurological signs at short term followup (four-point VAS; $p< 0.01$). Intermediate-term post-treatment data of the same trial showed no significant difference in relieving pain between the groups of manipulation and placebo. In another trial,[284] subjects randomized to manipulation had significantly better immediate-term post-treatment pain intensity (percentage of pain-free subjects: 92.0 percent versus 25.0 percent, $p < 0.01$) and mobility (improvement on Schober's test: 100.0 percent versus 50.0 percent, $p < 0.01$) compared to those randomized to placebo (i.e., simulated short-wave therapy).

Manipulation versus no treatment. The use of manipulation, compared to 'no treatment' was associated with a significantly lower immediate post-treatment pain intensity on five-point VAS ($p = 0.03$). [291]

Manipulation versus another type/method of the same CAM. No relevant studies were identified.

Manipulation versus other treatments. In one trial,[20], post-treatment differences in pain intensity (VAS), disability (Oswestry), depression score (modified Zung scale), integrated electromyographic activity (EMG(, and maximal voluntary contraction were not significant between the manipulation and the muscle relaxation groups.

In another study,[277] at short term post-treatment followup, manipulation was more efficacious in relieving pain four-point VAS) and improving function (using a four-point disability questionnaire) compared to bed rest or physiotherapy (massage, analgesic currents and diathermy) in subjects with acute pain. However, this advantage was not sustained at 6 months followup in both groups of subjects with or without radiating pain. In this trial, a subgroup of subjects with acute pain and a chronic history of pain were randomized to manipulation versus physiotherapy, low back school, or bed rest. Manipulation therapy at short term (3 weeks, 2 months) followup was significantly better in reducing pain intensity than back school or placebo. For the same period, physiotherapy was shown to be more effective in relieving pain and improving function than manipulation. At intermediate (6 months) post-treatment followup,

manipulation was better than placebo but did not differ from physiotherapy or back school.(numerical data not reported; only graphs were presented).[277]

In two trials,[101,290] manipulation did not differ from myofascial therapy (alone or combined with manipulation),[290] TENS,[101] or corset[101] in improving pain intensity (VAS),[101,290] disability (RMDQ),[290] or range of mobility (straight leg raising, pelvic flexion/extension, Schober's test),[101] immediately after the end of treatment.

In one trial,[123] manipulation combined with best care had a modest improvement compared to best care alone or combined with exercise in disability and pain.

Manipulation versus medication. In one trial,[287] there were no significant post-treatment differences between the manipulation and medication (e.g., antiinflammatory agents) groups with respect to reduction in pain intensity or disability.

In another study,[277] at short term post-treatment followup, manipulation was more efficacious in relieving pain (4-point VAS) and improving function (using 4-point disability questionnaire) compared to drug therapy in subjects with acute pain. This advantage was not sustained at 6 months followup. In this trial, a subgroup of subjects with acute pain in a chronic history of pain were also randomized to manipulation versus drug therapy. For 3 weeks and 2 months post-treatment periods, drug therapy was shown to be more effective in relieving pain and improving function than manipulation. At intermediate (6 months) post-treatment followup, manipulation did not differ from drug therapy (numerical data not reported; only graphs were presented).[277]

Manipulation + other treatments versus the same other treatments. In one trial,[274] short-term post-treatment pain intensity (VAS: 0.0 ± 0.0 versus 13.57 ± 9.40, $p < 0.0005$), ROM (flexion: 45.60 ± 6.95 versus 31.14 ± 7.48, $p < 0.0005$), and disability (RMDQ: 0.33 ± 0.82 versus 3.64 ± 2.80, $p < 0.001$) were significantly better in the manipulation + exercise group compared to the exercise alone group.

Population with chronic pain. This sub-section included 12 trials. [51,119,140,276,277,279-281,286,289,292,293] All trials studied subjects with nonspecific LBP. See additional results of one trial [51] in the Acupuncture, Chronic LBP section. See result for another trial,[279] in the Mobilization, Chronic LBP section.

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus another type/method of the same CAM. No relevant studies were identified.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation versus placebo. The effects of manipulation and placebo were compared in three trials.[119,277,293] In these trials, manipulation was associated with significantly greater improvements in pain (VAS) compared to placebo.

In the first trial,[119] immediately after the treatment, subjects in the manipulation group had a significantly improved disability level (i.e., decreased Oswestry scores) compared to those in placebo group (9.5 ± 6.3 versus 15.5 ± 10.8, $p = 0.012$). Although the observed difference 2 weeks after the treatment was numerically in favor of manipulation, compared to placebo, this

difference did not reach the traditional level of statistical significance (10.6 ± 11.7 versus 14.0 ± 11.7, p = 0.41).[119]

In the second trial,[293] the improvement in post-treatment pain intensity (VAS) was numerically greater in the manipulation versus placebo group immediately (1.3 versus 0.7, p-value for between-group comparison not reported) or short-term post-treatment (2.3 versus 0.6, p-value for between-group comparison not reported).

In the third trial,[277] manipulation was significantly better in reducing short- and intermediate-term post-treatment pain intensity (4- point VAS) compared to placebo in patients with chronic LBP with or without radiating pain. This trial failed to report numeric data.

Manipulation versus no treatment. In one trial,[281] subjects randomized to manipulation and 'no treatment' were compared with respect to flexion-relaxation degree. In this trial, the post-treatment flexion-relaxation degree did not differ between subjects in the manipulation and 'no treatment' groups.

Manipulation (type 1) versus manipulation (type 2). In one trial,[289] the short-term post-treatment effect on pain (NRS-11) and functional disability (the Modified Von Korff Scales - MVK) was significantly increased for subjects who received a greater number of manipulation treatments whether alone or combined with physical therapy.[289]

Manipulation versus other treatments. In two trials, manipulation was shown to produce significantly greater immediate post-treatment improvements in pain (VAS, NRS), disability (RMDQ, Oswestry), and ROM (lumbar flexion and extension) compared to massage,[292] or ultrasound.[286]

In one trial,[277] at 3 weeks post-treatment, physiotherapy (massage, and physical modalities) was more effective compared to manipulation or back school in patients without radiating pain. In this subgroup, patients originally randomized to manipulation showed significantly more improvement compared to back school (or placebo) at 3 weeks and 2 months but not at 6 months followup. The same trial, but in a subgroup of patients with radiating back pain, showed more improvement in pain and function with manipulation than back school at 3 weeks but not at 2 months or 6 months of followup. Physiotherapy and low back school were more effective than manipulation in both 2 months and 6 months followup. This trial failed to report numeric data.[277]

In another trial,[280] subjective analgesic effect of back school program was significantly better compared to manipulation in patients with sacroiliac joint pain immediately after the treatment.

Manipulation versus medication. In one trial,[277] at 3 weeks, short term- and intermediate-term post-treatment, spinal manipulation was not significantly different from drug therapy in reducing pain (4-point VAS; no numeric data were given). In contrast, in two other trials,[51,140] subjects in manipulation groups experienced significantly greater immediate post-treatment reductions in pain intensity (VAS score: 38.0 percent -50.0 percent) and disability (Oswestry score: 30.7 percent -50.0 percent) compared with subjects in the medication groups.

Manipulation + other treatments versus the same other treatments. In one trial,[276] at short- and intermediate-term after the treatment, manipulation combined with exercise did not significantly differ from exercise alone in improving pain (VAS).

Manipulation versus manipulation + other treatments. In one trial,[289] the short-term post-treatment effect on pain (NRS-11) and functional disability (the Modified Von Korff Scales - MVK) did not differ between manipulation alone or combined with physical therapy.[289]

Population with mixed duration of pain. This sub-section included 10 trials.[31,104,230,275,278,283,288,294-296] Of the nine trials, two studied subjects with specific LBP (e.g., disc protrusion, sciatica).[230,275]

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus another type/method of the same CAM. No relevant studies were identified.

Manipulation versus other treatments. The immediate and short-term post-treatment effects of manipulation and infra-red therapy were compared in subjects with sciatica.[230] Similar recovery rates (percentage of pain-free subjects) were found between the two groups amongst subjects with normal straight leg raise (58.0 percent versus 68.0 percent, $p > 0.05$). In contrast, amongst subjects with restricted straight leg raise, the between-group difference in recovery rate was significant, favoring subjects in the manipulation group over infra-red therapy group (77.2 percent versus 56.6 percent, $p < 0.05$).

In one trial, 11,128 subjects with disc protrusion who received a combination of manipulation and physiotherapy (traction, microwave and other modalities) had significantly greater healing (73.4 percent versus 47.3 percent, $p < 0.01$) and effective rates (98.6 percent versus 96.4 percent, $p < 0.01$) compared to subjects who received physiotherapy alone.[275]

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation versus placebo. In one trial,[104] the immediate post-treatment back pain improvement (percent change on VAS) was numerically greater in the manipulation group compared to placebo group (statistical test results were not provided). The beneficial effect of manipulation relative to placebo was more evident in subjects under 40 years (compared to subjects 40 years or older) or subjects with sub-acute LBP (versus subjects with acute LBP).[104]

Manipulation versus no treatment. In one trial,[288] subjects randomized to receive manipulation, experienced significant reduction (from baseline) in immediate/short-term post-treatment pain intensity (VAS: 12.20 versus 10.40, $p < 0.05$). In contrast, subjects randomized to no treatment group, did not experience significant reduction in pain intensity ($p = 0.10$).

Manipulation (type 1) versus manipulation (type 2). In one trial,[294] subjects with sub-acute and chronic LBP who received upper cervical adjustment as well as upper cervical + full spine adjustment experienced significant improvement in pain intensity (VAS score) compared to baseline. The group of subjects who received full spine adjustment only, did not improve in pain intensity (VAS) but did improve in disability (Oswestry score). Numerical data for these groups were not reported.

Manipulation versus other treatments. In one trial,[278] short-term post-treatment effects of manipulation and 'educational booklet' were compared and no significant differences in pain (11-point pain scale measuring symptom bothersomeness: 2.0 ± 2.2 versus 3.2 ± 3.2, $p = 0.06$) or disability (RMDQ: 3.1 ± 4.1 versus 4.1 ± 4.9, $p = 0.28$) were found between the two groups. In the same trial, no significant differences were found in short-term post-treatment effects on pain (percentage of pain-free subjects, 11-point pain scale) or disability (RMDQ) between manipulation and physiotherapy (McKenzie technique based on diagnoses of derangement, dysfunction or postural syndromes). In another trial,[296] high or low velocity spinal manipulation

(SM) was compared to minimal conservative medical care (aiming to improve pain with optimization of activities of daily living with patient specific choice of medication) in older adults. Spinal manipulation was significantly more effective compared to medical care alone in improving immediate, short-, or intermediate-term post-treatment disability (adjusted RMDQ score: 0-24) and perception of global improvement (score: 1-10), but not pain (VAS score: 0-100) or physical function (SF-36 score: 0-100). The adjusted RMDQ mean change from baseline values in the high and low velocity manipulation and medical care groups were 2.7 (95 percent CI: 2.0, 3.3), 2.9 (95 percent CI: 2.2, 3.6), and 1.6 (95 percent CI: 0.5, 2.8), respectively.

Manipulation versus other CAM treatments. In one trial,[295] subjects in the manipulation groups did not significantly differ from subjects in the massage group, with respect to straight leg raising.[295] In this trial, the data immediately after the end of treatment indicated significantly better spinal flexibility (e.g., walking, bending, twisting, sitting down in a chair, reaching, dressing) in the manipulation group compared to the massage group.[295]

In one trial,[296] high velocity spinal manipulation was similar to low velocity manipulation in reducing immediate, short term- and intermediate-term post treatment pain intensity (VAS score: 0-100) or disability (Oswestry score: 0-24) in adults ≥ 55 years or older. Both treatment methods were effective in the reduction of LBP symptoms.

Manipulation versus medication. The results of one underpowered trial[283] indicated statistically nonsignificantly greater proportion of pain-free subjects in the manipulation versus medication group (50.0 percent versus 11.0 percent, $p = 0.15$), and therefore were rendered as inconclusive. In another trial,[104] the immediate post-treatment back pain improvement (percent change on VAS) was numerically greater in the manipulation group compared to the medication group (statistical test results were not provided). The beneficial effect of manipulation relative to medication was more evident in subjects under 40 years (compared to subjects 40 years or older) or subjects with sub-acute/chronic LBP (versus subjects with acute LBP).[104]

Manipulation + other treatments versus the same other treatments. In one trial,[31] 131 subjects were randomized to either a combination of manipulation and exercise or exercise alone for 4 weeks. The subjects then were grouped into positive and negative subgroups according to whether or not they met a pre-specified set of 5 criteria (duration of current episode < 16 days, no symptoms distal to the knee, FABQ work subscale score < 19, ≥ 1 hypomobile lumbar spine segment, ≥ 1 hip with > 35 degrees of internal rotation range motion). Immediately after the end of treatment, the rate of success (> 50.0 percent improvement on Oswestry disability scale) in the manipulation group was significantly greater compared to the exercise alone group (62.9 percent versus 36.1 percent, $p = 0.002$). At intermediate-term post-treatment followup, the mean Oswestry disability score was significantly lower in subjects receiving manipulation plus exercise compared to those receiving exercise alone (mean between-group difference: 10.1, 95 percent CI: 4.3, 15.9, $p = 0.001$). Moreover, medication use and healthcare utilization was significantly lower in the manipulation group compared to the exercise group. The subgroup analysis indicated that the greatest treatment effect of manipulation relative to exercise was observed for subjects classified as positive on the prediction rule (i.e., meeting at least 4 of the 5 criteria). In the same trial,[31,35] the subject's age, gender, symptom duration, or the therapist's years of experience did not have a significant effect on the mean change on Oswestry score. This study also reported an increased risk of worsening disability for patients who did not receive spinal manipulation (11 percent versus 3 percent in exercise group and spinal manipulation + exercise group respectively; RR = 8.0, 95 percent CI: 1.1, 63.5) measured by Oswestry disability scores obtained at 6 months of followup. In addition, failure rates were

higher in subgroup of patients with hypomobility (74.4 percent versus 26 percent in exercise versus manipulation + exercise groups respectively). However, patients with hypermobility were more likely to benefit from stabilizing exercise than spinal manipulation + exercise (failure rates of 22.0 percent versus 83.3 percent in exercise and spinal manipulation + exercise groups respectively).

Population with unknown duration of pain. This sub-section included two trials,[282,285] one of which was restricted to subjects with specific LBP (degenerative spondylolisthesis)[282] and the other to subjects with nonspecific LBP (i.e., sacroiliac joint syndrome).[285]

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation (type 1) versus manipulation (type 2). In one trial,[282] fine adjusting manipulation was associated with a significantly greater therapeutic effect (percentage of pain free subjects) compared to that for the reduction manipulation in subjects with degenerative spondylolisthesis (60.0 percent versus 36.7 percent, $p < 0.05$).

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation (type 1) versus manipulation (type 2). In one trial,[285] although routine manipulation and manually assisted manipulation using Activator Adjusting Instrument (AAI) produced statistically significant reductions in pain (NRS) and disability (Oswestry) for subjects with sacroiliac joint syndrome, the between-group differences for these outcomes were not significant.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

4 – Manipulation + Mobilization for treatment of Low Back Pain

There were 10 trials identified for this section. Results of six studies were reported in multiple publications (Table 3).

Population/trial characteristics. These trials were conducted in Australia (two),[39,56] Ireland (one),[300] the Netherlands (one),[84] Norway (one),[299] UK (four),[95,108,301,302] and US (one).[66]

The proportion of men and women were similar in eight trials.[56,66,84,95,108,299,300,302] In one trial,[39] the majority of subjects were females.

The number of study participants in these trials ranged from 49[299] to 741[95] with a total of 2,838 subjects in all trials combined. Table 12 presents the control interventions in the included studies.

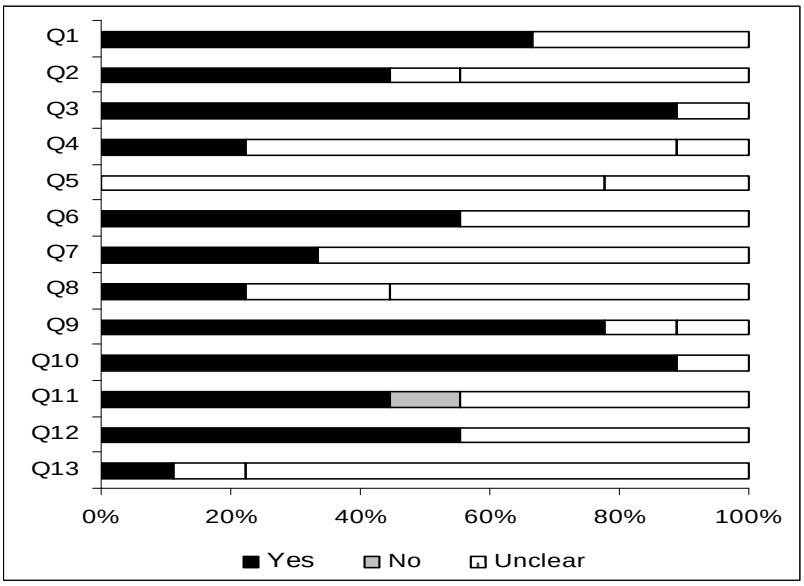
Table 12. Spinal manipulation + mobilization for treatment of low back pain- Control interventions

Type of control group	Cause of Pain	N studies	Detail of Control intervention
1 – Inactive treatments			
Placebo/sham	**Non Specific**	**1**	**sham manipulation + mobilization and placebo Diclofenac (double placebo),[56] low intensity microwave[108]**
	Specific	**0**	**NA**
2 – Active treatments			
Exercise/physical activity	**Non Specific**	**2**	**motor control exercise (retraining specific trunk muscles using ultrasound feedback),[39] general and individualized exercise programs (strengthening, stretching, mobilizing, coordination, and stabilizing exercise for the abdominal, back, pelvic, and lower limb muscles according to clinical findings)[299]**
	Specific	**0**	**NA**
Usual care	**Non Specific**	**2**	**Medical care alone,[66] in combination with physical modalities[66] Conventional outpatient care[95]**
	Specific	**0**	**NA**
Education	**Non Specific**		**Educational booklet[302]**
	Specific	**0**	**NA**
Physiotherapy	**Nonspecific**	**1**	**Manual therapy and physical modalities (exercise, massage, heat, electrotherapy, ultrasound, short-wave diathermy)[84]**
	Specific	**0**	**NA**
NA= not applicable;			

The duration of treatments varied from four to 12 weeks and the frequency of treatments were at least twice a week.

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 28. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for 67.0 percent and 44.0 percent of the trials, respectively. Up to 89.0 percent of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. The subjects were reported to be blinded in only 22.0 percent of the trials. About 78.0 percent of the trials reported acceptable drop-out rate. Results based on intention-to-treat analysis were explicitly reported for 44.0 percent of the trials.

Figure 28. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in Table 11. For more details please see evidence tables. (Appendix C, table 1.21 – table 1.27)

Population with acute/subacute pain. There were two trials[56,300] included in this sub-section. Both trials were restricted to subjects with LBP due to nonspecific causes.

Subjects with specific pain.

Manipulation + mobilization versus placebo. No relevant studies were identified.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. No relevant studies were identified.

Manipulation + mobilization versus medication. No relevant studies were identified.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation + mobilization versus placebo. In one trial,[56] manipulation + mobilization was compared to double placebo (sham manipulation and placebo medication) and the results indicated nonsignificant differences in time to achieve recovery, post-treatment pain intensity (VAS), disability (RMDQ), and global perceived effects between the two groups.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. In one trial,[300] post-treatment pain intensity (VAS, MPQ), quality of life (SF-36), disability (RMDQ), and range of mobility (e.g., flexion, functional activity) did not differ between the combination of manipulation and mobilization and inferential therapy at short- intermediate-, or long-term followup periods. In another trial,[301] patients in manipulation + mobilization group had significantly lower number of treatments to reach a symptom free status than those in microwave diathermy group. There was also a statistically significant difference between the intervention and control group in lumbar extension favoring manipulation + mobilization immediately post 3 weeks of treatment

($p < 0.05$) but not for any other objective measures. In both trials, manipulation + mobilization treatments were delivered by experienced physiotherapists.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Population with chronic pain. There were two trials[39,299] included in this sub-section. Both trials were restricted to subjects with LBP due to nonspecific causes.

Subjects with specific pain.

Manipulation + mobilization versus placebo. No relevant studies were identified.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. No relevant studies were identified.

Manipulation + mobilization versus medication. No relevant studies were identified.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation + mobilization versus placebo. No relevant studies were identified.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. In one trail,[299] the manual therapy group showed significantly greater improvements than the exercise therapy group on pain intensity, functional disability, general health and return to work throughout the 2 months intervention in group of sick-listed patients. Immediately after the 2 month treatment period, 67 percent in the manual therapy and 27 percent in the exercise therapy group had returned to work ($p < 0.01$), a relative difference that was maintained throughout followup.

In another trial,[39] motor control exercise (retraining specific trunk muscles using ultrasound feedback) and manipulation + mobilization produced slightly better short-term function (mean difference on Patient-Specific Functional scale: 2.30, 95 percent CI: 0.4, 4.2) and perceptions of effect (mean Global Perceived Effect difference: 1.20, 95 percent CI: 0.4, 2.0) than general exercise group, but not better intermediate or long-term effects,. There was no significant difference between the manipulation and motor control exercise in function (mean difference: 0.4, 95 percent CI: -1.5, 2.4) or global perceived effect (mean difference: 0.5, 95 percent CI: -0.2, 1.1).

Manipulation + mobilization versus medication. No relevant studies were identified.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Population with mixed duration of pain. This sub-section included three trials restricted to subjects with nonspecific LBP.[66,84,302]

Subjects with specific pain.

Manipulation + mobilization versus placebo. No relevant studies were identified.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. No relevant studies were identified.

Manipulation + mobilization versus medication. No relevant studies were identified.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation + mobilization versus placebo. No relevant studies were identified.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. In one trial,[66] the combination of manipulation and mobilization (with or without physical modalities) was not significantly different from medical care alone or medical care combined with physical modalities (in reducing pain (VAS) and disability (RMDQ) at short, intermediate, and long-term time points post-treatment. Throughout the followup, the use of prescription drugs (e.g., NSAIDs, muscle relaxants, analgesics) was significantly greater in the medical care group versus manipulation group (at 6 months: 32.0 percent versus 24.0 percent). The mean number of doctor visits during 6 months of followup was greater among subjects in the manipulation versus medical care group (5.4 versus 2.9). Chiropractors administered the manual treatment in this trial.

Similarly, another trial,[302] did not find any significant differences in disability (i.e., Disability Index) between subjects receiving osteopathic manipulation versus 'educational booklet.'

In one trial,[84] the combination of manipulation and mobilization produced significantly greater improvements in intermediate- and long-term post-treatment pain intensity(10-point scale: minimal severity = 1, maximal severity = 10) and physical functioning (10-point scale) compared to physiotherapy (exercise, massage, heat, electrotherapy, ultrasound, short-wave diathermy). The global perceived effect (six-point scale) did not differ between subjects who received manipulation plus mobilization and physiotherapy (intermediate-term post-treatment: 3.5 ± 1.9 versus 3.5 ± 1.8, $p > 0.05$).[84] The subgroup analysis of the same trial[85] revealed that the beneficial effect of manipulation compared to physiotherapy was maximized in subjects with chronic pain (longer than one year) and in subjects younger than 40 years old. The manual therapy was delivered by physiotherapist who had an additional three years of training in manipulation.

Manipulation + mobilization versus medication. No relevant studies were identified.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Population with unknown duration of pain. This sub-section included two trials with subjects having nonspecific LBP.[95,108]

Subjects with specific pain.

Manipulation + mobilization versus placebo. No relevant studies were identified.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. No relevant studies were identified.

Manipulation + mobilization versus medication. No relevant studies were identified.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation + mobilization versus placebo. In one trial,[108] the combination of manipulation and mobilization did not significantly improve immediate-, short-, or intermediate-term post-treatment lumbar mobility (flexion, extension, straight leg raising) compared to placebo (microwave at a very low setting). For example, mean values for extension in the combination and placebo groups immediately after the end of treatment were 42.96 ± 9.09 and 44.43 ± 11.38, respectively ($p > 0.1$). The corresponding values for flexion were 2.40 ± 10.30 and 22.75 ± 9.62, respectively ($p > 0.1$). Treatments were delivered by trained physiotherapists.

Manipulation + mobilization versus no treatment. No relevant studies were identified.

Manipulation + mobilization versus another type/method of the same CAM. No relevant studies were identified.

Manipulation + mobilization versus other treatments. In one trial,[95] subjects receiving manipulation plus mobilization (delivered by trained chiropractor) had significantly improved long-term post-treatment pain (percentage of pain-free subjects), disability (Oswestry) and straight leg raising compared to those receiving conventional care. The use of analgesics did not differ between the two groups. The combination group had a significantly fewer subjects who were absent from work (percentage of subjects taking time off work) compared to the conventional care group. The subjects with severe disability at entry (Oswestry > 40.0 percent) responded more favorably than subjects with less severe disability at entry (Oswestry ≤ 40.0 percent).

Manipulation + mobilization versus medication. No relevant studies were identified.

Manipulation + mobilization + other treatments versus the same other treatments. No relevant studies were identified.

5 – Flexion Distraction for Treatment of Low Back Pain

There were four trials identified and included in this sub-section. All four trials recruited participants with nonspecific pain.

Population/trial characteristics. All four trails were conducted in US. One of these trials was of particularly small sample size (only 13 subjects).[303]

Two of these trials reported information on ethnicity,[304,305] and two trials reported the proportion of men and women in the trial.[303,305]

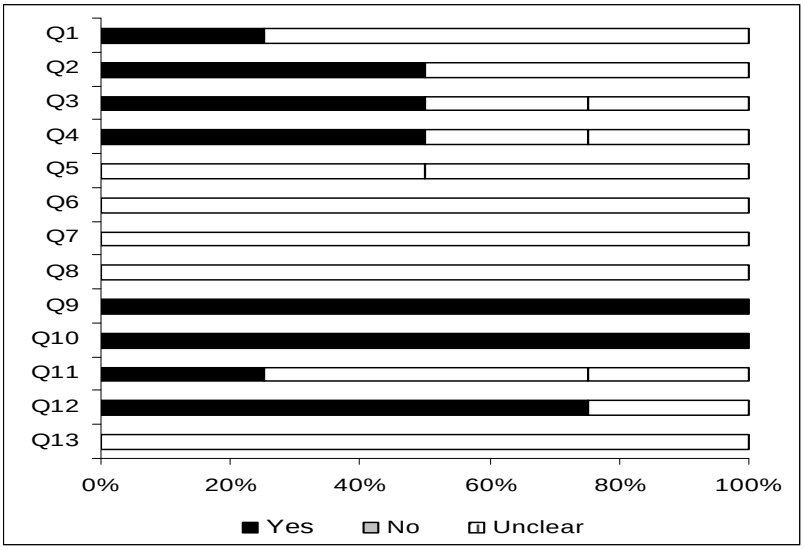
In total, there were 576 subjects randomize to flexion distraction technique therapy or control groups. The number of study participants ranged from 13 in one trial,[303] to 235 in the largest trial.[305] Control interventions were:

- Placebo (two studies)[303,304]
- Other treatments (two studies) including physical modalities,[297], and exercise[305]

The duration of treatments varied from 1 to 4 weeks. The frequency of treatments varied from twice a week to four times a week.

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 29. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for 25.0 percent and 50.0 percent of the trials, respectively. Up to 50.0 percent of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. The subjects were reported to be blinded in 50.0 percent of the trials. All of the trials reported acceptable drop-out rate. Results based on intention-to-treat analysis were explicitly reported for 25.0 percent of the trials.

Figure 29. Risk of bias scores (%)



Population with acute/subacute pain. No relevant studies were identified or included.

Population with chronic pain. Only one trial was included in this section.[305]

Subjects with specific pain.

Flexion distraction versus placebo. No relevant studies were identified.

Flexion distraction versus no treatment. No relevant studies were identified.

Flexion distraction versus another type/method of the same CAM. No relevant studies were identified.

Flexion distraction versus other treatments. No relevant studies were identified.

Flexion distraction versus medication. No relevant studies were identified.

Flexion distraction + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Flexion distraction versus placebo. No relevant studies were identified.

Flexion distraction versus no treatment. No relevant studies were identified.

Flexion distraction versus another type/method of the same CAM. No relevant studies were identified.

Flexion distraction versus other treatments. In one trial,[305] the effects of flexion-distraction therapy and physical therapy (exercise program) on short-term post-treatment pain intensity (VAS) and disability (RMDQ) did not significantly differ. After 1 year of care, subjects who received flexion-distraction therapy had a significantly lower mean pain score (VAS) than subjects who received physical therapy (20.6 ± 1.9 versus 21.6 ± 2.0, $p = 0.02$).

Flexion distraction versus medication. No relevant studies were identified.

Flexion distraction + other treatments versus the same other treatments. No relevant studies were identified.

Population with mixed duration of pain. Two trials were included in this sub-section.[303,304] Both trials studied subjects with nonspecific pain

Subjects with specific pain.

Flexion distraction versus placebo. No relevant studies were identified.

Flexion distraction versus no treatment. No relevant studies were identified.

Flexion distraction versus another type/method of the same CAM. No relevant studies were identified.

Flexion distraction versus other treatments. No relevant studies were identified.

Flexion distraction versus medication. No relevant studies were identified.

Flexion distraction + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Flexion distraction versus placebo. In two trials,[303,304] comparing the flexion-distraction technique to placebo (hand-held instrument producing effect similar to manual adjustments), no significant differences in disability (RMDQ, Pain Disability Index - PDI) were found between the two groups. The treatment effect was not modified by age, gender, duration of symptoms, or prior treatment with chiropractic therapy.[304]

Flexion distraction versus no treatment. No relevant studies were identified.

Flexion distraction versus another type/method of the same CAM. No relevant studies were identified.

Flexion distraction versus other treatments. No relevant studies were identified.

Flexion distraction versus medication. No relevant studies were identified.

Flexion distraction + other treatments versus the same other treatments. No relevant studies were identified.

Population with unknown duration of pain. Only one trial was included in this section.[297] This trial was restricted to subjects with nonspecific pain.

Subjects with specific pain.

Flexion distraction versus placebo. No relevant studies were identified.

Flexion distraction versus no treatment. No relevant studies were identified.

Flexion distraction versus another type/method of the same CAM. No relevant studies were identified.

Flexion distraction versus other treatments. No relevant studies were identified.

Flexion distraction versus medication. No relevant studies were identified.

Flexion distraction + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Flexion distraction versus placebo. No relevant studies were identified.

Flexion distraction versus no treatment. No relevant studies were identified.

Flexion Distraction versus another type/method of the same CAM. No relevant studies were identified.

Flexion distraction versus other treatments. No relevant studies were identified.

Flexion distraction versus medication. No relevant studies were identified.

Flexion distraction + other treatments versus the same other treatments. In one trial,[297] flexion-distraction combined with hot pack was significantly superior to hot pack alone in reducing pain intensity (VAS) and increasing lumbar ROM in subjects with LBP due to osteoarthritis.

6 – Manipulation for Treatment of Neck Pain

This section included 28 trials. Two trials were reported in six publications (Table 3).

The results from seven studies that compared techniques of manipulation and mobilization are presented in this section.[65,306-310] Results from two trials[51,140]comparing the effectiveness of manipulation and acupuncture are reported in the Acupuncture for Treatment of Neck Pain section.

Population/trial characteristics. The trials were conducted in Australia (three),[51,140,311] Canada (five),[309,312-315] China (one), [316] Denmark (one),[317] Germany (one),[308] South Africa (three),[307,318,319] Nigeria (one),[320] Spain (three),[310,321,322] and United States (eight).[65,306,323-328] The information on the country was not reported for two studies.[329,330]

There was a greater proportion of women (≥ 60 percent) versus men in eight studies,[65,310,313,314,323,324,326,328] and greater proportion of men (≥ 60 percent) versus women in two studies.[312,320] The proportions of men and women were similar in six studies.[51,306,308,317,321,322] The gender distribution was not reported for six studies.[309,311,315,325,329,330]

Patients in the included trials were adults aged 18 or older. The information regarding ethnicity was reported for only five trials.[65,320,323,327,328]

In total 1,820 patients were included in these trials. The experimental intervention included spinal manipulation alone or in combination with other treatment (two studies).[321,322] In one study,[328] two different dosing regiments of spinal manipulation (two randomized arms) were used combined with other treatments.

Control interventions for 29 trials with spinal manipulation or spinal manipulation + other treatments are displayed in Table 13.

Table 13. Spinal manipulation for treatment of neck pain- Control interventions

Type of control group	Cause of Pain	N studies	Detail of Control intervention
1- Inactive treatments			
Placebo/sham	Non Specific	7	Rotational mobilization,[312] light hand placement without tension or pressure,[308,326] light hand placement with slight rotation but no tension or thrust,[310] sham ultrasound,[330] sham manipulation delivered with a deactivated Pettibon,[311] no description provided,[325]
	Specific	0	NA
No-treatment/ waiting list	Non Specific	1	Positioning as spinal manipulation group without any intervention,[324]
	Specific	0	NA
2 – Active treatments			
Physiotherapy	Nonspecific	0	NA
	Specific (whiplash)	1	Active exercises, electrotherapy, ultrasound in soft tissues of the neck region, manual therapy, muscle stretching and multimodal therapy[321]
Physical modalities	Nonspecific	1	TENS,[316]
	Specific	0	NA
Manual therapy	Nonspecific	5	Mobilization,[65,306,308,309] massage,[317]
	Specific	0	NA
Medication	Nonspecific	4	Diazepam,[329] Amitriptyline,[331] Paracetamol/Acetaminophen,[51] Tenoxican and Ranitidine, [140]
	Specific	0	NA
Other methods of	Nonspecific	6	Manipulation on contra-lateral side,[307,314] manipulation to

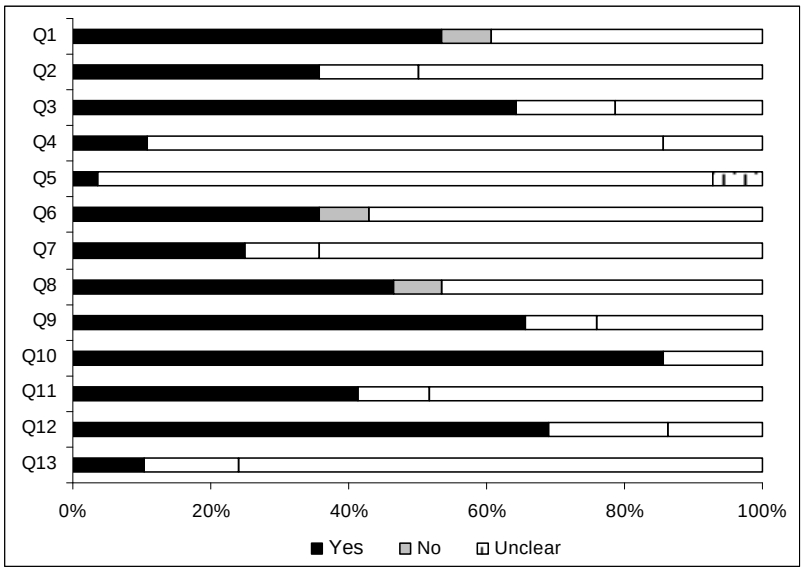
spinal manipulation			**dysfunctional sections of cervical spine only,[313] cervical and upper thoracic manipulation,[318] manipulation according to sham endplay findings generated by a computer algorithm,[327] mechanically assisted manipulation[315]**
	Specific	**1**	**Top vs. top and bottom segment adjustments,[319]**
Active treatment (also in manipulation group)	**Nonspecific**	**2**	**Physical modalities (electro-thermal therapy),[322] sham ultrasound,[330]**
	Specific	**0**	**NA**
Spinal manipulation in combination with another treatment (vs. manipulation alone)	**Nonspecific**	**1**	**Cervical post isometric relaxation,[323]**
	Specific	**0**	**NA**
NA= not applicable; TENS = transcutaneous electrical nerve stimulation			

The majority of studies reported a single treatment session for the length of the trial.[65,306,309,310,312-315,324-327,329] One study reported four treatment visits for duration of 2 weeks.[323] The remaining studies implemented one or two treatments for a duration of 3 to 11 weeks,[319,322] twice a week for total duration of 4 to 10 weeks,[51,140,307,318,330,332] and three to five times a week for a total duration of 3 to 12 weeks.[320,321]

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 30. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for 52.0 percent and 34.0 percent of the trials, respectively.

About 62.0 percent of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. In 72.0 percent of the trials, study participants were not blinded to the treatment. About 66.0 percent of the trials reported acceptable drop-out rate. Results based on intention-to-treat analysis were explicitly reported for 41.0 percent of the trials. The data for selected items of the risk of bias tool across the CAM interventions (acupuncture; spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.2 of Appendix G.

Figure 30. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in Table 14. For further detail of the trials please see the evidence tables. (Appendix C, table 2.9 – table 2.16)

Table 14 – Key results – Manipulation therapy for treatment of neck pain & cervicogenic headaches

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Man vs. No Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [324]	M	-	NA	Direct	= S-NS	Low
			ROM: B [324]	M	-	NA	Indirect	= S-NS	Low
Man vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [308,314]	H	-	Yes	Direct	> SS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [326,330]	M	-	Yes	Direct	> SS	Moderate
			PPT: B, C [326,330]	M	-	Yes	Direct	> SS	Moderate
			NDI: B, C [326]	M	-	NA	Direct	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	PPT: B [312]	H	-	NA	Direct	> SS	Low
			VAS: B [310]	M	-	NA	Direct	> SS	Low
			ROM: B [310]	M	-	NA	Indirect	> SS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [325]	H	-	NA	Direct	> SS	Low
Man** vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	ROM: B (ext, flx) [84]	M	-	NA	Indirect	= S-NS	Low
			Physical functioning (10-point	M	-	NA	Direct	> SS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE [Ψ]
			scale): B [84]						
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man** vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [85]	M	-	NA	Direct	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	ROM: B (ext, flx) [84]	M	-	NA	Indirect	= S-NS	Low
			Physical functioning (10-point scale): B [84]	M	-	NA	Direct	> SS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man** vs. ST	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	ROM: B (ext, flx) [84]	M	-	NA	Indirect	= S-NS	Low
			Physical functioning (10-point scale): B [84]	M	-	NA	Direct	> SS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man** vs. Ex	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	Headache frequency (mean number per week): B, C	M	-	NA	Direct	= S-NS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			[83]						
			VAS: B, C [83]	M	-	NA	Direct	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. Med	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C [51,140,329]	H	-	No	Direct	= >	Low
			NDI: C [51,140]	H	-	Yes	Direct	> SS	Low
			% pain-free pts: C [51]	H	-	NA	Indirect	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. Mob	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [308]	M	-	NA	Direct	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [309,310]	M	-	Yes	Indirect	> SS	Low
			ROM (ext): B [310]	M	-	NA	Indirect	> SS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			VAS: D [65]	M	-	NA	Direct	= S-NS	Low
			NDI: D [65]	M	-	NA	Direct	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. Ex	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Headache									
Man vs. NoTx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	ROM (ext, flx, rotation): B [311]	L	-	NA	Indirect	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, D [333]	M	-	NA	Direct	= S-NS	Low
			Pain duration (# of hours daily): B, D [333]	M	-	NA	Direct	= S-NS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			Use of analgesics (# of tablets daily): B, D [333]	M	-	NA	Indirect	= S-NS	Low
Man vs. Cold Packs	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	VAS: B [334]	M	-	NA	Direct	> SS	Low
			VAS: C [334]	M	-	NA	Direct	= S-NS	Low
			ROM (ext, flx): B, C [334]	M	-	NA	Indirect	= S-NS	Low
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-		-	-	Insufficient
		NS	-		-	-	-	-	Insufficient
Man vs. Mob	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Man vs. Ex	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo; Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable									

Ψ Grade (High, moderate, low, and insufficient)
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect
H = high
L = low
M = medium
- No evidence
** Manipulation in combination with mobilization
B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
= Similar beneficial effect

Population with acute/subacute pain. In total, there were four trials eligible for this section, all of which enrolled patients with nonspecific pain.[308,314,315,322]

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus another type/method of the same CAM. No relevant studies were identified.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation versus placebo. In one trial,[314] immediate post single treatment mean VAS scores indicated statistically significantly lower degree of pain in patients receiving ipsilateral manipulation compared to placebo ultrasound (23.6 ± 18.6 versus 46.5 ± 21.8, p = 0.001). There was no difference between the applications of contralateral manipulation and placebo in lowering pain intensity (p = 0.93).[314] Manipulation was administered by chiropractors.

In another trial,[308] manipulation delivered by trained chiropractors resulted in significantly lower pain intensity (VAS) compared with placebo (light hand placement on the side of neck without application of any side-different pressure or tension) immediately after the treatment (p = 0.01).

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus mobilization. In one trial,[308] the post-treatment mean VAS scores were not statistically significantly different between the patients randomized to manipulation and those randomized to mobilization (p = 0.16; no other numerical data were reported).

Manipulation (type 1) versus manipulation (type 2). In one trial,[314] the application of ipsilateral manipulation led to a lower intensity of pain on VAS compared to contralateral manipulation (41.4 ± 28.4, p = 0.0005).

Immediate post-treatment results of another trial indicated that spinal manipulation did not differ from manipulation with mechanically-assisted device (VAS: 21.8 ± 21.4 versus 20.4 ± 18.4, respectively, p = 0.77). [315] Both treatments were performed by experienced chiropractors.[315]

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. In one trial,[322] patients randomized to receive a combination of thoracic spine manipulation and electro-thermal therapy compared to those randomized to electro-thermal therapy alone, experienced greater short-term post-treatment mean improvements in pain – VAS score (between-group mean score difference: 26.5, 95 percent CI: 22.9, 30.2) and disability – the Northwick Neck Pain Questionnaire (NPQ) (between-group mean score difference: 8.8, 95 percent CI: 7.5, 10.1). The treatments were performed by an experienced manual therapist.

Population with chronic pain. A total of eight trials were included in this section.[51,140,311,316,317,326,328,329] All trials enrolled patients with nonspecific chronic neck pain. In four of these trials, the treatment of cervicogenic headaches was the primary goal.[311,316,317,328]

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus another type/method of the same CAM. No relevant studies were identified.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation versus placebo. In two studies, it was demonstrated that patients randomized to manipulation experienced significantly greater immediate post-treatment reduction in pain (measured on VAS, PPT) [326,330] and disability (measured on NDI)[326] compared to patients randomized to placebo (hand maneuver without high velocity thrust in patients naïve to spinal manipulation,[326] and sham ultrasound[330]). Treatments consisted of a single thoracic manipulation by physical therapists in one trial,[326] and five cervical osteopathic interventions over a 10 week period in the other trial.[330] In one trial,[311] the use of cervical manipulation performed by a trained chiropractor was associated with significant increase in cervical ROM (extension, flexion, rotation) compared to sham manipulation for cervicogenic headache.[311]

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus mobilization. No relevant studies were identified.

Manipulation (type 1) versus manipulation (type 2). One dose-response study,[328] showed significantly better response in headache-related pain intensity (VAS score) and disability (Modified Von Korff scale) with a higher dose of manipulation (three to four chiropractor visits per week for 3 weeks) compared to one chiropractor visit (per week for 3 weeks) in short-term followup.

Manipulation versus another type/method of the same CAM. No relevant studies were identified.

Manipulation versus other treatments. In one trial,[316] there was a significant improvement in pain intensity in the manipulation group versus TENS group (2.81 ± 1.15 versus 5.26 ± 1.83).[316] Both groups improved in pain intensity and ROM compared to baseline but there was no difference in post treatment scores between the groups in ROM measures (1.17 ± 0.86 versus 1.43 ± 1.04).

Another trial,[317] compared the effect of 3 weeks treatment with manipulation by registered chiropractors to that of low level laser and massage in patient with cervicogenic headaches. In this trial, the use of analgesics decreased by 36 percent in the manipulation group but was not changed in massage group. This difference was statistically significant (P = 0.04). This study also reported significantly greater improvement in number of headache hours per day in the manipulation group versus soft tissue massage group (decrease of 69 percent versus 37 percent, p = 0.03).[317]

Manipulation versus medication. In one trial,[329] although both manipulation (performed by a trained rheumatologist) and medication groups demonstrated improvement on mean VAS at 3 weeks (5.0 ± 3.2 versus 1.8 ± 3.1, P = 0.20), there was no significant difference between manipulation and medication (Diazepam) in short-term post-treatment reduction of pain (VAS). In contrast, findings from two other trials,[51,140] indicated a significant superiority of manipulation performed by experienced chiropractors over medication (e.g., NSAIDs, Celebrex, Vioxx,

Paracetamol) in reducing immediate/short-term post-treatment pain intensity and disability (Oswestry scale, NDI).[51,140] In one of these trials,[51] the proportion of pain-free patients after the treatment was significantly higher in the manipulation group compared to the medication group (27.3 percent versus 5.0 percent, p = 0.05).

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Population with mixed duration of pain. This section included eight trials.[65,306,309,310,312,321,323,327] All except for one trial included subjects with nonspecific pain.[321]

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus another type/method of the same CAM. No relevant studies were identified.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. In one trial,[321] patients with whiplash injuries receiving manipulation of thoracic spine (performed twice in combination with physiotherapy on the 5th and 10th sessions) had significantly greater mean reduction in pain score (VAS) at immediate/short-term post-treatment followup compared to patients treated with physiotherapy alone which consisted of active exercise, electrotherapy, ultrasound, and manual therapy (2.27 ± 0.87 versus 1.66 ± 0.91, p = 0.002).

Subjects with nonspecific pain.

Manipulation versus placebo. In one trial,[312] patients randomized to a single cervical manipulation experienced significantly greater immediate post-treatment percent increase (40.0 percent-55.0 percent) in pressure pain threshold (PPT) around fixation level of 4 tender points compared to placebo (0-0.8 percent, p < 0.0001). In another trial,[310] spinal manipulation was more effective than sham treatment in patients with mechanical neck pain in improving pain (VAS) and cervical ROM.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation versus mobilization. Results regarding the comparison of manipulation and mobilization in terms of improvement in pain and disability were reported for 3 trials and were inconsistent.[65,309,310] For example, in one trial in 100 patients with unilateral mechanical pain, manipulation was found to be more effective (nonsignificant) than mobilization in immediate post-treatment improvement in pain intensity (NRS-101, VAS).[309] In a larger trial (336 patients),[65] the intermediate-term post-treatment differences between the groups of manipulation and mobilization were clinically negligible and statistically nonsignificant with respect to pain intensity (NRS-11: -0.02, 95 percent CI: -0.69, 0.65) and disability (NDI: 0.46, 95 percent CI: -0.89, 1.82).

In one trial, comparing two different modalities of the combined treatment of manipulation and mobilization (thrust versus nonthrust), thrust manipulation/ mobilization group achieved greater short-term post-treatment improvements in disability (between-group mean NDI score difference: 10.03, 95 percent CI: 5.3, 14.7) and pain intensity (between-group mean Numeric Pain Rating Scale score difference: 2.03, 95 percent CI: 1.4, 2.7) compared to nonthrust manipulation/mobilization group of patients.[306]

Manipulation (type 1) versus manipulation (type 2). The effectiveness of manipulation based on endplay assessment and manipulation determined by sham was compared in one trial.[327] The

between-group differences in immediate/short-term post-treatment pain (NRS, McGill Pain Questionnaire or MPQ, VAS, PPT) and disability (NDI) were statistically nonsignificant.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Manipulation versus manipulation + other treatment. In one small trial[323] of 6 subjects randomized to receive either manipulation alone or in combination with postisometric relaxation, no meaningful results were obtained regarding the between-group differences in immediate post-treatment disability (NDI score) or pain intensity (VAS score) due to small sample size. The manipulation alone group had a numerical favor over the combination group.

Population with unknown duration of pain. This section included six trials comprising of patients with neck pain of unknown duration.[307,313,318-320,324,325] One of these trials enrolled patients with specific pain (facet syndrome, whiplash injury)[319,320] and the remaining five trials – patients with nonspecific neck pain.[307,313,318,324,325]

Subjects with specific pain.

Manipulation versus placebo. No relevant studies were identified.

Manipulation versus no treatment. No relevant studies were identified.

Manipulation (type 1) versus manipulation (type 2). In one trial of 30 patients with facet syndrome,[319] two approaches of manipulation (i.e., top segment adjustment in the direction of the restriction versus top and bottom segment adjustments in the direction of the restriction and the opposite direction, respectively) were compared in terms of short-term post-treatment reduction in pain intensity (NRS-101, MPQ-short form) and disability (NDI). Both groups had significantly improved pain and disability measures. The only between-group difference was observed for cervical forward flexion ROM in favor of the top and bottom segment adjustment technique.

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Manipulation versus placebo. In one trial,[325] manipulation was compared to placebo with respect to immediate-term post-treatment reduction in pain intensity (VAS). In this trial, patients who received manipulation had a significantly greater mean reduction in VAS scores (15.5, 95 percent CI: 11.8, 19.2) than those who received placebo (4.2, 95 percent CI: 1.9, 6.6).

Manipulation versus no treatment. In one trial,[324] manipulation groups had a modest improvement in cervical ROM or pain (VAS) compared to no treatment group. There was no significant difference between the manipulation and no treatment groups in immediate-term post-treatment pain intensity during left and right cervical rotation.[324]

Manipulation (type 1) versus manipulation (type 2). In three trials,[307,313,318] two different modalities of manipulation were compared. In the first trial,[318] there was no significant difference in post-treatment pain (MPQ-short form, NRS-101), disability (NDI), or ROM between the two approaches of manipulation (cervical versus cervical/thoracic). In the second trial[313] there was a modest advantage in improving muscle strength (in pounds) for manipulation applied in the upper and lower spine compared to that applied only in the lower spine (19.6 ± 6.5 versus 15.5 ± 6.4, $p = 0.05$). The third study reported similar beneficial effect of cervical rotatory

manipulation compared to supine lateral break manipulation in immediate and short-term post-treatment followup for pain intensity and disability (NRS, MPQ-short-form, and NDI), and cervical ROM.[307]

Manipulation versus other treatments. No relevant studies were identified.

Manipulation versus medication. No relevant studies were identified.

Manipulation + other treatments versus the same other treatments. No relevant studies were identified.

7 – Manipulation + Mobilization for Treatment of Neck Pain

Two studies were included in this section, both of which were reported in multiple publications (Table 3).

Population/trial characteristics. These studies were conducted in the Netherlands[85]and Australia.[81] The proportion of females was greater (70 percent of all patients) for the Australian study.[81] The treatment duration was 6 weeks in both trials.

Manual therapy in these trials were compared with exercise, physiotherapy, and no treatment.

Risk of bias. Both trials had fair risk of bias (i.e., scored two out of four on treatment allocation concealment, balance of baseline characteristics between the groups, patients' blinding status, and reasons/number of dropouts/withdrawals).

Efficacy. A summary of the key results is presented in Table 14. For further detail of the trials please see the evidence tables. (Appendix C, table 2.9 – table 2.16)

Population with acute/ subacute pain. No relevant studies were identified (see one study[85] in the Population with Chronic Pain sub-section).

Population with chronic pain.

Subjects with specific pain. No relevant studies were identified.

Subjects with nonspecific pain.

Manual therapy versus placebo. No relevant studies were identified.

Manual therapy versus no treatment. No relevant studies were identified.

Manual therapy versus medication. No relevant studies were identified

Manual therapy versus other treatments. In the first trial,[85]the use of manual therapy (spinal manipulation + mobilization) led to a significantly greater improvement in the main complaint (pain, and/or physical functioning measured by a 10-point scale) when compared to physiotherapy (exercise, massage, heat, electrotherapy, ultrasound, shortwave diathermy) in patients with chronic or sub-acute nonspecific neck pain. The mean difference in physical functioning at 12 weeks followup between physiotherapy and manual therapy while adjusting for baseline differences was 1.9. The unadjusted mean improvements from baseline in physical functioning at 12 weeks for the manual therapy and physiotherapy groups were 4.8 and 3.4, respectively. The mean changes in cervical ROM (forward flexion, lateral flexion, extension) between the groups ranged from zero to five degrees which were neither clinically meaningful nor statistically significant. The long-term results (12 months post-treatment)[85,87] were reported for the combined sample of subjects with low back and neck pain and therefore are not presented in this review.

In the second trial,[81,83] spinal manipulation plus mobilization with or without exercise (low load endurance exercises aimed to train muscle control of the cervico-scapular region) and exercise alone did not differ in the degree of reducing headache frequency (average number of headache days per week), intensity (VAS score: 0-10) and neck pain (percentage of patients who

improved ≥ 50 percent on a 10 point pain rating scale calculated from MPQ). However, all three active treatments were significantly better in reducing pain intensity and the frequency of headache than the control (i.e., no treatment) group ($p < 0.001$). In all active treatment groups, the median daily medication intake (Anatomical Therapeutic Chemical code) at 12 months post-treatment were significantly decreased (93 percent - 100 percent) compared to baseline. In contrast, the daily median medication intake in the no active treatment group increased by 33.0 percent compared to baseline ($p < 0.015$).

Population with mixed duration of pain. No relevant studies were identified.

Population with unknown duration of pain. No relevant studies were identified.

8– Manipulation for Treatment of Thoracic Pain

Only one trial[335] was identified and included in this section. In this trial, 30 subjects with nonspecific thoracic pain of unknown duration were randomized to receive either manipulation or placebo (nonfunctional ultrasound) for 3 weeks. The outcomes of interest, assessed immediately or short-term (1 month) after the end of treatment were ROM of the thoracic spine (flexion, extension, rotation) and pain threshold. The study authors also assessed subjective measures of pain intensity (VAS, MPQ) and disability (Oswestry).

Population/trial characteristics. This trial was conducted in the United Kingdom. The participants were men (47 percent) and women 16 – 55 years old. Half of study participants were 16 – 24 years old. Thoracic pain was located in mid section of thorax (T5 – T9) in 77 percent, and upper (T1 – T4) and lower sections (T10 – T12) of the thoracic spine in the remaining 23.0 percent. The intervention consisted of thoracic spine manipulation (n = 15) and the control consisted of nonfunctional ultrasound application which the study considered as placebo treatment (n = 15). The patients received treatment until they were free of symptoms or up to a maximum of 6 treatments during a minimum period of 2 weeks to a maximum period of 3 weeks with two to three treatments per week. A followup consultation for reassessment took place 1 month after the final treatment.

Risk of bias. This trial was rated as high risk of bias. Neither randomization nor treatment allocation concealment could be ascertained. The care provider and outcome assessors were not blinded to the intervention. The dropout rates were not reported either.

Efficacy. Please see Table 15 for the key efficacy results. Immediately after the end of treatment, there were statistically significant differences for right and left lateral flexion measures, between the manipulation and placebo groups, in favor of manipulation ($p < 0.025$). After 1 month of followup, the between-group differences for all the ROM measures were not statistically significant at $\alpha = 0.025$ ($p > 0.025$). The immediate post-treatment mean pain score (VAS) was significantly lower in the manipulation versus placebo group (21.9 ± 11.4 versus 35.6 ± 14.2, $p = 0.014$). Meanwhile, pain and disability scores of MPQ and Oswestry scales were not significantly different between the two groups of subjects. At 1 month of followup, only pain measured on MPQ was significantly lower in the manipulation versus placebo group (0.08 ± 0.18 versus 0.13 ± 0.11, $p = 0.03$).

Table 15 – Key Results – Manipulation therapy for thoracic pain

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Man vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [335]	H	-	NA	Direct	> SS	Low
			MPQ: B [335]	H	-	NA	Direct	= S-NS	Low
			MPQ: C [335]	H	-	NA	Direct	> SS	Low
			Oswestry: B [335]	H	-	NA	Direct	= S-NS	Low
			ROM (right/left lateral flx): B [335]	H	-	NA	Indirect	> SS	Low
			ROM (flx, ext, rotation): C [335]	H	-	NA	Indirect	= S-NS	Low

S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo; Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable

[Ψ] Grade (High, moderate, low, and insufficient)

B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium
- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

9– Mobilization for Treatment of Low Back Pain

This section included 18 trials. One trial was reported in two publications (Table 3)

Population/trial characteristics. The studies were conducted in Australia (three),[336-338] Canada (one),[279], Bulgaria (one),[339] China (one),[340] Finland (four),[341-344] Spain (one),[345], Sweden (one),[346] Thailand (one),[347] United Kingdom, (one)[348] and United States (four).[55,349-351]

The proportion of men and women was similar in nine studies, [55,336,338-341,343,344,348] and differed (> 60.0 percent men or women) in six trials.[279,337,345,347,350,351] Two studies included either only women[346] or only men.[349] Information on gender was not reported for one study.[342]

The trials recruited adults with the mean age ranging from about 20.0 years[349] to 47.0 years.[336] Table 16 presents the control interventions in the included studies.

Table 16. Mobilization for treatment of low back pain- Control interventions

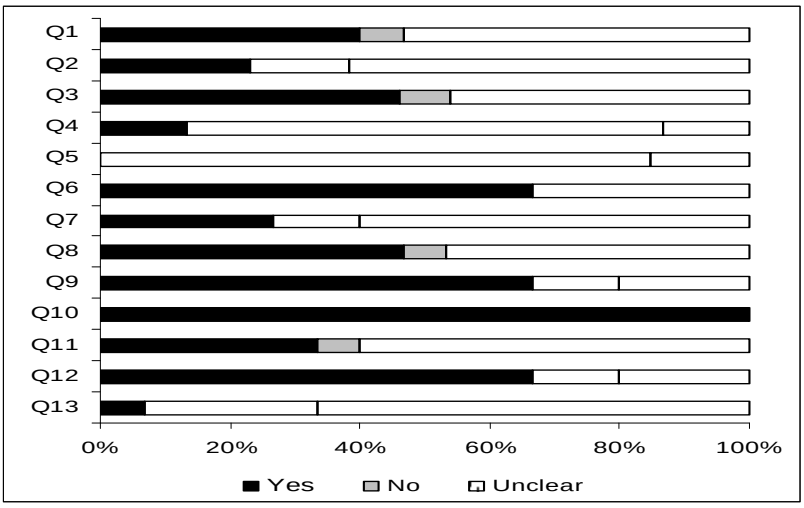
Type of control group	Cause of Pain	N studies	Detail of Control intervention
1 – Inactive treatments			
Placebo/sham	Non Specific	2	Comfortable positioning of patients without physical contact ,[348] sham mobilization[339]
	Specific	1	Manual transverse frictions on the gluteus medius muscles[346]
No treatment	Non Specific	3	Control without any manual or physical treatments[337,345,349]
	Specific	0	NA
2 – Active treatments			
Exercise/physical activity	Non Specific	3	Rhythmical bending of lumbar spine and stretching,[342] press up maneuver in prone position,[350] home exercise with specific instruction by physiotherapist[344]
	Specific	1	Low-tech exercise consist of McKenzie technique and spinal stabilization exercises,[351] high-tech exercise consist of cardiovascular, isotonic and isokinetic exercise[351]
Physiotherapy	Nonspecific	4	massage, therapeutic stretching, trunk stabilization exercise, exercise therapy,[341] manual, thermal, and electrotherapies according to the Finnish routine, massage, specific mobilizations, and manual traction, stretching[342] massage, therapeutic stretching and exercise therapy,[343] manual therapy without thrusts, thermal, electrotherapy[344]
	Specific	0	NA
Traction	Nonspecific	1	Traction with sham mobilization,[339]
	Specific	0	NA
Physical modalities	Nonspecific	1	Sinous-modulated current therapy and sham mobilization,[339]
	Specific	1	Hot-pack, ultrasound, TENS,[351]
Manual therapy	Nonspecific	3	Spinal manipulation,[55,279] massage[347]
	Specific	1	Massage[340]
Other technique of spinal mobilization	Nonspecific	1	Postero-anterior mobilization at the most symptomatic lumbar spine (vs. same technique at randomly selected lumbar level)[338]
	Specific	0	NA

NA= not applicable

The number of treatments used in 10 studies ranged from one [279,336-338,345,347,349,350] to five sessions.[341,343] In three studies, up to 10 [342,344] or 12 sessions,[339] and in one study[351] – 24 treatments sessions were provided. This information was not clearly reported for four studies.[55,340,346,348]

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 31. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for 38 percent and 19 percent of the trials, respectively. Only about half of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. In 69.0 percent of the trials, study participants were not blinded to the treatment. Up to 63.0 percent of the trials reported acceptable dropout rate. Results based on intention-to-treat analysis were explicitly reported for 31.0 percent of the trials. The data for selected items of the risk of bias tool across the CAM interventions (acupuncture; spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.1 of Appendix G.

Figure 31. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in Table 17. For further detail of the trials please see the evidence tables. (Appendix C, table 1.17 – table 1.20)

Table 17. – Key results – Mobilization therapy for low back pain

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Mob vs. No Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [349]	H	-	NA		> SS	Low
			MPQ: B, C [349]	H	-	NA	Direct	> SS	Low
	Chronic	S	Oswestry: B, C [351]	H	-	NA	Direct	= S-NS	Low
		NS	VAS: B [345]	M	-	NA	Direct	> SS	Low
			ROM (right and left side bending): B [345]	M	-	NA	Indirect	> SS	Low
			RMDQ: B [345]	M	-	NA	Direct	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [337]	H	-	NA	Direct	= S-NS	Low
			ROM (flx, ext, FTF): B, C [337]	H	-	NA	Indirect	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. PL	Acute/sub-acute	S	VAS: B [346]	H	-	NA	Direct	= S-NS	Low
			ROM (flx, ext): B [346]	H	-	NA	Indirect	= S-NS	Low
			% pts using analgesics: B [346]	H	-	NA	Indirect	> SS	Low
			Median duration of sick leave: B [346]	H	-	NA	Indirect	> SS	Low
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [348]	M	-	NA	Direct	= S-NS	Low
			ROM (ext, FTF): B, C [348]	M	-	NA	Indirect	= S-NS	Low
			ROM (full and total flx): B [348]	M	-	NA	Indirect	> SS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
	Chronic	S	Oswestry: B, C [351]	H	-	NA	Direct	= S-NS	Low
		NS	VAS: B	M	Precise (2) £ [341,343]	No	Direct	> SS	Low
			Oswestry: B	M	Precise (2) [341,343]	Yes	Direct	> SS	Moderate
			FTF: B	M	Precise (2) [341,343]	Yes	Direct	= S-NS	Moderate
			VAS: B, D [344]	H	-	NA	Direct	= S-NS	Low
			ROM (modified Schober test): B, D [344]	H	-	NA	Indirect	= S-NS	Low
			SLR (degrees): B, D [344]	H	-	NA	Indirect	= S-NS	Low
			ROM (ext; in degrees): B, D [344]	H	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	Oswestry: B [342]	M	-	NA	Direct	= S-NS	Low
			Oswestry: D [342]	M	-	NA	Direct	> SS	Low
			# of sick leave days: B, C, D [342]	M	-	NA	Indirect	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. Man	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	RMDQ: B [55]	M	-	NA	Direct	< SS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	PPT: B [279]	M	-	NA	Direct	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. Ma	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
		NS	VAS: B [347]	H	-	NA	Direct	< SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	VAS: B [340]	H	-	NA	Direct	= S-NS	Low
		NS	-	-	-	-	-	-	Insufficient
Mob vs. Ex	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	ROM (modified Schober test): B, D [344]	H	-	NA	Indirect	= S-NS	Low
			SLR (degrees): B, D [344]	H	-	NA	Indirect	= S-NS	Low
			ROM (ext; in degrees): B, D [344]	H	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [350]	H	-	NA	Direct	= S-NS	Low
			ROM (ext): B [350]	H	-	NA	Indirect	= S-NS	Low
			Oswestry: B [342]	M	-	NA	Direct	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo; Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable

Ψ Grade (High, moderate, low, and insufficient)
£ Number of pooled trials

B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium

- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

Population with acute/subacute pain. There were four trials, of which, three trials studied subjects with nonspecific pain[55,339,349] and one – subjects with cause-specific pain (i.e., pelvic joint dysfunction.[346]

Subjects with specific pain.

Mobilization versus placebo. In one trial,[346] consisting of mostly women (96.0 percent) affected by sacroiliac joint dysfunction, there was no statistically significant difference in post-treatment pain intensity and lumbar mobility between subjects in the mobilization and placebo (massage therapy consisting of manual transverse frictions of the gluteus medius muscle) groups. The median number of analgesic pills taken was significantly higher in the placebo group (median: 3.5, range: 0-54) compared to mobilization group (median: 0, range: 0-132). The median duration of sick leave (in days) was also significantly greater in the placebo (median: 14, range: 0-26) versus mobilization group (median: 7, range: 0-35).

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. In one trial,[349] mobilization was compared to no treatment in post-treatment pain and disability. Immediately or short-term after the end of treatment, mobilization group had significantly lower pain scores (VAS, MPQ; $p = 0.001$) compared to 'no treatment' group.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments.

In one trial,[339] immediate or intermediate-term post-treatment pain intensity was significantly lower in the mobilization group compared to electro-stimulation, traction, or medication group.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Mobilization versus manipulation. In one trial,[55] 2 weeks after the randomization, the manipulation group of subjects had a significantly better disability score (RMDQ) compared to the mobilization group.

Population with chronic pain. Seven trials were included in this sub-section,.[279,341,343-345,347,351] Of these, six trials studied subjects with nonspecific LBP and one trial included post-laminectomy patients.[351]

Subjects with specific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. Immediate and short-term post-treatment degree of disability (Oswestry score) did not differ between the mobilization and no treatment groups. [351]

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. Immediate and short-term post-treatment degree of disability (Oswestry score) did not differ between the subjects who received mobilization and physiotherapy (physical modalities including exercise).[351]

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. Kaltenborn's wedge assisted posteroanterior mobilization was shown to be significantly superior to 'no treatment' in improving pain (VAS: $p < 0.001$), back bending mobility (right side: $p < 0.004$, left side: $p < 0.02$), and disability (RMDQ: $p < 0.003$).[345]

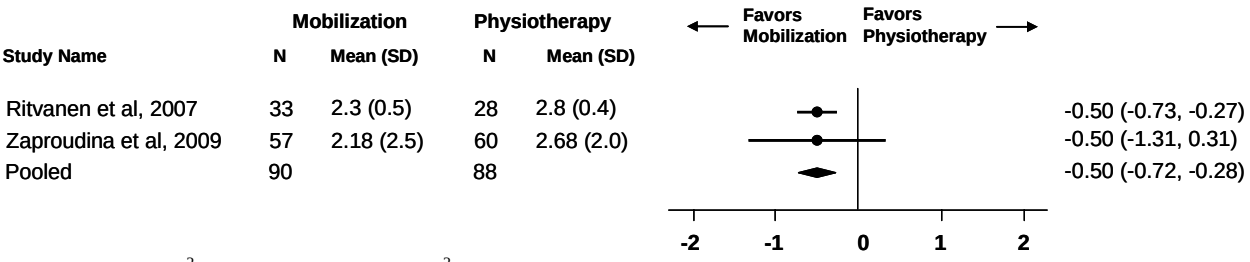
Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. In two trials, mobilization (traditional bone setting technique) was compared with physiotherapy (massage, therapeutic stretching, trunk stabilization exercise, and exercise therapy) in terms of pain intensity (VAS), disability (Oswestry), back mobility (lateral bending), quality of life (HRQoL-15D questionnaire), and global assessment (scores from -1 to +10).[341,343] In one of these trials,[343] scores for 1 month post-treatment global assessment and quality of life were better in the mobilization compared to physiotherapy group.

Based on the results from two meta-analyses (Figures 32-33), subjects with chronic nonspecific LBP in the mobilization groups had significantly reduced immediate post-treatment pain intensity (pooled mean difference in VAS score: -0.50, 95 percent CI: -0.72, -0.28)[341,343] or disability (pooled mean difference in Oswestry score: -4.93, 95 percent CI: -5.91, -3.96) [341,343] compared to those in the physiotherapy groups. According to a meta-analysis of the same trials (Figure 34),[341,343] the mean difference in finger to floor distance (in cm) between the mobilization and placebo groups was not statistically significant (pooled mean difference: -0.89, 95 percent CI: -1.89, 0.12)

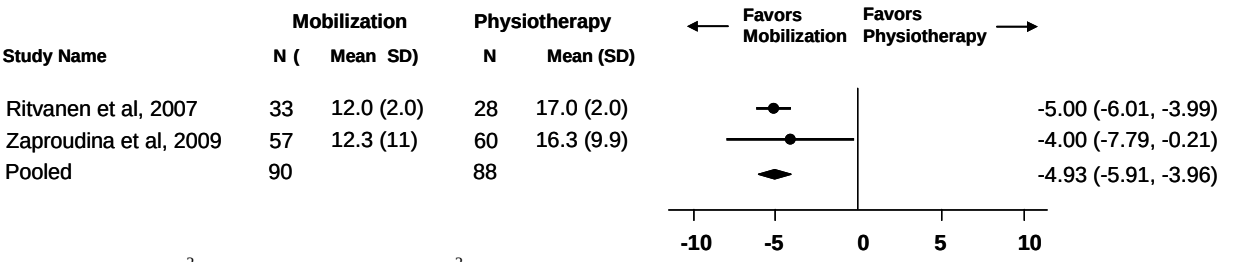
In one trial,[344] there was no difference between subjects in the mobilization versus physiotherapy or exercise (light back movements) groups with respect to immediate and intermediate-term post-treatment pain intensity (VAS), ROM (modified Schober's test; extension in degrees), and straight leg raising. In this study mobilization was performed by folk-healers practitioners who had no formal medical education.

Figure 32. Pain intensity (VAS score) – Immediate post-treatment



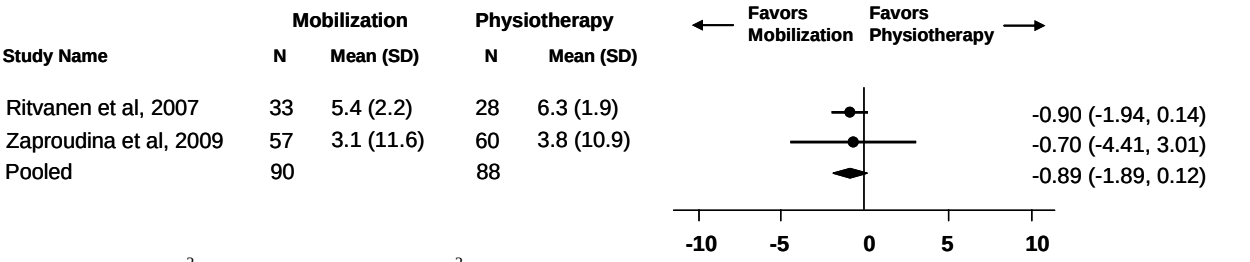
Heterogeneity: $Chi^2 = 0.0$, df = 1 (P = 1.00); $I^2 = 0.0\%$

Figure 33. Disability (Oswestry score) – Immediate post-treatment



Heterogeneity: $Chi^2 = 0.24$, df = 1 (P = 0.61); $I^2 = 0.0\%$

Figure 34. **Finger to floor distance (in cm) – Immediate post-treatment**



Heterogeneity: $Chi^2 = 0.01$, df = 1 (P = 0.91); $I^2 = 0.0\%$

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Mobilization versus manipulation. In one trial,[279] short-term post-treatment effects of mobilization and manipulation on pain were compared. The post-treatment pain pressure threshold was similar in the manipulation and mobilization groups.

Mobilization versus massage In one trial,[347] short-term post-treatment effects of mobilization and massage on pain were compared. The post-treatment pain intensity (VAS) was slightly but significantly greater in the mobilization group compared to the massage group (3.36 ± 0.25 versus 2.48 ± 0.25, p = 0.017).

Population with mixed duration of pain. Six trials were included in this sub-section.[336-338,342,348,350] All of these trials enrolled subjects with nonspecific LBP in whom the effect of

mobilization was compared to that of 'no treatment',[337] placebo,[348] exercise,[342,350] or physiotherapy.[342] In two trials,[336,338] two delivery modes of mobilization were compared (therapist-selected levels versus randomly selected levels).

Subjects with specific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

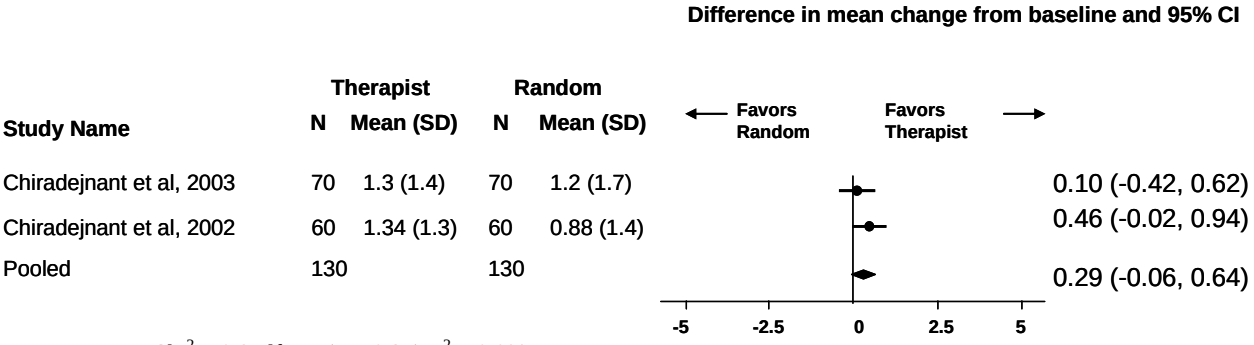
Mobilization versus placebo. In one trial,[348] mobilization did not significantly differ from placebo (consisted of patients lying in a comfortable position with no manual intervention applied) in reducing immediate or short-term post-treatment pain intensity (VAS) or spinal ROM (flexion, extension, finger-to-floor). There was a small but a statistically significant difference in favor of mobilization (versus placebo) for improving spinal ROM (true flexion: 49.2º ± 16.4 versus 45.3 º ± 14.1, p = 0.005; total flexion: 76.7 º ± 22.4 versus 69.7 º ± 21.5, p = 0.005) immediately after the treatment. The intervention was provided by experience physiotherapist trained for mobilization for movement techniques.

Mobilization versus no treatment. In one trial, [337]mobilization did not significantly differ from 'no treatment' in reducing immediate or short-term post-treatment pain intensity (VAS) or spinal ROM (flexion, extension, finger-to-floor).

Mobilization (type1) versus mobilization (type2). In one of the two trials,[336,338]comparing therapist-selected levels to randomly selected levels of mobilization, current pain intensity was significantly reduced in the therapist-selected group (1.34, 95 percent CI: 1.02, 1.66) compared to the random group (0.88, 95 percent CI: 0.52, 1.24).[338] The reduction in pain (NRS-11) was greater for subjects whose most painful movement was flexion (as opposed to extension, lateral flexion). The post-treatment spinal ROM (fingertip-to-floor, flexion, extension, lateral flexion, worst movement) or global perceived effect did not differ between the groups.[338] In contrast, results from the other trial,[336] indicated no significant difference between the two types of mobilization in terms of immediate pain reduction (NRS-11: 1.3 ± 1.4 versus 1.2 ± 1.7, p > 0.05). Significant interaction effects were found for the most painful movement direction for the left (p = 0.006) and right lateral flexion (p = 0.02).

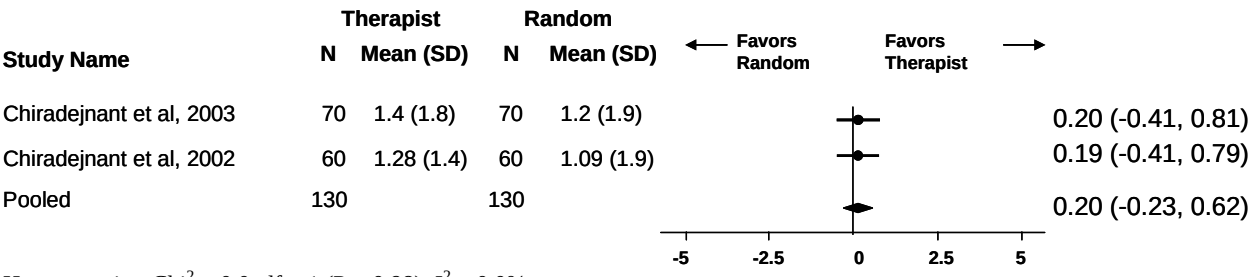
A series of meta-analyses based on the above-mentioned trials (Figures 35-41)[336,338] did not show any significant differences between the two modalities of mobilization for mean improvement in pain intensity (pooled mean reduction in VAS score: 0.29, 95 percent CI: -0.06, 0.64), global perceived scale (0.20, 95 percent CI: -0.23, 0.62), extension (pooled mean change in degrees: 0.01, 95 percent CI: -0.83, 0.85), flexion (pooled mean change in degrees: 0.90, 95 percent CI: 0.16, 1.96), and finger to floor distance (pooled mean change in degrees: 0.88, 95 percent CI: -0.12, 1.88). Similarly, the pooled estimates for differences between mean changes of the two groups for right lateral flexion (0.14, 95 percent CI: -0.51, 0.79) and left lateral flexion (mean degrees: 0.31, 95 percent CI: -0.35, 0.96) were not statistically significant.

Figure 35. Pain intensity (VAS score) – Immediate post-treatment



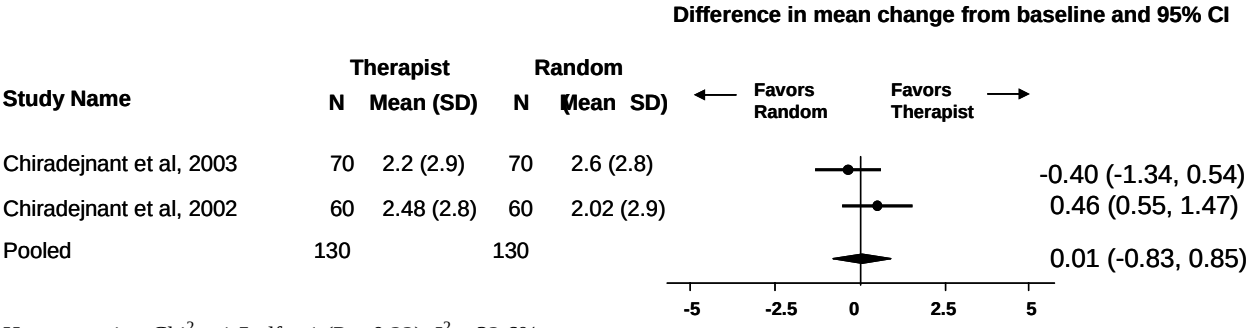
Heterogeneity: $Chi^2 = 0.9$, df = 1 (P = 0.31); $I^2 = 0.0\%$

Figure 36. Global perceived scale – Immediate post-treatment



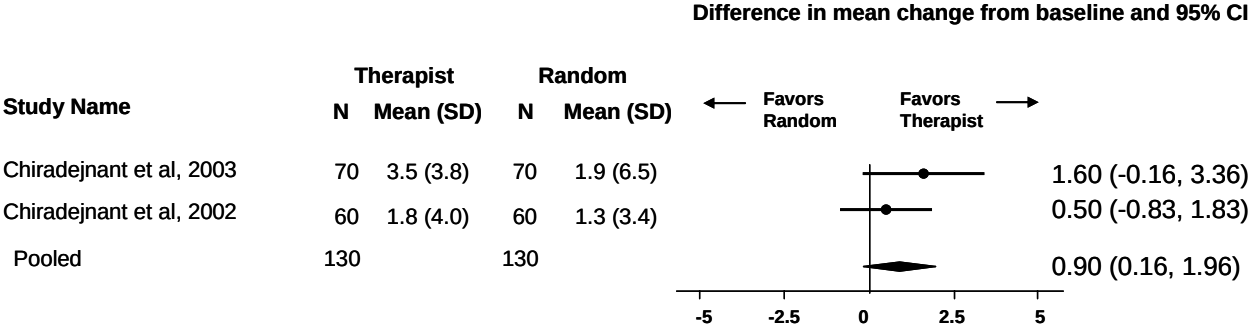
Heterogeneity: $Chi^2 = 0.0$, df = 1 (P = 0.98); $I^2 = 0.0\%$

Figure 37. Range of mobility (lumbar extension) – Immediate post-treatment



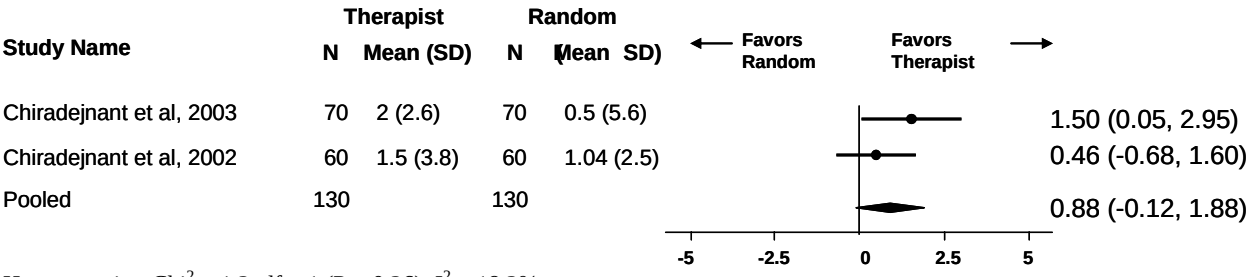
Heterogeneity: $Chi^2 = 1.5$, df = 1 (P = 0.22); $I^2 = 32.6\%$

Figure 38. Range of mobility (lumbar flexion) – Immediate post-treatment



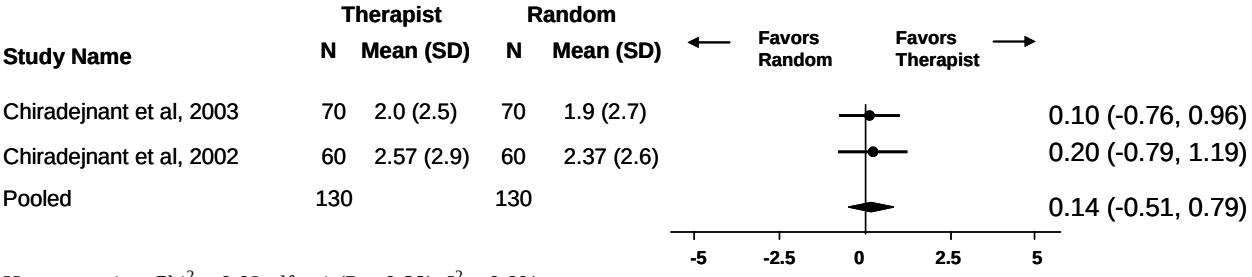
Heterogeneity: $Chi^2 = 0.9$, df = 1 (P = 0.32); $I^2 = 0.0\%$

Figure 39. Finger to floor distance (in cm) – Immediate post-treatment



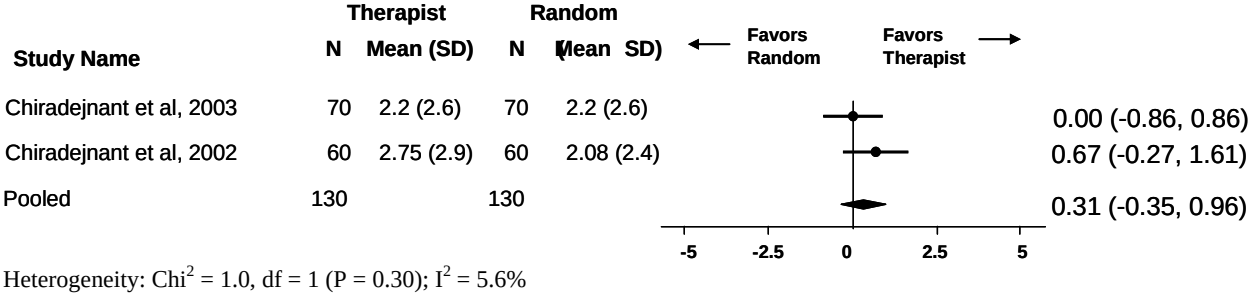
Heterogeneity: $Chi^2 = 1.2$, df = 1 (P = 0.26); $I^2 = 18.2\%$

Figure 40. Range of mobility (right lateral flexion; in degrees) – Immediate post-treatment



Heterogeneity: $Chi^2 = 0.02$, df = 1 (P = 0.88); $I^2 = 0.0\%$

Figure 41. Range of mobility (left lateral flexion; in degrees) – Immediate post-treatment



Heterogeneity: $Chi^2 = 1.0$, df = 1 (P = 0.30); $I^2 = 5.6\%$

Mobilization versus other treatments. Results from two trials comparing mobilization to a press up exercise indicated either no significant difference between the two in reducing pain (VAS) and lumbar ROM (total lumbar extension) immediately after the end of a single treatment[350] or a slight numerical difference in favor of mobilization (bone-setting) (versus exercise) in reducing disability (Oswestry) at intermediate-term after the end of 6 weeks treatment (manual, thermal, and electrotherapies according to the Finnish routine) within-group reductions: 5.9 percent, $p = 0.009$ versus 6.2 percent, $p = 0.02$, respectively).[342] In the second trial,[342] there was no difference between bone-setting and physiotherapy in terms of reduction of the Oswestry disability score (within-group reductions: 4.7 versus 4.0). In this trial, reduction in number of sick leaves was not statistically or clinically significant between the three groups during one year post intervention. The average number of visits to health centers for back pain decreased in all groups, with significant changes only in physiotherapy (mean change from year before therapy = 0.5 compared with 0.1 in bone setting, and -0.1 in exercise group, $p < 0.1$).[342]

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Population with unknown duration of pain. One trial was included in this section. This trail included subjects with lumbar intervertebral disc protrusion-induced back-leg pain.[340]

Subjects with specific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus massage. In one trial of subjects with LBP due to disc protrusion, there was no statistically significant difference in post-treatment pain intensity on VAS (5.59 ± 0.80 versus 4.71 ± 0.52, $p > 0.05$) between the groups of mobilization (oblique-pulling method) and massage (kneading method of tender points).[340]

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

10 - Mobilization for Treatment of Neck Pain

This section included 11 trials. Note that two trials were reported in multiple publications (Table 3). Results from four trials comparing mobilization to manipulation,[65,308-310] are presented in the Spinal Manipulation section. Results from one trial are presented in Acupuncture section.[265] Results of cost effectiveness for one trial[62-64] are reported in the respective section.

Population/trial characteristics. The trials were conducted in Finland (two)[352,353], Belgium (one)[354], Canada (two)[309,355], Spain (one) [310], Germany (one)[308], Sweden (one)[356], Thailand (one)[357], United States (one) [65], and the Netherlands (one).[62]

In total, 1,504 patients were included in these trials. All studies recruited adults aged 18 years or older. In four studies, the majority were women.[65,310,352,354] The proportion of men and women was similar in four studies,[308,353,355,357] and differed in one study,[358] and were not reported for two studies.[309,356] Table 18 presents the control interventions in the included studies.

Table 18. Spinal mobilization for treatment of neck pain- Control interventions

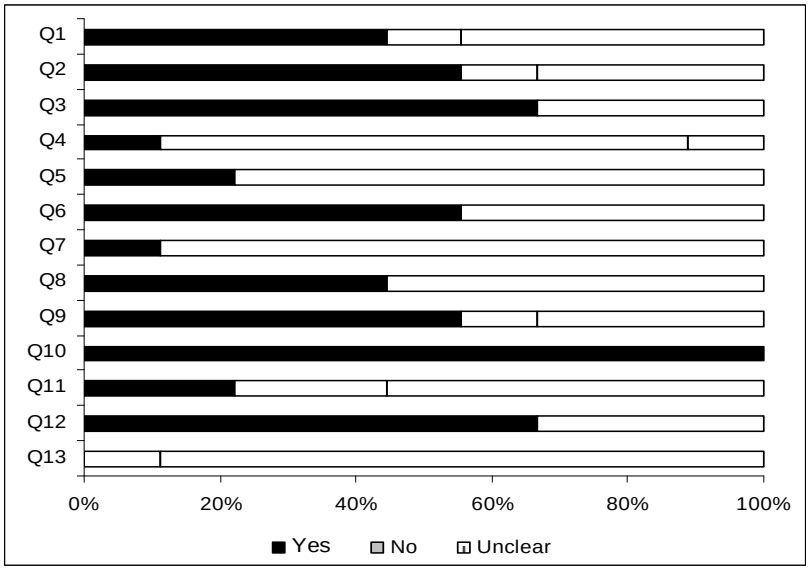
Type of control group	Cause of Pain	N studies	Detail of Control intervention
1 – Inactive treatments			
Placebo/sham	**Non Specific**	**3**	**Manual contact without any movement of cervical spine or tension in the region,[308,355,356]**
	Specific	**0**	**NA**
No-treatment/ waiting list	**Non Specific**	**1**	**No physical contact[355]**
	Specific	**0**	**NA**
2 – Active treatments			
Education	**Non Specific**	**0**	**NA**
	Specific (whiplash)	**1**	**Information and advise on staying active,[359]**
Physiotherapy	**Nonspecific**	**1**	**Massage, therapeutic stretching, and exercise therapy,[353]**
	Specific	**0**	**NA**
Cervical collar	**Nonspecific**	**0**	**NA**
	Specific (whiplash)	**1**	**Semi-rigid neck collar,[359]**
Physical modalities	**Nonspecific**	**0**	**NA**
	Specific	**1**	**Ultrasound,[354]**
Manual therapy	**Nonspecific**	**4**	**Manipulation,[65,308-310] massage,[353]**
	Specific	**0**	**NA**
Other methods of mobilization	**Nonspecific**	**1**	**Randomly selected (vs. therapist selected) mobilization[357]**
	Specific	**1**	**Antero-posterior unilateral pressure,[320] cervical oscillatory rotation,[320] transverse oscillatory pressure[320]**
NA= not applicable			

In five trials, single session of treatment was applied.[309,310,354,355,357] The duration of treatment in the remaining six trials was up to 8 weeks.[62,65,308,352,353,356]

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 42. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for 44.0 percent and 56.0 percent of the trials, respectively. About 67.0 percent of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. In 78.0 percent of the trials, study participants were not

blinded to the treatment. Up to 56.0 percent of the trials reported acceptable drop-out rate. Results based on intention-to-treat analysis were explicitly reported for 22.0 percent of the trials. The data for selected items of the risk of bias tool across the CAM interventions (acupuncture; spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.2 of Appendix G.

Figure 42. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in Table 19. For more detail of trials please see evidence tables. (Appendix C, table 2.18 – table 2.19)

Table 19 – Key results – Mobilization therapy for neck pain

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Mob vs. No Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [355]	M	-	NA	Direct	> SS	Low
			PPT: B [355]	M	-	NA	Direct	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [352]	H	-	NA	Direct	> SS	Low
			Pain medications taken (# of pills annually): B, C [352]	H	-	NA	Indirect	= S-NS	Low
			# of sick leave days: B, C, D [352]	H	-	NA	Indirect	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [308]	M	-	NA	Direct	> SS	Low
	Chronic	S	-	-	-	NA	-	-	Insufficient
		NS	VAS: B [355]	M	-	NA	Direct	= S-NS	Low
			PPT: B [355]	M	-	NA	Direct	> SS	Low
	Mixed	S	-	-	-	-	-	-	-
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. Ma	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: D [353]	M	-	NA	Direct	> SS	Low
			NDI: D [353]	M	-	NA	Direct	> SS	Low
			# of sick leave days: D [353]	M	-	NA	Indirect	> SS	Low

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
			Global assessment (score: -1, +10): D [353]	M	-	NA	Indirect	> SS	Low
			ROM (rotation, frons-knee distance): D [353]	M	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: D [353]	M	-	NA	Direct	> SS	Low
			NDI: D [353]	M	-	NA	Direct	> SS	Low
			# of sick leave days: D [353]	M	-	NA	Indirect	> SS	Low
			% pts using analgesics: D [353]	M	-	NA	Indirect	> SS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	VAS: D[62]	H	-	NA	Direct	> SS	Low
			NDI: D[62]	H	-	NA	Direct	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Mob vs. ST	Acute/sub-acute	S	-	-	-	-	-	-	-
		NS	-	-	-	-	-	-	-
	Chronic	S	-	-	-	-	-	-	-
		NS	-	-	-	-	-	-	-
	Mixed	S	-	-	-	-	-	-	-
		NS	VAS: D[62]	H	-	NA	Direct	= S-NS	Low
			NDI: D[62]	H	-	NA	Direct	= S-NS	Low
	Unknown	S	-	-	-	-	-	-	-
		NS	-	-	-	-	-	-	-

S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo;

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable									

[Ψ] Grade (High, moderate, low, and insufficient)

B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium

- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

Population with acute/subacute duration of pain. One trial,[308] was included in this section. This trial enrolled patients with nonspecific pain. Additional results from this trial are also reported in the Spinal Manipulation, Acute Neck Pain sub-section.

Subjects with specific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Mobilization versus placebo. In one trial,[308] patients in mobilization group had significantly ($p < 0.01$) lower intensity of pain compared to placebo (hand placement without any pressure or tension).

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Population with chronic duration of pain. There were two trials included in this sub-section, one studied subjects with nonspecific chronic neck pain,[355] and the other - subjects with specific chronic neck pain.[358]

Subjects with specific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Mobilization versus placebo. In one trial,[355] post-treatment mean VAS scores were not significantly different between mobilization and placebo (hand placement without movement of vertebral segment) groups ($p = 0.09$). However, the mobilization group had a significantly greater PPT mean score compared to the placebo group.

Mobilization versus no treatment. In one trial, [355] post-treatment mean PPT and VAS scores in the mobilization group were significantly greater compared to no treatment group ($p < 0.001$ and $p = 0.04$, respectively).

Mobilization versus another type/method of the same CAM. No relevant studies were identified

Mobilization versus other treatments (including CAM). In one trial,[353] subjects who received bone setting experienced significantly greater improvements in pain intensity (PPT, VAS) and disability level (NDI) compared to patients who received physiotherapy (massage, therapeutic stretching, and exercise therapy) or traditional massage. Moreover, patients in the bone-setting group during 1 year of followup had a lower number of sick leave days (0.61 per person) compared to those in the physiotherapy (2.6 per person) or the traditional massage group (3.9 per person). Similarly, the bone-setting group had a greater percent decrease in the use of analgesics compared to physiotherapy and traditional massage groups (65.7 percent, 50.0 percent, and 56.2 percent, respectively).

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Population with mixed duration of pain. There were eight trials included in this section.[62,65,309,310,352,354,356,357] Only one trial included patients with pain due to specific cause - neurogenic disorder.[354] In these trials clinical benefits/harms of mobilization were compared to those of no treatment,[352] manipulation,[65,309,310] mobilization,[357] placebo,[354], continued GP care,[62] physiotherapy,[62] or analgesic medication.[356]

Results from three trials where mobilization is compared to manipulation,[65,309,310] are also presented in the Spinal Manipulation, Mixed Duration Neck Pain sub-sections.

Subjects with specific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. In a small trial of 20 patients diagnosed with neurogenic cervicobrachial pain,[354] the efficacy of mobilization performed by physical therapist was compared to pulsed ultrasound applied over the painful area. The application of mobilization technique was associated with statistically significant immediate post-treatment improvement compared to baseline in pain intensity on VAS (from 7.3 ± 1.8 to 5.8 ± 2.1, $p = 0.005$) and cervical ROM (from 137.3 ± 15.4 to 156.7 ± 10.7, $p = 0.0005$). In contrast, in control group, the corresponding within-group changes in VAS (from 7.7 ± 1.9 to 7.4 ± 1.8, $p = 0.16$) and ROM (from 130.2 ± 14.7 to 130.7 ± 16.0, $p = 0.78$) were not significant. Statistical test results for the inter-group comparisons (mobilization versus placebo) were not provided.[354]

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. In one study,[352] the use of bone-setting resulted in a significantly greater proportion of improved subjects (> 50 percent improvement in VAS) compared to control group (neither offered nor denied treatment) after 5 weeks ($p = 0.04$) and 6 months ($p = 0.002$) of treatment. This difference was not statistically significant after one year ($p = 0.2$). In this trial slight self-rated improvement compared with baseline was reported after 5 weeks by 20/21 subjects in the massage group versus 3/17 subjects in the control group ($p < 0.001$). These rates were 15/20 versus 6/18 ($p = 0.01$) after 5 weeks, and 16/20 versus 5/18 ($p = 0.002$) after one year. There were no statistically significant differences between bone-setting

and the no treatment group in the annual number of pain medications taken (63 ± 146 versus 188 ± 332, p = 0.1) and the number of sick leave days (4.5 ± 20.0 versus 16.9 ± 53, p = not reported).[352]

Mobilization (type 1) versus mobilization (type 2). One trial,[357] comparing an immediate post-treatment effect of randomly chosen mobilization versus preferred mobilization, showed similar degree of global perceived effect (an ordinal 7-point scale; ranging from 1 = completely recovered to worse than ever = 7) and pain intensity (VAS) between the two groups. The same trial indicated the preferred mobilization group being superior to randomly chosen mobilization group with respect to cervical flexion ROM (p = 0.024).

Mobilization versus other treatments. In one trial,[62] spinal mobilization led to statistically significant improvement in pain intensity (VAS) compared to GP care which consisted of counseling and advice on staying active, role of psychosocial factors, self-care such as heat application, home exercises, and ergonomic advice (mean difference 0.9, 95 percent CI: 0.1, 1.5) but not to physiotherapy including specific exercises (mean difference 0.3, 95 percent CI: -0.6, 1.2) in short term followup. At the same followup, there was no significant difference for disability (NDI) between the treatment groups. At 52 weeks, spinal manipulation faired statistically significantly better than physiotherapy (mean difference 1.0, 95 percent CI: 0.1, 1.9) in improving pain intensity (VAS), but not compared to GP care (mean difference 0.5, 95 percent CI: -0.4, 1.3).

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. In one trial,[356] short-term post-treatment analgesic effect of mobilization and medication (Premaspin 0.5 g daily) was significantly greater compared to the same medication alone (pain free subjects: 48 percent versus 12 percent, p < 0.05).

Population with unknown duration of pain.

Subjects with specific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization (type 1) versus mobilization (type 2). In one trial,[320] there was a significantly (p < 0.001) higher proportion of pain-free subjects in the anterior-posterior unilateral pressure (63.0 percent) and posterior-anterior unilateral pressure (46.0 percent) groups compared to subjects in the cervical oscillatory rotation (17.0 percent) and transverse oscillatory pressure groups (25.0 percent). This trial included patients with cervical spondylolysis.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Mobilization versus placebo. No relevant studies were identified.

Mobilization versus no treatment. No relevant studies were identified.

Mobilization versus another type/method of the same CAM. No relevant studies were identified.

Mobilization versus other treatments. No relevant studies were identified.

Mobilization versus medication. No relevant studies were identified.

Mobilization + other treatments versus the same other treatments. No relevant studies were identified.

11 - Massage for Treatment of Low Back Pain

A total of 20 trials were included in this section. Four trials were reported in multiple publications (Table 3).

Population/trial characteristics. The trials were conducted in Belgium (one),[360] Canada (one),[361] China (two),[340,362] Germany (one),[41] Hungary (one),[363] Taiwan (two),[364,365] Hong Kong (one),[366] Thailand (two),[347,367] United Kingdom (three),[90,368,369] and United States (six).[29,101,295,370-372]

The proportions of women and men were similar for 13 studies (40.0 percent-60.0 percent).[29,41,295,340,360-363,365,369-372] In five studies, there were more women than men,[90,347,364,366,367] and in one – more men.[101] The proportions of men and women could not be ascertained for one trial.[368]

The study participants were adults aged 18 or older. Information regarding ethnicity was reported for only three trials.[29,370,372] For one Chinese study, the participants' ethnicity was assumed to be Asian.[362] The majority of subjects (> 65.0 percent) in two studies were Caucasians.[29,372] The remaining studies did not report any data on ethnicity.

In total 2,953 subjects with low back pain (of specific and nonspecific cause) were included in these trials and 884 of them were randomized to massage treatment. Table 20 presents the control interventions in the included studies.

Table 20. Massage for treatment of low back pain- Control interventions

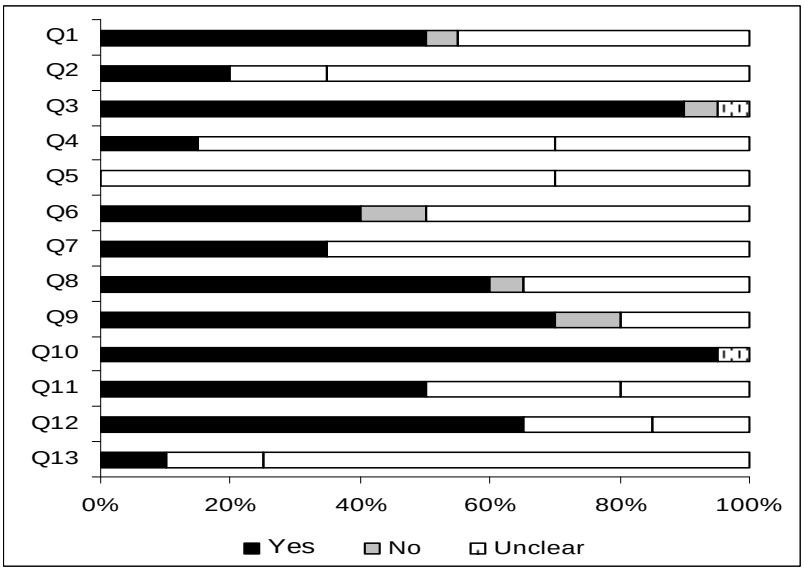
Type of control group	Cause of Pain	N studies	Detail of Control intervention
1 – Inactive treatments			
Placebo/sham	Non Specific	3	Foot massage (avoiding points representative of the vertebrae of the spine and surrounding musculature),[368] minimal but continuous suction delivered by device,[360] sham laser[361]
	Specific	0	NA
No-treatment/ waiting list	Non Specific	2	Routinely examined without therapy,[360,363,366]
	Specific	0	NA
2 – Active treatments			
Exercise/physical activity	Non Specific	3	Specific (1st group), and nonspecific (2nd group) exercise in addition to sham massage,[371] Alexander lesson techniques (multiple groups with various doses)[90] training for home program,[373]
	Specific	0	NA
Usual care	Non Specific	3	prescription by physician, and behavioral counseling with practice nurse,[90] continued care by general practitioner[369] self care,[29]
	Specific	0	NA
Physiotherapy	Nonspecific	3	pelvic manual traction, spinal manipulation, thermotherapy, infrared light therapy, electrical stimulation, and exercise,[364,365] massage + exercise + postural education[361]
	Specific	0	NA
Relaxation	Nonspecific	3	Progressive muscle relaxation techniques[369,370,372]
	Specific	0	NA
Other	Nonspecific	2	Lumbar corset,[101] balenotherapy (mineral hydrotherapy) in two groups: with and without traction,[363] traction,[362]
	Specific	0	NA
Physical modalities	Nonspecific	2	TENS,[101,374]
	Specific	0	NA

Type of control group	Cause of Pain	N studies	Detail of Control intervention
Manual therapy	**Nonspecific**	**4**	**Manipulation,[101,292,295], mobilization,[347]**
	Specific	**1**	**Oblique pulling (mobilization technique),[340]**
Other methods of massage	**Nonspecific**	**1**	**Swedish massage (light stroking or effleurage, and petrissage), [367]**
	Specific	**0**	**NA**
Massage in combination with another treatment (versus massage alone)	**Nonspecific**	**0**	**NA**
	Specific	**3**	**Individual gymnastic exercise,[41] exercise[362] electro therapy[339]**
NA= not applicable; TENS=transcutaneous electrical nerve stimulation			

Generally, trials included multi-session treatments which ranged from under 14 treatments,[29,41,90,101,295,340,361,363-365,367-370,372-374] to 20 sessions[339,362] in the course for the trial ranging from three to 10 weeks in total. Two studies were designed as single intervention trials.[347,360]

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 43. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for 50.0 percent and 20.0 percent of the trials, respectively. About 90.0 percent of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. In half of the trials, study participants were not blinded to the treatment. Up to 70.0 percent of the trials reported acceptable drop-out rate. Results based on intention-to-treat analysis were explicitly reported for 50.0 percent of the trials. The data for selected items of the risk of bias tool across the CAM interventions (acupuncture; spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.1 of Appendix G.

Figure 43. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in Table 21. For more detail of trials please see evidence tables. (Appendix C, table 1.35 – table 1.41)

Table 21– Key results – Massage therapy for low back pain

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Massage vs. No Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: C [360]	M	-	NA	Direct	> SS	Low
			Oswestry: C [360]	M	-	NA	Direct	> SS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, D [369]	M	-	NA	Direct	= S-NS	Low
			Oswestry: B, D [369]	M	-	NA	Direct	= S-NS	Low
			GHP: B, D [369]	M	-	NA	Direct	= S-NS	Low
			SF-36: B, D [369]	M	-	NA	Direct	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Massage vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [360,361]	M	-	Yes	Direct	> SS	Moderate
			Oswestry: C [360],	M	-	NA	Direct	> SS	Low
			RMDQ: B, C [361]	M	-	NA	Direct	> SS	Low
			MPQ: B, C [360,361]	M	-	Yes	Direct	> SS	Moderate
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: D [368]	H	-	NA	Direct	= NR	Low
			MPQ: D [368]	H	-	NA	Direct	= NR	Low
			RMDQ: D [368]	H	-	NA	Direct	= NR	Low
			SF-36: D [368]	H	-	NA	Direct	= NR	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Massage vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: D [364]	M	-	NA	Direct	> SS	Low
			SF-PQ: B, D [365]	M	-	NA	Direct	> SS	Low
			RMDQ: B, D [364]	M	-	NA	Direct	> SS	Low
			Modified Oswestry: B, D [364]	M	-	NA	Direct	> SS	Low
			# of days off from work: B, D [364]	M	-	NA	Indirect	> SS	Low
			VAS: B	M	Precise (2) [364,365]	Yes	Direct	> SS	Moderate
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Massage vs. ST	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	RMDQ: D [90]	M	-	NA	Direct	= S-NS	Low
			VAS: D [90]	M	-	NA	Direct	= S-NS	Low
			SF-36: D [90]	M	-	NA	Direct	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Massage vs. Ex	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B, C [361]	M	-	NA	Direct	> SS	Low
			RMDQ: B, C [361]	M	-	NA	Direct	> SS	Low
			ROM (modified Schober test): B, C [361]	M	-	NA	Indirect	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
		NS	VAS: B [41,90]	M	-	Yes	Direct	= S-NS	Moderate
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Massage vs. TENS	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B [101]	H	-	NA	Direct	= S-NS	Low
			ROM (Schober's test: ext, flx): B [101]	H	-	NA	Indirect	= S-NS	Low
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
			-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
Massage vs. Relax	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	VAS: B	H	Imprecise (2) [370,372]	Yes	Direct	> SS	Low
			ROM (flx): B	H	Imprecise (2) [370,372]	Yes	Indirect	= S-NS	Low
			VAS: B, D [369]	M	-	NA	Direct	= S-NS	Low
			Oswestry: B, D [369]	M	-	NA	Direct	= S-NS	Low
			SF-36: B, D [369]	M	-	NA	Direct	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

S=specific; NS=nonspecific; SS=statistically significant; S-NS=statistically nonsignificant; Man=manipulation; Acu=acupuncture; Ma=massage; Mob=mobilization; PL=placebo;

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity									

[Ψ] Grade (High, moderate, low, and insufficient)
[£] Number of pooled trials

B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium

- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

Population with acute/subacute pain. There were five trials eligible for the inclusion in this sub-section, all of which studied subjects with sub-acute LBP of nonspecific cause.[101,360,361,363,366]

Subjects with specific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Massage versus placebo. In two trials,[360,361] the use of massage produced significantly lower immediate or short-term post-treatment pain intensity (VAS, MPQ) and disability scores (Oswestry, RMDQ) compared to placebo (minimal but continuous suction delivered by device,[360] and sham laser[361]). For example, in one of these trials,[361] the short-term post-treatment mean RMDQ scores in the massage and placebo groups were 2.86 ± 3.1 and 6.5 ± 4.2, respectively ($p < 0.001$). The corresponding values for pain intensity on the Pain Rating Index (PRI) were 4.5 ± 5.7 and 7.7 ± 6.0, respectively ($p = 0.006$). The massage and placebo groups did not differ in post-treatment lumbar ROM.[361] One of these trials employed a single treatment design.[360]

Massage versus no treatment. In one trial,[360] the effect of a single massage treatment (roptrotherapy - deep cross-friction massage with a copper myofascial T-bar) was compared to that of 'no treatment,' showing significantly decreased pain intensity (VAS: 37.0 ± 19.0 versus 52.0 ± 21.0, $p < 0.001$) and disability scores (Oswestry: 16.0 ± 5.0 versus 31.0 versus 12.0, $p < 0.001$) amongst the massage-treated subjects compared to those in 'no treatment' group at short-term post-treatment followup (1 week post-treatment).

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. Massage was compared to other treatments in four trials.[101,361,363,366] In the first trial,[361] comprehensive treatment of massage plus exercise and postural education was shown to produce significantly greater short-term post-treatment improvements in pain intensity (PRI, VAS) and disability (RMDQ), compared to massage (soft-tissue manipulation), or remedial exercise alone. In the same trial, immediate or short-term post-treatment lumbar ROM did not differ across the massage, soft-tissue manipulation, and remedial exercise groups. Similarly, in the second trial,[101] the magnitude of improvement immediately post-treatment in pain intensity (VAS), extension and flexion (using Schober method), or maximum voluntary extension effort (MVEE) was not significantly different in the massage versus spinal manipulation, TENS, or corset group. In the third trial,[363] one year after the end of treatment, subjects who received underwater massage, underwater traction, or balneotherapy did differ in the use of analgesic pills (# taken daily: 2.3 ± 1.7 versus 2.1 ± 1.2 versus 1.9 ± 1.8, respectively) or pain intensity (VAS: 54.7 ± 33.7 versus 45.8 ± 26.2 versus 49.5 ± 25.7, respectively). In the fourth trial,[366] acupressure on eight fixed acupoints with aromatic lavender essential oil (performed by a nurse trained in Chinese medicinal nursing) significantly improved short-term post-treatment pain intensity (VAS: 0.61 versus 0.99, $p = 0.0001$), walking time (in seconds: 0.91 versus 1.03, $p = 0.05$), and lateral fingertip-to-floor distance (in centimeters: 0.96 versus 1.01, $p = 0.01$) compared with usual care. There was no significant difference between the two groups for post-treatment pain duration (in hours: 0.76 versus 1.05, $p = 0.08$).

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Population with chronic pain. There were 11 trials that were included in this section.[29,41,90,347,364,365,368-372] Additional results (acupuncture versus massage) from one trial[29] are reported in the Acupuncture, Chronic LBP sub-section. Results of one trial[347] are presented in the Mobilization (Chronic LBP) sub-section. All trials included subjects with pain due to nonspecific causes.

Subjects with specific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Massage versus placebo. In one trial,[368] subjects randomized to massage (reflexology) had numerically similar degree of improvement in intermediate-term post-treatment pain intensity (VAS: 2.2 versus 3.3, MPQ: 6.0 versus 7.5), disability (MRDQ: 4 versus 3.5), and health status (SF-36: physical functioning and bodily pain) compared to subjects in the placebo group. Placebo intervention in this trial included light pressure foot massage which was avoided on the points used for intervention group. Note that this was a pilot study and it was not adequately powered to detect a pre-specified difference.

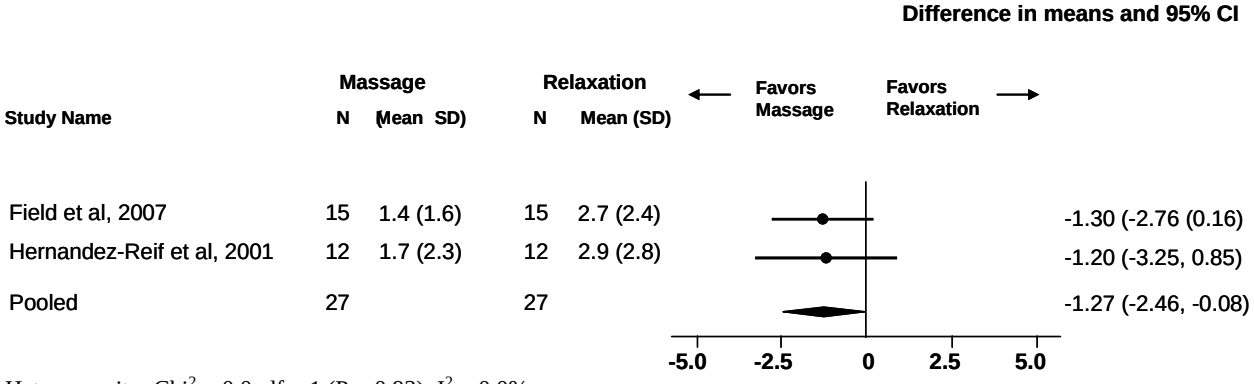
Massage versus no treatment. The immediate and intermediate-term post-treatment effects of massage (reflexology) and 'no treatment' with respect to pain (VAS), disability (Oswestry), global health perception, and physical/social functioning (SF-36) were compared in one trial.[369] Although subjects in both groups improved in all outcomes, there was no significant between-group difference after the end of treatment.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. In three trials, massage[370,372] or reflexology[369] was compared to relaxation therapy in terms of post-treatment reduction in pain intensity (VAS, MPQ), disability (Oswestry), global health perception, physical/social functioning (SF-36), stress (mood , anxiety), and/or lumbar ROM (trunk flexion). In two of the three trials,[370,372] massage was shown to produce significantly lower pain intensity, improved depression/anxiety score, ROM, and sleep compared to relaxation therapy, immediately after the end of treatment. In contrast, the third trial[369] did not demonstrate any significant immediate (or intermediate-term) post-treatment differences in pain (immediate post-treatment VAS: 50.0 ± 25.7 versus 47.2 ± 26.3), disability (immediate post-treatment Oswestry: 29.8 ± 19.6 versus 33.4 ± 22.3) or physical functioning (SF-36: 53.9 ± 27.8 versus 57.1 ± 30.2) between the massage versus relaxation therapy groups. In one trial,[90] at 1 year post intervention, the groups receiving exercise followed by Alexander technique lessons (six or 24 lessons plus exercise prescription from a doctor, and counseling from a nurse) significantly improved in disability compared to subjects receiving six sessions of massage (mean difference from baseline in RMDQ: -3.40, 95 percent CI: -4.76, -2.03, versus -1.40, 95 percent CI: -2.77, -0.03 versus -0.58, 95 percent CI: -1.94, 0.77 for 24 and six lessons of Alexander technique, and massage, respectively).

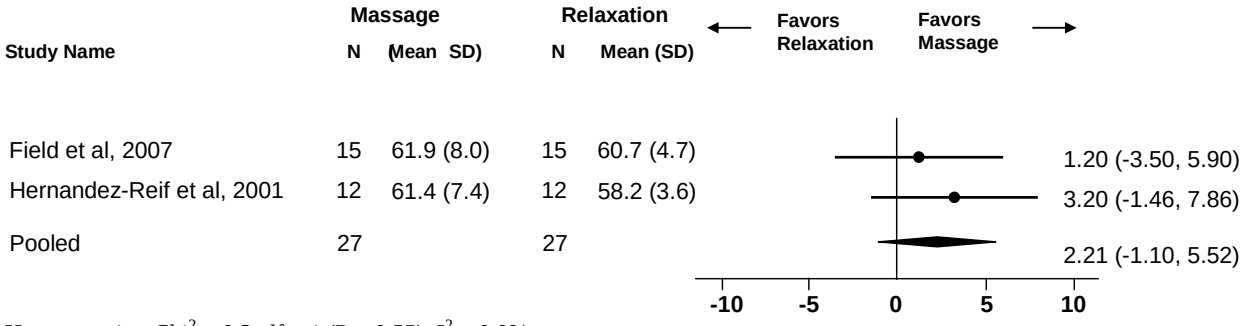
The meta-analyses based on pooled results of two trials[370,372] were performed to quantify and compare the effects of massage and relaxation with respect to improving pain intensity (VAS score) and trunk flexion (touch toe without pain in cm) in subjects with chronic nonspecific LBP (Figures 44-45). The result of one meta-analysis indicated a significantly lower pain intensity in the massage compared to relaxation group (pooled mean difference on VAS score: -1.27, 95 percent CI: -2.46, -0.08). Although the difference with respect to trunk flexion was numerically in favor of massage over relaxation, this difference did not reach the traditional level of statistical significance (pooled mean difference: 2.21, 95 percent CI: -1.10, 5.52).

Figure 44. **Pain intensity (VAS score) – Immediate post-treatment**



Heterogeneity: $Chi^2 = 0.0$, df = 1 (P = 0.93); $I^2 = 0.0\%$

Figure 45. Range of mobility (trunk flexion: touch toe without pain) – Immediate post-treatment



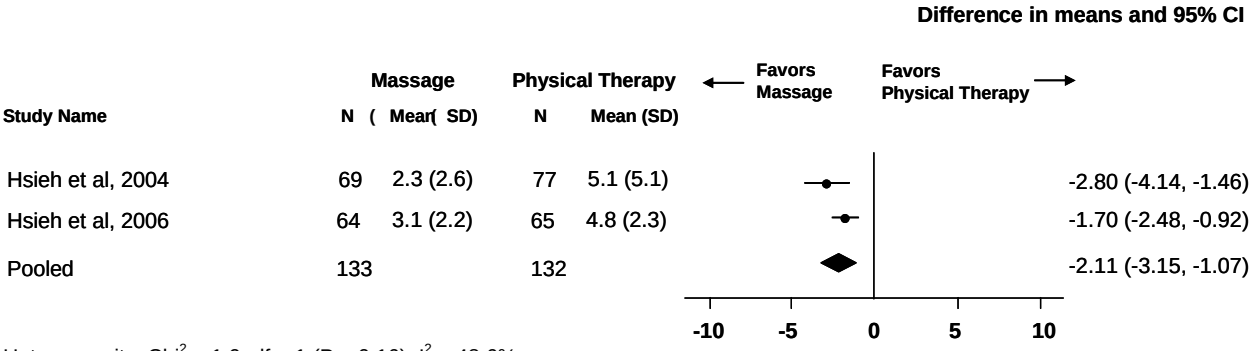
Heterogeneity: $Chi^2 = 0.3$, df = 1 (P = 0.55); $I^2 = 0.0\%$

The immediate and intermediate-term post-treatment effects of massage (acupressure) and physical therapy (PT) were compared in two trials.[364,365] Both trials demonstrated superiority of massage over PT in significantly better scores for pain intensity (VAS, Chinese version of Short-Form Pain Questionnaire – SF-PQ), disability (RMDQ, modified Oswestry questionnaire) or lower number of days off from work (1.5 ± 5.4 versus 3.5 ± 9.3, $p < 0.05$). In one of these trials,[365] the intermediate-term post-treatment mean pain intensity score in the massage group was significantly lower compared to that in the PT group (SF-PQ: 1.08 ± 1.43 versus 3.15 ± 3.62, $p = 0.0004$). The magnitude of benefit of massage relative to PT did not differ across age and gender groups.[365]

The meta-analysis of two trials[364,365] restricted to subjects with chronic nonspecific low back pain showed a statistically significant difference in favor of massage over physical therapy in

reducing pain intensity immediately post-treatment (pooled mean difference on VAS score: -2.11, 95 percent CI: -3.15, -1.07) (Figure 46).

Figure 46. **Pain intensity (VAS score) – Immediate post-treatment**



One trial demonstrated significantly lower pain intensity (VAS) and disability (HFAQ) scores for subjects after receiving acupuncture massage compared to Swedish massage followed by individual exercise.[41] In another trial,[29] immediate post-treatment symptom bothersomeness scale ($p = 0.02$) and disability (RMDQ; $p < 0.001$) scores were better in the massage versus self-care group. After a 1 year followup, these differences were not significant ($p = 0.42$ and $p = 0.97$, respectively). In one study,[371] subjects who received the combination of massage and specific exercise had a numerically lower immediate post-treatment pain intensity (VAS score) compared to those who received specific or nonspecific exercise alone. In the specific exercise group the post-treatment disability was significantly increased versus pre-treatment disability.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Massage versus standard therapy. In one trial,[90] the effectiveness of massage was compared to that of normal care in improving pain intensity, disability (RMDQ), and quality of life (SF-36). In this trial, there were significant reductions for all intervention groups in RMDQ disability score and days in pain at 3 months followup. However, no differences were observed in the disability scores between the massage and standard care groups.

Population with mixed duration of pain. This sub-section included three trials.[295,362,367] One trial[362] included subjects with LBP due to specific cause (i.e., disc herniation), and one trial[367] subjects with nonspecific LBP. Results from one trial[295] are reported in the Manipulation, Mixed LBP sub-section.

Subjects with specific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. In one trial,[362] the combination of massage and exercise was as effective as massage alone or more effective than traction in improvement of lumbar function among subjects with LBP due to disc herniation.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage (type 1) versus massage (type 2). In one trial,[367] subjects who received traditional massage (Thai-massage) did not differ from Swedish massage in pain intensity (VAS), disability (Owestry), and back flexion/extension immediately, short-term or log-term period after the end of treatment.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Population with unknown duration of pain.

This sub-section included one trial, with subjects having specific LBP.[340] Results of this trial are presented in the Mobilization alone (Unknown Duration LBP) sub-section.

Subjects with specific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

12 – Massage for Treatment of Neck Pain

This section included 14 trials. Two trials were reported in multiple publications(Table 3). Results of two trials are also presented in the Acupuncture, Chronic Duration Neck Pain[77] and Mobilization, Chronic Duration Neck Pain[353] sections.

Population/trial characteristics. The trials were conducted in Australia (one),[43] China, (three)[246,247,375] Germany, (one)[77] Spain (two),[376,377] Taiwan (one),[378] Turkey (one),[379] United Kingdom (two),[380,381] and the United States (three).[382-384]

All studies included adults of 18 years or older. The proportion of women and men were similar in two studies.[375,376] In eight studies, the proportion of women (> 60 percent) was greater than that of men,[43,77,377-379,382-384] and in one study, the proportion of men was greater than that of women (> 60 percent).[246] In two studies, the proportions of men and women were similar.[247,381] The proportion of men/women could not be ascertained for one study.[380]

In one study, the majority of patients were Caucasians.[383] In trials conducted in China, the study participants' ethnicity was assumed to be Asian,[246,247,375] No ethnicity information was reported for the remaining studies.

In total, 1,104 patients were included in these trials and 676 of them were randomized to massage only[43,77,246,247,352,376-384] or to massage + other intervention.[247,375,378,384] Table 22 presents the control interventions in the included studies.

Table 22. Massage for treatment of neck pain- Control interventions

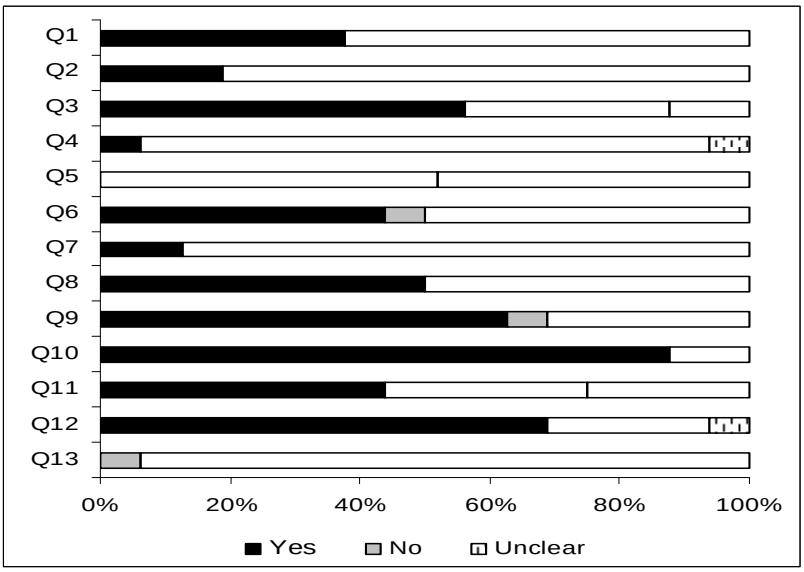
Type of control group	Cause of Pain	N studies	Detail of Control intervention
1 – Inactive treatments			
Placebo/sham	Non Specific	2	Sham ultrasound,[380,381]
	Specific	2	Sham laser,[77] sham myofascial release[43]
No-treatment/ waiting list	Non Specific	1	Similar patient positioning as the massage group with not intervention,[377]
	Specific	2	Upright seated position with no intervention,[382,384]
2 – Active treatments			
Usual care	Non Specific	0	NA
	Specific	1	Self care: home exercise program followed by moist heat and stretching,[382]
Education	Non Specific	1	Self-care book,[383]
	Specific	0	NA
Physiotherapy	Nonspecific	1	Massage, therapeutic stretching, and exercise therapy,[353]
	Specific	0	NA
Physical modalities	Nonspecific	0	NA
	Specific	1	Hot pack (in multiple groups in combination with massage and other physical modalities),[378]
Other treatments	Nonspecific	1	Control: neither given nor denied treatment,[352]
	Specific	2	Traction,[375] vapo-coolant spray and stretching technique,[379]
Manual therapy	Nonspecific	1	Bone setting,[353]

Type of control group	Cause of Pain	N studies	Detail of Control intervention
	Specific	**0**	**NA**
Other methods of massage	**Nonspecific**	**4**	**Five session of massage (vs.),[353] trigger point pressure release,[380] myofascial band therapy,[381] progressive pressure of tender points,[377]**
	Specific	**1**	**Ischemic compression to average pain threshold in three different duration: 30, 60, and 90 seconds (vs. ischemic compression to pain threshold at 30, 60 and 90 seconds),[378]**
Massage in combination with another treatment (vs. acupuncture alone)	**Nonspecific**	**0**	**NA**
	Specific	**4**	**Needle scalpel therapy,[246] acupuncture and manipulation,[247] head traction and extension exercise,[384]physical modalities,[378]**
NA= not applicable			

Number of massage treatment sessions varied and included a single treatment,[43,378-381,384] five treatments over 3 weeks,[77] up to 10 treatments,[247,375,383] 18 treatments,[382] and 21 treatments[246] across all trials.

Risk of bias. The risk-of-bias graph for the trials included in this sub-section is presented in Figure 47. All trials were randomized. The adequate method of randomization and treatment allocation concealment was reported for 38.0 percent and 19.0 percent of the trials, respectively. Only a half of the trials reported that distribution of the subjects' baseline characteristics across the treatment arms was similar. In 56.0 percent of the trials, study participants were not blinded to the treatment. About 63.0 percent of the trials reported acceptable drop-out rate. Results based on intention-to-treat analysis were explicitly reported for 44.0 percent of the trials. The data for selected items of the risk of bias tool across the CAM interventions (acupuncture; spinal manipulation; spinal mobilization; combination of manipulation and mobilization; and massage therapy) is displayed in table 7.2 of Appendix G.

Figure 47. Risk of bias scores (%)



Efficacy results. A summary of the key results is presented in table 23. For further detail of the trials please see the evidence tables. (Appendix C, table 2.19 – table 2.26)

Table 23 – Key results – Massage therapy for neck pain

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
Massage vs. No Tx	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	NPQ: B [382]	M	-	NA	Direct	> SS	Low
			ROM (ext, flx): B [382]	M	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	PPT: B [384]	H	-	NA	Direct	= S-NS	Low
		NS	VAS: B [377]	M	-	NA	Direct	> SS	Low
Massage vs. PL	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	≥ 2-point decrease on NRS-11: B [381]	M	-	NA	Direct	> SS	Low
	Chronic	S	VAS: B, C [77]	H	-	NA	Direct	> SS	Low
			ROM (ext, flx): B, C, D [77]	H	-	NA	Indirect	= NR	Low
			SF-36 (role physical, pain index): D [77]	H	-	NA	Direct	= NR	Low
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	PPT: B [43]	H	-	NA	Direct	> SS	Low
Massage vs. Ex	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	NPQ: B [382]	M	-	NA	Direct	> SS	Low
			ROM (ext, flx): B [382]	M	-	NA	Indirect	= S-NS	Low
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient

CAM therapy	Duration of pain	Cause of pain	Outcome	Risk-of-bias	Precision of the pooled estimate	Consistency	Directness	Finding	GRADE Ψ
		NS	-	-	-	-	-	-	Insufficient
Massage vs. PT	Acute/sub-acute	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Chronic	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Mixed	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient
	Unknown	S	-	-	-	-	-	-	Insufficient
		NS	-	-	-	-	-	-	Insufficient

Tx=treatment. Med=medication(s); Int=intervention; PT=physiotherapy; ST=standard therapy; E-acu=electro-acupuncture; MR=muscle relaxation; TENS= transcutaneous electrical nerve stimulation; Ex=exercise; TrP=trigger point; VAS=visual analog scale; RMDQ=Roland Morris Disability scale; NHP=Nottingham Health Profile; PPT= pressure pain threshold; HFAQ=Hanover functional ability questionnaire; MPQ=McGill pain questionnaire; ext=extension; flx=flexion; rot=rotation; PDI=pain disability index; min=minute(s); hr(s)=hour(s); L=low; M=medium; H=high; pt(s)=patient(s); SF=short-form; NPQ=neck pain questionnaire; GWBS=global well-being scale; SLR=straight leg raising; GPE= Global perceived effect; NSAIDS=nonsteroidal antiinflammatory drugs; FTF=finger-to-floor; SF-PQ=short form pain questionnaire; PRI=pain rating index; PPI=present pain intensity; NA=not applicable

Ψ Grade (High, moderate, low, and insufficient)

B = immediate post-treatment
C = short-term post-treatment
D = intermediate-term post-treatment
E = long-term post-treatment
H = high
L = low
M = medium

- No evidence
= Similar beneficial effect
> Favors treatment A over treatment B
< Favors treatment B over treatment A
><, =>, <= Inconsistent beneficial effect

Population with acute/subacute pain. There was one trial evaluating the effectiveness of massage given to patients with subacute neck pain.[381]

Subjects with specific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Massage versus other treatments or placebo. This trial included patients with nonspecific neck pain who were randomized to receive trigger point therapy, myofascial band therapy, or placebo (ultrasound).[381] Although the trial authors measured pain intensity (NRS-11, PPT) and cervical ROM, the results were reported on a dichotomous scale (i.e., odds ratios, number needed to treat) instead of continuous scale (i.e., mean scores). The patients treated with trigger point therapy were seven times more likely to improve in terms of pain reduction (decrease of at least two points on NRS-11) compared to patients treated with myofascial band therapy or placebo (odds ratio: 7.4, 95 percent CI: 1.22, 45.02).[381]

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Population with chronic pain. A total of four trials restricted to patients with specific (whiplash injuries, myofascial pain syndrome)[77,379,382] and nonspecific neck pain,[383] were included in this sub-section.

Subjects with specific pain.

Massage versus placebo. In one trial,[77] patients with whiplash and myofascial pain syndrome who received massage had lower pain intensity compared to those in sham laser group (VAS: 7.89 versus 17.28, $p < 0.05$).

Massage versus no treatment. In one trial,[382] immediate post-treatment mean NPQ score was significantly lower in the massage group (13.24 ± 11.88) compared with that in no treatment group (35.64 ± 12.54). The patients who received massage had a slight but only numerically greater cervical ROM extension (49.38 ± 13.71) and flexion (50.0 ± 3.74) compared to those who had not received any treatment (extension: 46.80 ± 13.60, flexion: 44.1 ± 12.28).

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. There was one trial evaluating the clinical benefits of massage compared with vapocoolant spray in the treatment of patients with chronic myofascial pain syndrome.[379] The application of massage did not differ from vapocoolant spray in reducing immediate post-treatment pain on VAS (2.60 ± 1.73 versus 2.88 ± 1.50) or increasing cervical ROM (flexion, extension). The only significant difference was observed for rotation to left in favor of spray versus massage (78.65 versus 72.45, $p < 0.05$).[379]

In another trial,[382] immediate post-treatment mean NPQ score was significantly lower in the massage group (13.24 ± 11.88) compared to that in the exercise group (20.23 ± 12.06). In this

trial, patients who received massage had a slight but only numerically greater cervical ROM extension (49.38 ± 13.71) and flexion (50.0 ± 3.74) compared to those who received exercise (extension: 48.38 ± 11.8, flexion: 48.62 ± 14.04).

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. In one trial,[383] there was no difference in immediate and intermediate-term post-treatment degree of disability between patients who received 10 weeks of massage and self-care instruction (16 weeks post-treatment difference in NDI mean score: -1.9, 95 percent CI: -4.4, 0.63, p = 0.14). At 16 weeks post-treatment, the use of medication, which was similar in the groups at baseline, increased by 14.0 percent in the self-care group but did not change in the massage group.[383]

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Population with mixed duration of pain. A total of six trials restricted to patients with specific (whiplash injury, spondylosis, spondylopathy, myofascial pain syndrome)[246,247,375,376] and nonspecific[380] neck pain of mixed duration (acute, sub-acute, chronic) were included in this section.

Subjects with specific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage versus another type/method of the same CAM. No relevant studies were identified.

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Massage alone versus massage (combined or alone). In one trial,[376] 40 patients with myofascial pain syndrome experienced equal immediate post-treatment clinical benefit in terms of pain intensity reduction after being randomized to receive either ischemic compression (PPT: 2.2 ± 0.6 and VAS: 3.8 ± 0.9) or transverse friction massage (PPT: 2.35 ± 0.4 and VAS: 4.2 ± 0.4; for both outcomes between-group p > 0.40).

In two trials[246,247] of patients with spondylosis or spondylopathy, massage combined with either acupoint injection[247] or needle scalpel[246] produced statistically significantly greater rates of cure (post-treatment absence of symptoms and physical signs) compared with massage alone.

Massage + other treatment versus other treatment. In one Chinese study,[375] the combination of massage and traction was compared to traction alone in subjects with spondylopathy. The immediate post-treatment improvement score (measured using Cervical Spondylopathy Therapeutic Effect Rating Scale) but not effective rate (subjects with improved clinical and body symptoms but partially affected daily activities) was significantly higher in the massage combination versus traction alone group (0.50 ± 0.16 versus 0.36 ± 0.14, p < 0.01).

Subjects with nonspecific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. No relevant studies were identified.

Massage (type 1) versus massage (type2). In one trial, [380] the effectiveness of ischemic compression and trigger point pressure release was compared. In this trial, patients had similar post-treatment pain intensity (VAS, PPT) across the randomized groups. For example, the effect on mean VAS scores was similar ($p > 0.10$) for patients treated with ischemic compression (22.9 ± 12.7) versus sham ultrasound (22.6 ± 8.2). Likewise, no between-group differences ($p > 0.10$) were found in relation to the mean pain pressure threshold (PPT) scores (4.45 ± 1.69 versus 3.77 ± 1.76 versus 3.37 ± 1.62).[380]

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Population with unknown duration of pain. A total of four studies were included which enrolled patients with specific (myofascial trigger point syndrome),[43,378,384] or nonspecific cause.[377]

Subjects with specific pain.

Massage versus placebo. In one trial,[43] the application of manual pressure to trigger points (to patient's pain tolerance level) sustained for 60 seconds resulted in a statistically greater improvement compared to sham myofascial release ($p < 0.001$).

Massage versus no treatment. No relevant studies were identified.

Massage (type 1) versus massage (type2). In one trial,[384] single treatment with either occipital release (O/R), active head retraction with extension exercises , or no treatment did not differ in reducing sensitivity (PPT in kg/cm^2) of cervical and scapular trigger points (2.5 ± 1.1 versus 2.8 ± 1.3 versus 2.6 ± 1.5, p = NR).

In another trial,[378] immediate effects of ischemic pressure applied at two intensities (low pressure = at pain threshold, high pressure = at averaged pain threshold and tolerance) were measured. The use of ischemic compression therapy with low pressure (90 seconds) and high pressure (60 – 90 seconds) was associated with a significant reduction of pain (VAS), elevation of pain tolerance, and improvement of ROM compared to that of ischemic compressions with low or high pressure at shorter durations ($p < 0.05$).

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Subjects with nonspecific pain.

Massage versus placebo. No relevant studies were identified.

Massage versus no treatment. In one trial,[377] both classical and modified strain/counterstrain techniques produced significantly better immediate post-treatment pain intensity scores (VAS) compared to no treatment in subjects with nonspecific neck pain ($p < 0.001$). The 'no treatment' group in this study did not experience any change from baseline in the pain intensity measure ($p > 0.30$).

Massage (type 1) versus massage (type2). In one trial, [377] local pain elicited by application of 4.5 kg/cm^2 of pressure on the tender points improved after a single treatment with either classical or modified strain/counterstrain technique in subjects with nonspecific neck pain. However, the

difference in immediate post-treatment VAS scores between the two classical and modified strain/counterstrain groups was not statistically significant (p = 0.8).

Massage versus other treatments. No relevant studies were identified.

Massage versus medication. No relevant studies were identified.

Massage + other treatments versus the same other treatments. No relevant studies were identified.

Cost Effectiveness

In total 10 trials were included for cost-effectiveness of CAM treatment for LBP[24,72,94,112,125,385,386], and neck pain.[63,89,130] The trials recruited patients with nonspecific pain (Table 24 and 25).

Low Back Pain

We identified 10 studies.[24,29,72,94,112,125,224,278,385,386] Of these 10 studies, seven were reports of full economic evaluations of the cost-effectiveness of spinal manipulation[72,125,385,386], acupuncture,[24,112] and massage [94] for low back pain. The three remaining studies had not performed a full economic evaluation by combining differences in costs and effects of the two (or more) compared alternatives and therefore were excluded from the review.[29,224,278]

Population/trial characteristics. The studies were conducted in Finland,[385] Germany,[24] Sweden,[386] United Kingdom,[94,112,125] and United States.[72] The mean age ranged from 37 to 54 years and the proportion of men and women were balanced in all trials. In total, 5,984 participants with nonspecific LBP were included in these seven trials. The duration of pain was acute in one trial,[386], chronic in three trials,[24,94,385] and mixed in three trials.[72,112,125]

Acupuncture. Ratcliffe et al,[112] compared individualized acupuncture treatment for 3 months from acupuncturists trained in traditional Chinese medicine with usual care. The study population consisted of patients with subacute and chronic low back pain. The total costs of health care utilization during 2 year followup were higher in the acupuncture group ($859) compared with the usual care group ($645). The difference in health gain was .012 QALY at 1 year and 0.027 QALY at 2 year followup. The incremental cost-utility ratio was $7931 per QALY gained. From the health services perspective, the acceptability curve showed that acupuncture had a more than 90 percent chance of being cost-effective at a $37,400 (GBP 20,000) per QALY threshold. The study showed that, from societal perspective (including costs of health care utilization, patient costs and costs of productivity losses) acupuncture was more dominant (i.e. less costly and more effective) compared with GP care.

Witt et al,[24] conducted an economic evaluation alongside a large randomized trial (N=3093) comparing acupuncture with no treatment (delayed acupuncture) in patients with chronic low back pain. The difference in QALYs at 3 months between the acupuncture and control group was 0.03. The costs of acupuncture were higher than the costs of the control group; mean difference at 3 months was $423 (95 percent CI: 224, 622) in total costs, and $461 (95 percent CI: 342, 579) in back pain specific costs. The incremental cost-utility ratios were $15,895 (Euro 10,526) per QALY gained for overall costs and $17,321 (Euro 11,470) per QALY gained for back pain specific costs. At a threshold of $22,662 (Euro 15,000) per QALY acupuncture had a more than 90 percent chance of being cost-effective.

Spinal manipulation. Four full economic evaluations on spinal manipulation were identified.[72,125,385,386] In a large randomized control study [72] that recruited patients from a large medical group practices (HMO), the authors compared four treatments: chiropractic care (spinal manipulation), chiropractic care plus physical modalities (heat, cold, ultrasound, and electrical muscle stimulation provided by chiropractor), medical care, and medical care plus physical therapy. (Table 22) The study population consisted of 681 acute, subacute or chronic low back pain patients. The authors conducted a cost-minimization analysis, given that that previously published findings showed no clinically meaningful difference in effects between these four treatments. The results showed that the adjusted mean outpatient costs of low back pain in 18 months were $765 for medical care plus physical therapy, $565 for chiropractic plus physical modalities, $550 for chiropractic, and $463 for medical care. The authors concluded that costs were higher for chiropractic care compared with medical care without producing better clinical outcomes. Physical therapy in addition to medical care does not seem to be a cost-effective strategy for low back pain. However, the authors did not include in their analyses pharmaceutical costs and costs of production loss.

Niemisto,[385] compared a combined intervention of physician consultation, spinal manipulation and stabilizing exercises to physician consultation alone in 204 patients with chronic low back pain. The economic evaluation was conducted from a societal perspective. Costs of health care consumption and costs of productivity loss were included. There were no statistically significant differences in costs between the two groups. The incremental cost of the combination treatment compared with the physician consultation only for one point improvement on pain intensity (100 mm VAS) was $23.

Seferlis et al,[386] conducted a cost-minimization analysis of manual therapy, general practitioner care, and intensive training, since a previously conducted randomized trial had not identified any statistically significant differences in clinical effects between the three interventions. The study population consisted of patients with acute low back pain. Direct and indirect costs were included. The results showed that direct costs per patient were $1,054 for manual therapy, $404 for GP care, and $1,123 for intensive therapy. Indirect costs per patient were $6,163 for manual therapy, $7,072 for GP care, and $5,556 for intensive therapy. Finally, the total costs per patient were $7,217 for manual therapy, $7,476 for GP care, and $6,680 for intensive therapy. This study did not report any quality of life or additional cost of drug outcomes. There were no statistically significant differences in costs between the groups.

The UK BEAM trial,[125] compared the cost-effectiveness of adding spinal manipulation, exercise classes, or manipulation followed by exercise (combined treatment) to “best care” in general practice for patients with subacute and chronic low back pain. Results showed that adding spinal manipulation to GP care was effective in improving QALY compared to GP care alone, and would cost $ 8880 per QALY gained from the health sector’s perspective. In contrast, adding both spinal manipulation and exercise to GP care did not statistically significant improve QALY compared to GP care alone, but would only cost $7030 per QALY gained. The authors concluded that spinal manipulation in addition to GP care appeared relatively cost-effective compared to GP care alone from the health sector’s perspective.[125]

Massage. Hollinghurst et al,[94] reported an economic evaluation of therapeutic massage, exercise, Alexander technique and usual GP care in patients with chronic and recurrent low back pain. The authors used a 4 X 2 factorial design in which participants were randomized to one of eight groups. Total NHS costs over 1 year (costs of interventions, GP visits, other primary and secondary care, and medication) were $460 (± 364) for the massage group (n=64), $97 (± 179)

for GP care without exercise (n=60), $388 (± 260) for 6 sessions of Alexander technique without exercise (n=53), $1,087 (± 467) for 24 sessions of
Alexander technique without exercise (n=61), $427 (± 190) for 6 sessions of Alexander technique with exercise (n=57), $1,177 (± 585) for 24 sessions of Alexander technique with exercise (n=56), $476 (± 647) for massage with exercise (n=56), and $275 (± 932) for GP care with exercise (n=51). Exercise had the highest probability of being the most cost-effective first choice of therapy. The acceptability curves showed that if exercise is the first choice, at a threshold of GBP $18,000 per QALY, the chance that a second intervention is cost-effective is 80 percent.

Table 24. Summary of RCTs reporting data on economic evaluation of CAM versus other treatments- Low back pain

Author, Year Country of Study	N (sample size) Region, Cause, Duration of Pain	Intervention/s	Outcomes Duration of Outcome Assessment	Conclusion (by study authors)
Hollinghurst, S ATEAM study (2008)[90,94] UK	N= 579 LBP, N-S; Chronic	• Intervention: massage, and six or 24 lessons in the Alexander technique. • Control: Normal care (control) 50% of each group randomized to exercise (by GP) + behavioral counseling (by a nurse)	Costs to NHS & cost to participants (incremental cost effectiveness ratios & cost effectiveness acceptability curves) 1 year	The acceptability curves showed that if exercise is the first choice, at a threshold of GBP $18,000 per QALY the chance that a second intervention is cost-effective is 80% Exercise had the highest probability of being the most cost-effective first choice of therapy.
Kominski, GF (2005)[66,70-76,387] U.S.	N = 681 LBP, N-S; Acute/ subacute	• medical care only (MD) • medical care with physical therapy (MD + PT), • chiropractic care (CC) • CC + physical modalities (Pm)	Total outpatient costs (excluding pharmaceuticals, and productivity loss) Cost-effectiveness analysis was not performed 18 months	Adjusting for covariates, cost for CC 51.9% grater than MD; CC + Pm 3.2% grater than CC; and MD + PT 105.8% grater than MD Higher costs for CC without producing better clinical outcomes
Niemisto, L (2003)[385] Finland	N = 204 LBP, N-S, Chronic	• SM + MD • Physician consultation + educational booklet	Total healthcare cost Productivity loss (full day or half day salary) 1 year	The incremental cost of SM + MD compared with the physician consultation for one point improvement on pain intensity (100 mm VAS) = $23. No SS differences in cost between two groups
Seferlis, T (2000)[386,388] Sweden	N = 180 LBP w/out sciatica requiring sick leave; N-S; Acute	• General Practitioner care (GP) • Manual therapy (MT) • Intensive training program	Total (direct & indirect) cost per patient Method used: least-cost alternative, i.e. a cost-minimization analysis 1 year	There were no differences between the three tx groups in total cost, with GP being the least costly. Indirect costs, defined as sick-leave for LBP represent about 90% of the total cost
Ratcliffe (2006)[110-	N= 241	• Acupuncture (Acu)	Total NHS cost	Total costs to the U.K. health

Author, Year Country of Study	N (sample size) Region, Cause, Duration of Pain	Intervention/s	Outcomes Duration of Outcome Assessment	Conclusion (by study authors)
[118,389] U.K.	LBP; N-S; Mixed duration	• Usual care (UC)	Incremental cost pr QALY 2 years	service were higher on average for the Acu ($859) than for the UC ($645) Acu tx has > 90% chance of being cost effective at a $37,400 cost per QALY threshold.
UK BEAM trial team (UK beam study[123,125,390] U.K.	N = 1287 LBP; N-S; Mixed duration	• Spinal manipulation (SM) + best care by general practitioner care (GP) • SM + exercise • GP + exercise • GP alone	Healthcare costs Quality adjusted life QALY Cost per QALY 1 year	All three active txs increased pts' average QALYs compared with GP alone. SM + GP care appears relatively cost-effective compared to GP care alone from the health sector's perspective.
Witt, CM (2006)[24-26] Germany	N = 2841 LBP; N-S; Chronic	• Acupuncture (Acu) + routine care • No tx (delayed acu) + routine care	The incremental cost effectiveness ratio 6 months	The incremental cost-effectiveness ratio was $15,895 per QALY At a threshold of $22,662 per QALY acu had a more than 90% chance of being cost-effective.

RCT= randomized control trial; LBP = low back pain; AT= Alexander technique; NS = non specific; Acu = acupuncture; TENS = transcutaneous electrical stimulation; tx = treatment; GP= general practitioner (care); PT= physical therapy; QALY= quality adjusted life years; MD=medical care; w/out=with or without; Pm=physical modalities; HRQoL=health related quality of life; NHS = National Healthcare Services; SS = statistically significant; U.K.= United Kingdom

Neck Pain

Three full economic evaluations were identified that evaluated the cost-effectiveness of spinal manipulation,[63,89] and acupuncture[130] for neck pain.

These trials were reported in multiple publications [62,63]; [89,92]; and [130,131] (Table 23)

Population/trial characteristics. The trials were conducted in Germany,[130], the Netherlands,[63] and the United Kingdom.[89] In total, 3,984 participants with mixed nonspecific neck pain were included. The mean age of participants ranged from 45 to 53 years and the proportions of men and women were not significantly different in any of these trials.

Acupuncture. Willich et al,[130] performed cost-effectiveness and cost-utility analyses alongside a randomized controlled trial comparing additional acupuncture compared with usual care alone in patients with chronic neck pain. Subjects in the usual care group received acupuncture treatment after the 3 months study period. Adults with chronic neck pain (> 6 months) were included. A total of 3,451 subjects were randomized to either acupuncture (n=1,753) or usual care (n=1,698). The mean (SD) QALYs over 3 months followup were 0.649 (0.096) in the acupuncture group and 0.625 (0.103) in the usual care group, with a mean difference of 0.024 (p=0.004). Acupuncture treatment was associated with significantly higher total costs over 3 months of followup compared to usual care ($1,157 versus $810); the mean difference in total costs was $347 (95 percent CI: 220, 477). This difference in cost was mainly due to costs of acupuncture ($452). The incremental costs-effectiveness ratio was $15.710 per QALY; the net benefit of acupuncture was $1147.

Spinal manipulation. Lewis et al,[89] conducted cost-effectiveness and cost-utility analyses alongside a randomized controlled trial (Diedzic et al) comparing advice and exercise plus manual therapy (n=114) and advice and exercise plus pulsed shortwave diathermy (n=121) with advice and exercise alone (n=115) for patients with nonspecific neck pain. Experienced physiotherapists provided all interventions. The results showed that the mean improvement in neck pain (VAS) at 6 months was 10.2 in the manual therapy group, 10.3 in the pulsed shortwave diathermy group and 11.5 in the advice and exercise group. The mean quality adjusted life years (QALY) scores for the treatment three groups were 0.342, 0.360, and 0.362, respectively. The mean health care costs were $190, $197 and $169 and the mean total costs were $486, $543 and $598, respectively. From the health care perspective, the cost-effectiveness acceptability curves showed that the probability of each intervention being cost-effective at the $48,000 per QALY threshold was 0.37 for manual therapy, 0.31 for pulsed shortwave diathermy and 0.32 for advice and exercise alone. From the societal perspective, these probabilities were 0.44, 0.26 and 0.30, respectively. Although the authors concluded that the interventions of choice are likely to be manual therapy or advice and exercise alone, and that pulsed shortwave diathermy is unlikely to be a cost-effective intervention, the probabilities that any of these interventions is cost-effective are very low.

Korthals-de Bos et al,[63] conducted an economic evaluation alongside a randomized controlled trial (Hoving et al)[62] to evaluate the cost effectiveness of manual therapy (n=60), physiotherapy (individualized exercise therapy, active and postural or relaxation exercises, stretching, and functional exercises; n=59), and care by a general practitioner (n=64) for subjects with nonspecific neck pain. Study participants were treated by the general practitioners, physiotherapists, or manual therapists. Manual therapy provided faster improvement compared with physiotherapy and general practitioner care up to 26 weeks, but there were no statistically significant differences at 52 weeks of followup. The total costs of manual therapy ($402) were

around one third of the costs of physiotherapy ($1,166) and general practitioner care ($1,240). These differences were statistically significant for manual therapy versus physiotherapy and manual therapy versus general practitioner care, but not for general practitioner care versus physiotherapy.

Table 25. Summary of RCTs reporting data on economic evaluation of CAM versus other treatments- Neck pain

Author, Year Country of Study	N (sample size) Region, Cause, Duration of Pain	Intervention/s	Outcomes Duration of Outcome Assessment	Conclusion (by study authors)
Willich, SN (2006)[130,131] Germany	N = 3451 NP, N-S; Chronic	• Acupuncture (Acu) + routine care • routine care	Direct and indirect cost (not including private medical expenses) The incremental cost-effectiveness ratio of acu tx 3 months	The incremental costs-effectiveness ratio was $15.710 per QALY; the net benefit of acup was $1147.
Lewis, M (2005)[89,92] U.K.	N = 350 NP, N-S; Mixed	• advice and exercise (A&E)+ manual tx (MT) • advice and exercise + pulsed shortwave diathermy (PSWD) • advice and exercise alone	Health care & societal costs QALY utility scores 6 months	Probability of each intervention being cost-effective at the $48,000 per QALY threshold Health care perspective-: MT = 0.37, PSWD = 0.31, and A&E = 0.32 Societal perspective- MT = 0.44, PSWD = 0.26, and A&E = 0.30 PWSD was the last cost effective of three tx strategies
Kothals de Bos (2005)[63,64] the Netherlands	N = 183 NP; N-S; Mixed	• Spinal mobilization (SM) • Physiotherapy (PT) • General practitioner care (GP)	Direct and indirect costs Cost effectiveness, and cost utility ratios were evaluated 1 year	The total costs of MT were around one third of the costs of PT, or GP MT was less costly and more effective than PT, or GP

RCT= randomized control trial; NP= neck pain; NS = non specific; Acu = acupuncture; TENS = transcutaneous electrical stimulation; tx = treatment; GP= general practitioner; PT= physical therapy; QALY= quality adjusted life years; MD=medical care; w/out=with or without; Pm=physical modalities; HRQoL=health related quality of life; NHS = National Healthcare Services; SS = statistically significant; UK= United Kingdom

KQ1a-b. For any of the CAM Therapies Found to be Effective for Back Pain, what Patient, Treatment Provider and Trial Specific Factors Influence Success of Treatments?

Subgroup Analysis

The amount of evidence regarding factors potentially influencing treatment effect (e.g., age, gender race, education, income, cause of pain, type of treatment provider, dose of treatment) was relatively limited. Effects of treatment related factors such as duration, frequency (number of sessions) are explored qualitatively if reported in the efficacy and effectiveness sections for dose response studies (see Chapter 3).

Qualitative analysis. We identified only seven trials that included age-specific populations (i.e., elderly),[45,53,207,208,216,217,226,227] Six trials that included women only[219,263] or men only.[144,284,349] (see Table 26). Of these, nine trials were conducted to assess the effects of acupuncture in subjects with low back pain.[53,144,207,208,216,217,219,226,227] The results of trials across these subgroups were not comparable due to different control treatments and/or duration/cause of pain in subjects included in these trials.

In one trial reporting subgroup effects of manipulation in subjects with mixed duration of low back pain. [34,81] The subject's age, gender, symptom duration, or the therapist's years of experience did not have a significant effect on the mean change for Oswestry score between two groups receiving spinal manipulation in addition to exercise and exercise alone. Within the spinal manipulation group, subjects positive on the rule (4/5 of the above criterion) had a significantly greater improvement on Oswestry score compared to subjects negative on the rule (immediately and short-term post-treatment: 10.3, 95 percent CI: 2.2, 18.4, $p < 0.014$).[81] In the same study, patients with LBP of mixed duration who were judged to have lumbar hypomobility experienced greater benefit from spinal manipulation than subjects without hypomobility (mean difference, 23.7 percent, 95 percent CI: 5.1, 42.4). Subjects with lumbar hypermobility receiving a program of stabilizing exercise had a greater benefit than subjects without hypermobility (mean difference, 36.4 percent, 95 percent CI: 10.3, 69.3). [34]

In one trial reporting subgroup analysis of subjects with chronic nonspecific low back pain,[365] the beneficial effect of massage compared to physical therapy (physical modalities, exercise and traction) was similar across age (≤ 50 years: $p = 0.0023$ and > 50 years: $p = 0.0221$) and gender groups (male: $p = 0.0356$, female: $p = 0.001$). However, the short term post-treatment effect of massage differed across baseline pain severity groups (VAS ≤ 8: $p = 0.179$, and VAS > 8: $p = 0.0001$). Specifically, massage was significantly better in reducing pain intensity compared to physical therapy but only in subjects with severe pain at baseline (immediately post-treatment mean VAS: 2.84 ± 3.13 versus 8.19 ± 5.60, $p = 0.0001$). The intermediate-term (6 months post-treatment followup) effect of massage compared to physical therapy was significantly more beneficial and was not different across the severity groups (VAS ≤ 8: $p = 0.0319$, and VAS > 8: $p = 0.0016$).

Quantitative analysis. We were not able to conduct the analysis quantitatively due to insufficient data. The largest meta-analysis of this review included only 10 trials (acupuncture versus placebo for chronic nonspecific low back pain; (see Figure 4) and the remaining smaller meta-analyses included a range of two to four trials. The pooled trials did not include solely subjects from the subgroups of interest.

Table 26. Subgroup analyses

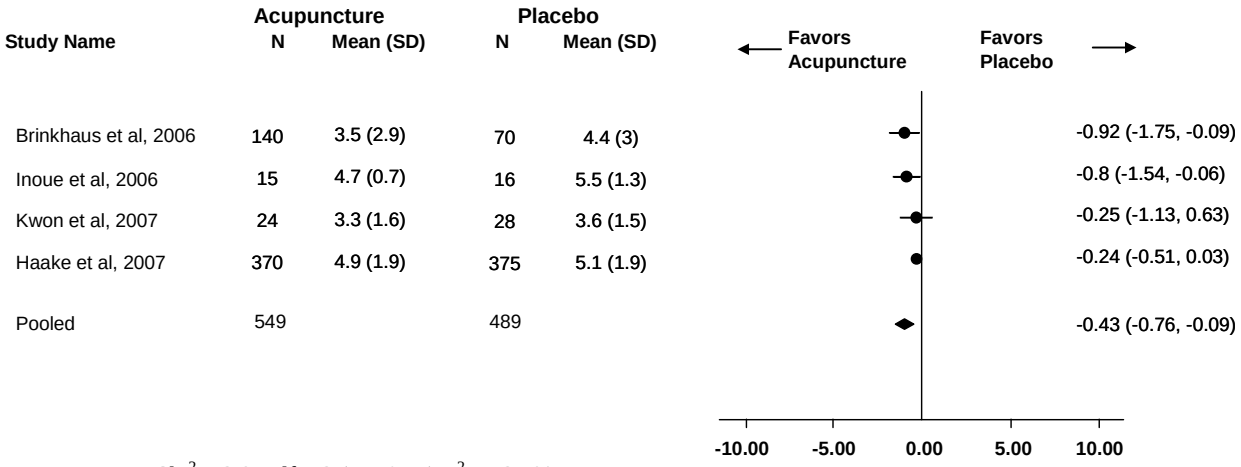
Body region Intervention	Elderly		Only women		Only men	
	No. of studies	Outcomes (efficacy)	No. of studies	Outcomes (efficacy)	No. of studies	Outcomes (efficacy)
LBP Acupuncture	7[53,207,208,216,217,226,227]	Pain (VAS) [53,207,208,216,217,226,227] Disability (RMQ)[207,208,216,217,226] QOL[53,226]	1[219]	Pain (VAS) QOL	1[144]	Pain + ability to return to work
NP Acupuncture	1[45]	Pain (VAS)	1[263]	Pain (VAS) Function (NHP)		
Cervicogenic headache Acupuncture	None	NA	None	NA	None	NA
LBP Manipulation	None	NA	None	NA	1[284]	NA
Cervicogenic headache Manipulation	None	NA	None	NA	None	NA
LBP Mobilization	None	NA	None	NA	1[349]	Pain (VAS)
NP Mobilization	None	NA	None	NA	None	NA
LBP Massage	None	NA	None	NA	None	NA
NP Massage	None	NA	None	NA	None	NA
All	8	14	2	NA	3	0

Abbreviations: NA=not applicable; LBP= low back pain; NP= neck pain; VAS=visual analogue scale; PPT=Pressure Pain Threshold; NHP=Nottingham Health Profile;

Sensitivity Analyses

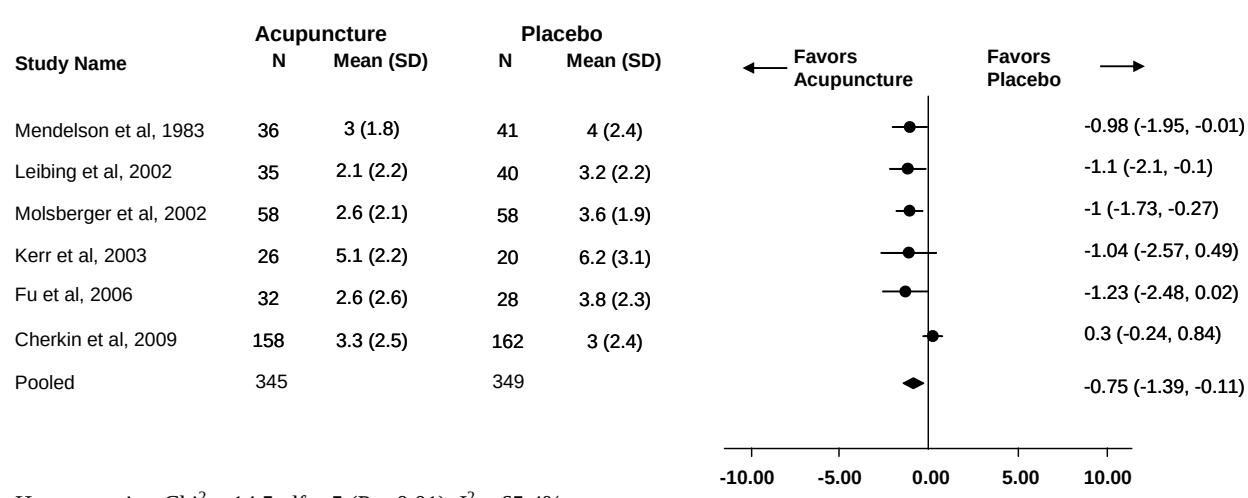
The conduct of sensitivity analysis was possible for only one meta-analysis (Figure 4) with pooled mean difference -0.59, 95 percent CI: -0.93, -0.25). We explored the impact of study quality (risk-of-bias) on the pooled effect estimate of mean pain score difference between acupuncture and placebo. Initially, the 10 trials were categorized into two groups: 'higher risk-of-bias' and 'lower risk-of-bias.' If for a trial, seven or more items of the risk-of-bias tool were rated as 'Yes' this trial was categorized into 'lower risk-of-bias' group, otherwise into 'higher risk-of-bias' group. Thus, there were four 'lower risk-of-bias' trials[22,37,197,206] and six 'higher risk-of-bias' trials.[99,141,156,198,203,228] The pooled effect estimates for the two categories of trials were -0.43 (95 percent CI: -0.76, -0.09) and -0.75 (95 percent CI: -1.39, -0.11), respectively (Figures 48-49). This analysis suggests that the quality (risk of bias) of trial did not appreciably modify the effect of acupuncture compared to placebo in subjects with chronic nonspecific low back pain.

Figure 48. Pain intensity (VAS Score) – Immediate post-treatment (lower risk-of-bias trials)



Heterogeneity: $Chi^2 = 3.92$, df = 3 (P = 0.27); $I^2 = 23.5\%$

Figure 49. Pain intensity (VAS score) – Immediate post-treatment (higher risk-of-bias trials)



Heterogeneity: $Chi^2 = 14.5$, df = 5 (P = 0.01); $I^2 = 65.4\%$

KQ1c. Does the Use of any of the Three Most Prevalent Types of CAM for Back Pain in Adults Result in a Decreased or Increased Utilization of Conventional Management?

Low Back Pain

The comparative data on days off work, medication use, and health care utilization reported for 16 trials of low back pain are presented in Tables 27-29.[22,24,29,31,53,66,95,111,112,143,202,342,346,369,385,391]

Acupuncture. In the first trial,[202] there was no statistically significant difference between subjects in acupuncture and placebo groups in the post-treatment number of days off work. The mean (or median) number of pain medication pills per unit of time (day of week) was significantly lower in subjects who received acupuncture compared to those who received placebo (mean number of pills per day: 1.0 ± 0.3 versus 4.2 ± 0.6)[202] or TENS (median number of pills per week: 15 versus 28).[53] Subjects receiving acupuncture had significantly lower number of days using analgesics compared to subjects receiving no treatment or placebo.[22]

The time to return to full time work and number of pills consumed was significantly shorter/lower for subjects receiving electro-acupuncture compared to subjects receiving manual acupuncture (no numerical data were given).

Subjects receiving acupuncture did not significantly differ from subjects receiving self-care in the number of medication fills (4.4 ± 8.9 versus4.0 ± 8.6), provider visits, or imaging tests per year.[29] Similar results were obtained in another study that compared acupuncture to usual care for chronic nonspecific patients in a 2 year study. One trial,[111] reported numerically lower proportions of any medication users amongst subjects in the acupuncture versus usual care groups (40.0 percent versus 59.0 percent).

Manipulation. Most studies reporting the data on days off work, medication use, and health care utilization indicated nonsignificant differences between the groups of spinal manipulation and exercise (days off work),[31] physician consultation (days off work, healthcare utilization),[385] medical care (pain medication use: proportion of users or number of pills),[66] or placebo (pain medication use: proportion of users or number of pills).[39]

Mobilization. In one trial in subjects with low back pain and sciatica due to sacroiliac joint dysfunction, the median number of analgesic pills taken was significantly higher in the placebo group (median: 3.5, range: 0-54) compared to mobilization group (median: 0, range: 0-132).[346] The median duration of sick leave (in days) was also significantly greater in the placebo (median: 14, range: 0-26) versus mobilization group (median: 7, range: 0-35).[346]
In another trial including patients with chronic nonspecific low back pain, the number of patients on sick leave decreased in three groups of patients randomized to bone setting, physiotherapy and exercise. There were no significant differences in proportion of patients on sick leave in the year before the intervention compared to the year after the intervention between the three groups. In this study, the average number of visits to health centers for back pain was reduced in all three groups, but was only significant in physiotherapy group.[342] (Table 26)

Massage. There were no statistically significant differences in pain medication use (e.g., proportion of patients using medications) and number of provider visits between subjects who received massage versus relaxation or self-care at end of treatment.[29,369]

Table 27. Utility of conventional medicine for low back pain: Use of medication

Author, Year (ID)	Intervention (sample size)	Control (sample size)	Region, Cause, duration of Pain	Healthcare Utilization- end point	Results CAM	Results Control	CAM vs. Control
Acupuncture							
Brinkhaus 2006[22]	**Acupuncture (147)**	**Placebo (minimal acupuncture); waiting list (154)**	**LBP, N-S**	**Days with analgesics in last 4 week- immediately post intervention (8 weeks)**	**2.0 (4.8)**	**4.9 (8.3); 6.2 (1.6)**	***Acupuncture vs. minimal acupuncture -2.9 (95%CI: -5.0, -0.8)*** ***Acupuncture vs. waiting list -4.3 (95%CI:-6.5, -2.0)***
Cherkin 2001[29]	**Acupuncture (94)**	**Self care (90)**	**LBP, NS, Chronic**	**Number of pain medication fills- 1 year**	**4.4 (8.9)**	**4.0 (8.6)**	***NS***
Kennedy, 2008[202]	**Acupuncture (24)**	**Placebo (24)**	**LBP, NS, Acute**	**Mean (SD) tablets/day at end of tx**	**1.0 (0.3)**	**4.2 (0.6)**	***S***
Thomas 2006[111]	**Acupuncture (160)**	**Usual care (81)**	**LBP, N-S, Mixed**	**Pts using any medication in past 4 weeks- 2 years**	**40%**	**59%**	**S (-19, 95% CI:-35.0, -3.0)**
Grant 1999[53]	**Acupuncture (32)**	**TENS (28)**	**LBP, N-S, Chronic (elderly**	**Median (IQ range) tablets consumed in last week- immediate post tx (B); 3 months (C)**	**B) 15 (5-37) C) 14 (0-38)**	**B) 28 (7-42) C) 24 (2-42)**	***S***
Sator-Katzenschlager 2004[143]	**Acupuncture (electrical/auricular) (31)**	**Acupuncture (manual/auricular) (30)**	**LBP, N-S, Chronic**	**Consumption of rescue medication (Tramadol), number of tablets used-**	**6**	**150**	***S***

Author, Year (ID)	Intervention (sample size)	Control (sample size)	Region, Cause, duration of Pain	Healthcare Utilization- end point	Results CAM	Results Control	CAM vs. Control
Spinal manipulation							
Childs 2004[31]	**Spinal manipulation + exercise (70)**	**Exercise alone (61)**	**LBP, NS, Mixed**	**% of pts taking any medication in past week – 6 mo fu**	**9.6%**	**25%**	***S***
Hurwitz 2006[66]	**Spinal manipulation (169)**	**Medical care (170)**	**LBP, N-S, Mixed**	**% of pts using prescription pain medication- 6 months (D), 1 year (E1), 18 months (E2)**	**D) 24% E1) 20% E2) 19%**	**D) 32% E1) 29% E2) 27%**	***NS (also pts in Spinal manipulation were more likely to use over the counter pain medication at D than pts in medical care, but not at E1-2, 56% vs. 49%, respectively)***
Meade 1991[95]	**Spinal manipulation (treated by chiropractor) (384)**	**Hospital outpatient management (357)**	**LBP, N-S, Unknown/ Mixed**	**Pts using analgesics and antiinflammatory drugs- 6 months (D); 1 year (E1); 2 years (E2)**	**D) 33% E1) 30% E2) 30%**	**D) 35% E1) 29% E2) 36%**	***-1.8 (95% CI: -9.3, 5.7) 0.7 (95% CI: -7.6, 9.0) -6.0 (95% CI: -19.1, 7.1)***
Santilli 2006[391]	**Spinal manipulation (53)**	**Placebo manipulation (simulated Spinal manipulation) (49)**	**LBP and Sciatica, Specific, Acute/ subacute**	**Number of days on antiinflammatory drugs (NSAIDs)**	**1.8 (2.9)**	**3.7 (7.1)**	***NS***
Santilli 2006[391]	**Spinal manipulation (53)**	**Placebo manipulation (simulated Spinal manipulation) (49)**	**LBP and Sciatica, Specific, Acute**	**Number of drug prescriptions-**	**2.6 (4.0)**	**4.6 (8.9)**	***NS***
Niemistö	**Spinal manipulation**	**Physician**	**LBP, N-S,**	**Pts using**	**23%**	**26%**	***NS***

Author, Year (ID)	Intervention (sample size)	Control (sample size)	Region, Cause, duration of Pain	Healthcare Utilization- end point	Results CAM	Results Control	CAM vs. Control
2003[385]	**(102)**	**consultation (102)**	**chronic**	**analgesics for LBP- 1 year**			
Nordgren, WU 1992[346]	**Spinal mobilization (18)**	**Placebo (massage) (21)**	**LBP, and Sciatica, Specific Acute/subacute**	**Number of analgesic pills (median, range)**	**0 (0-132)**	**3.5 (0.5)**	***S (p< 0.05)***
Massage							
Cherkin 2001[29]	**Massage (94)**	**Self care (90)**	**LBP, NS, Chronic**	**Number of pain medication fills- 1 year**	**2.5 (3.6)**	**4.0 (8.6)**	***S***
Poole 2007[369]	**Massage (77)**	**Relaxation; (82)**	**LBP, NS, Chronic**	**Pts using prescribed medication for LBP- 6 months**	**43.1%**	**52.6%; 55.8%**	***NR***
Poole 2007[369]	**Massage (77)**	**Relaxation; (82)**	**LBP, N-S, Chronic**	**Pts using over the counter medication for LBP- 6 months**	**18.5%**	**15.8%; 18.6%**	***NS***

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End point= denotes the last follow up in which the data was reported
NS= not significant; N-S=nonspecific; pt/s= patient/s; tx=treatment/intervention; LBP= low back pain; TENS= transcutaneous electrical stimulation; B=immediately post treatment; C= short term follow up (up to 3 months post treatment); D=intermediate follow up (up to 6 months post treatment); E=long term follow up (over 6 months post treatment)

Table 28. Utility of conventional medicine for low back pain: Use of conventional treatments

Author, Year (ID)	Intervention	Control	Region, Cause, duration of Pain	Healthcare Utilization- end point	Results CAM	Results Control	CAM vs. Control
Acupuncture							
Cherkin 2001[29]	**Acupuncture (94)**	**Self care (90)** **Massage (78)**	**LBP, N-S, Chronic**	**Number of provider visits- 1 year**	**1.9 (3.7)**	**1.5 (4.0)** **1.0 (2.1)**	**NS**
Cherkin 2001[29]	**Acupuncture (94)**	**Self care (90)** **Massage (78)**	**LBP, N-S, Chronic**	**Number of imaging studies- 1 year**	**0.2 (0.4)**	**0.1 (0.4)** **0.1 (0.4)**	**NS**
Thomas 2008[112]	**Acupuncture (123)**	**Usual care (59)**	**LBP, N-S, Chronic**	**Mean number of healthcare visits:** **a-GP** **b-outpatient** **c- NHS (National Health Services)** **d- private** **- 2 years**	**a- 3.78 (3.36)** **b- 0.50 (1.62)** **c- 8.79 (5.30)** **d- 0.98 (4.68**	**a- 4.25 (4.74)** **b- 0.41 (1.95)** **c- 9.59 (5.60)** **d- 0.90 (3.65)**	**NS**
Spinal manipulation							
Childs 2004[31]	**Spinal manipulation + exercise (70)**	**Exercise alone (61)**	**LBP, N-S, Mixed**	**% of pts seeking tx for LBP- 6 mo fu**	**11.5%**	**42.5%**	**S**
Meade 1991[95]	**Spinal manipulation (treated by chiropractor) (384)**	**Hospital outpatient management (357)**	**LBP, N-S,**	**Pts seeking any further tx- between 1 and 2 years**	**36%**	**41%**	**-4.9 (95% CI: -18.5, 8.7)**
Niemistö[385]	**Spinal manipulation (102)**	**Physician consultation (102)**	**LBP, N-S, chronic**	**Number of visits to physicians- 1 year**	**2.1 (2.6)**	**2.4 (3.3)**	**NS**

Author, Year (ID)	Intervention	Control	Region, Cause, duration of Pain	Healthcare Utilization- end point	Results CAM	Results Control	CAM vs. Control
Niemistö[385]	**Spinal manipulation (102)**	**Physician consultation (102)**	**LBP, N-S, chronic**	**Number of visits to physiotherapy or other therapists- 1 year**	**7.6 (7.7)**	**6.0 (7.3)**	**NS**
Spinal mobilization							
Hemmila, HM 2002[342]	**Spinal mobilization (bone setting)(44)**	**Physiotherapy (34)**	**LBP, N-S Chronic**	**Mean change from baseline in number of visits to health centers for back pain**	**0.1**	**0.5**	**S (only in Physiotherapy group compared to baseline)**
Hemmila, HM 2002[342]	**Spinal mobilization (bone setting)(44)**	**Exercise (35)**	**LBP, N-S Chronic**	**Mean change from baseline in number of visits to health centers for back pain**	**0.1**	**0.1**	**NS**
Massage							
Cherkin 2001[29]	**Massage (94)**	**Self care (90)**	**LBP, N-S, Chronic**	**Number of imaging studies- 1 year**	**0.1 (0.4)**	**0.1 (0.4)**	**NS**
Cherkin 2001[29]	**Massage (94)**	**Self care (90)**	**LBP, N-S, Chronic**	**Number of provider visits- 1 year**	**1.0 (2.1)**	**1.5 (4.0)**	**NS**
Poole 2007[369]	**Massage (77)**	**Relaxation; (82)** **Usual care (131)**	**LBP, N-S, Chronic**	**Pts using usual care (including medication)- 6 months**	**47.0%**	**36.8%;** **30.2%**	**No statistical results reported.** **The data for pts using treatments other than medication could not be teased out appropriately**

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End point= denotes the last follow up in which the data was reported
NS= not significant; N-S=nonspecific; pt/s= patient/s; tx=treatment/intervention; LBP= low back pain; TENS= transcutaneous electrical stimulation; B=immediately post treatment; C= short term follow up (up to 3 months post treatment); D=intermediate follow up (up to 6 months post treatment); E=long term follow up (over 6 months post treatment)

Table 29. Utility of conventional medicine for low back pain: Work absenteeism

Author, Year (ID)	Intervention (number of subjects)	Control (number of subjects)	Region, Cause, duration of Pain	Healthcare Utilization- end point	Results CAM	Results Control	CAM vs. Control
Acupuncture							
Kennedy, 2008[202]	**Acupuncture (24)**	**Placebo (24)**	**LBP, NS, Acute**	**Days off work- at end of tx**	**13.9 (5.3)**	**10.9 (4.1)**	**NS**
Sator-Katzenschlager 2004[143]	**Acupuncture (electrical/auricular) (31)**	**Acupuncture (manual/auricular) (30)**	**LBP, NS, Chronic**	**Time to return to full time work**	**No numerical data reported**	**No numerical data reported**	**Pts in electrical auricular acupuncture returned to work earlier than pts in manual acupuncture**
Spinal manipulation							
Childs 2004[31]	**Spinal manipulation + exercise (70)**	**Exercise alone (61)**	**LBP, NS, Mixed**	**% of pts with missed any time work in past 6 wks- 6 mo fu**	**41.2%**	**38.3%**	**NS**
Niemistö [385]	**Spinal manipulation (102)**	**Physician consultation (102)**	**LBP, N-S, chronic**	**Days absence of work- 1 year**	**13.9 (26.6)**	**18.5 (38.8)**	**NS**
Nordgren, WU 1992[346]	**Spinal mobilization (18)**	**Placebo (massage) (21)**	**LBP, and Sciatica, Specific Acute/subacute**	**Median duration of sick leaves during the follow-up period**	**7, (0-35)**	**14 (0-26)**	**S ($p < 0.05$)**
Hemmila, HM 2002[342]	**Spinal mobilization (bone setting)(44)**	**Physiotherapy (34)**	**LBP, N-S Chronic**	**Mean change in sick leave days for back pain-comparison between year before and year after the intervention**	**0.8**	**2.1**	**NS**
Hemmila, HM 2002[342]	**Spinal mobilization (bone setting)(44)**	**Exercise (35)**	**LBP, N-S Chronic**	**Mean change in sick leave days for back pain-comparison between year**	**0.8**	**-1.0**	**NS**

Author, Year (ID)	Intervention (number of subjects)	Control (number of subjects)	Region, Cause, duration of Pain	Healthcare Utilization- end point	Results CAM	Results Control	CAM vs. Control
				before and year after the intervention			
Hemmila, HM 2002[342]	**Spinal mobilization (bone setting)(44)**	**Physiotherapy (34)**	**LBP, N-S Chronic**	**% of patients on sick leave for back pain in the year after therapy**	**16%**	**9%**	**NS**
Hemmila, HM 2002[342]	**Spinal mobilization (bone setting)(44)**	**Exercise (35)**	**LBP, N-S Chronic**	**% of patients on sick leave for back pain in the year after therapy**	**16%**	**17%**	**NS**

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NS= not significant; N-S=non-specific; pt/s= patient/s; tx=treatment/intervention; LBP= low back pain; TENS= transcutaneous electrical stimulation; B=immediately post treatment; C= short term follow up (up to 3 months post treatment); D=intermediate follow up (up to 6 months post treatment); E=long term follow up (over 6 months post treatment)

Neck Pain

The comparative data on days off work, medication use, and health care utilization reported for 12 trials of neck pain are presented in Tables 30-31. [126,127,235,259,263,266,267,271,320,352,353,383]

Acupuncture. The number of analgesics consumed by subjects receiving acupuncture did not significantly differ from that consumed by subjects receiving Botulinum toxin[127] or Lidocaine injection.[126] The proportion of patients not taking rescue medication was significantly greater in the acupuncture versus placebo group (RR = 4.0, 95 percent CI: 2.3, 7.0).[259] In another trial,[271] the mean percent decrease in analgesic use was significantly greater in the local acupuncture versus remote acupuncture group (37.0 percent versus 9.0 percent).

Manipulation. No relevant trials were identified.

Mobilization. In two studies, analgesic medication use (i.e., percent decrease in annual use, mean annual number of doses) and the mean number of sick leave days were numerically better (no statistical test results reported) in the mobilization group versus no treatment[352] or physiotherapy (massage, stretching, and exercise).[35]

Massage. In the massage groups of two trials,[353,383] the use of pain medication was significantly lower compared to the self-care book (mean increase: 0 percent versus 14.0 percent respectively)[383] but not significantly different compared to physiotherapy group (mean decrease: 56.2 percent versus 50.0 percent, respectively).[353]

Table 30. Utility of conventional medicine for neck pain: Use of medication

Author, Year (ID)	Intervention	Control	Cause, duration of Pain	Medication intake- end point	Results CAM	Results Control	CAM vs. Control
Acupuncture							
Ilbuldu 2004[263]	**Acupuncture (dry needling) (20)**	**1- Laser tx (20)** **2- Placebo laser (20)**	**NP; Myofascial Pain; Mixed**	**Mean analgesic use- 4 weeks (B); 6 months (D)**	**B) 3.6 (4.4)** **D) 2.5 (2.7)**	**B)** **1- 0.8 (1.3);** **2- 2.1 (3.4)** **D)** **1- 1.1 (3.4);** **2- 2.5 (3.5)**	**B) S** **D) NS**
Petrie 1986[266]	**Acupuncture (13)**	**Placebo TENS (12)**	**NP- N-S, Chronic**	**Mean daily pill count- 4 weeks (B); 3 months (C)**	**B) 2.7 (2.5)** **C) 2.4 (2.6)**	**B) 1.2 (1.1)** **C) 0.8 (0.5)**	**NS**
Vas 2006[259]	**Acupuncture (61)**	**Placebo TENS (62)**	**NP; N-S; chronic**	**Pts (%) taking some rescue medication- one week post tx (C),**	**29.5%**	**98.3%**	**4.0 (95% CI: 2.3, 7.0)**
Vas 2006[259]	**Acupuncture (61)**	**Placebo TENS (62)**	**NP; N-S; chronic**	**Pts (%) using other medications (tetrazepam)- one week post tx (C)**	**8 (29.6%)**	**19 (67.9%)**	**NR**
Salter 2006[267]	**Acupuncture + GP care (10)**	**GP care (14)**	**NP- N-S, Chronic**	**Number of pts using medication- 3 months**	**11.1%**	**41.7%**	**NS**
Venancio 2008[126]	**Acupuncture (15)**	**Lidocaine injection; Lidocaine + corticoid (30)**	**Headache, N-S; Chronic**	**Number of analgesics (ibuprofen tablets) ingested- 3 months**	**32.9 (61.7)**	**32.3 (45.2); 17.8 (25.8)**	**NS**
Venancio 2009[127]	**Acupuncture (15)**	**Botulinum toxin [not sure, possibly same as REFID 19: (30)] - SG**	**Headache, N-S; Chronic**	**Number of analgesics (ibuprofen tablets) ingested- 3 months**	**32.9 (61.7)**	**15.5 (21.9)**	**NS**

Author, Year (ID)	Intervention	Control	Cause, duration of Pain	Medication intake- end point	Results CAM	Results Control	CAM vs. Control
White 2000[271]	**Acupuncture (ES) at local points (68)**	**Acupuncture (ES) at remote points (68)**	**NP-Specific; Chronic**	**Mean (SD) % decrease in average oral analgesic medication- 3 months**	**37% (18%)**	**9% (13%)**	**S**
White 2000[271] (Cross over)	**Acupuncture (ES) at local points (68)**	**Acupuncture (no ES) at local points (68)**	**NP-Specific; Chronic**	**Mean (SD) % decrease in average oral analgesic medication- 3 months**	**37% (18%)**	**6% (15%)**	**S**
Spinal mobilization							
Hemmila 2005[352]	**Mobilization (22)**	**No tx (intervention was neither offered nor denied) (20)**	**NP- N-S; Mixed/Unknown**	**The mean annual number of doses- 1 year**	**63 (146)**	**188 (332)**	**NS**
Zaproudina 2007[353]	**Mobilization (35)**	**Physiotherapy (34)**	**NP- N-S, Chronic**	**Decrease in use of painkillers (%)- 1 year**	**67.0%**	**50.0%**	**NR**
Massage							
Zaproudina 2007[353]	**Massage (35)**	**Physiotherapy (34)**	**NP- N-S, Chronic**	**Decrease in use of painkillers (%)- 1 year**	**56.2%**	**50.0%**	**NS**
Cen, 2009[383]	**Massage (32)**	**Self care book (32)**	**NP- N-S, Chronic**	**Increase in use of medication-6 months**	**0% (no change)**	**14%**	**S**

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NS= not significant; N-S=nonspecific; pt/s= patient/s; tx=treatment/intervention; LBP= low back pain; TENS= transcutaneous electrical stimulation; B=immediately post treatment; C= short term follow up (up to 3 months post treatment); D=intermediate follow up (up to 6 months post treatment); E=long term follow up (over 6 months post treatment)

Table 31. Utility of conventional medicine for neck pain: Work absenteeism

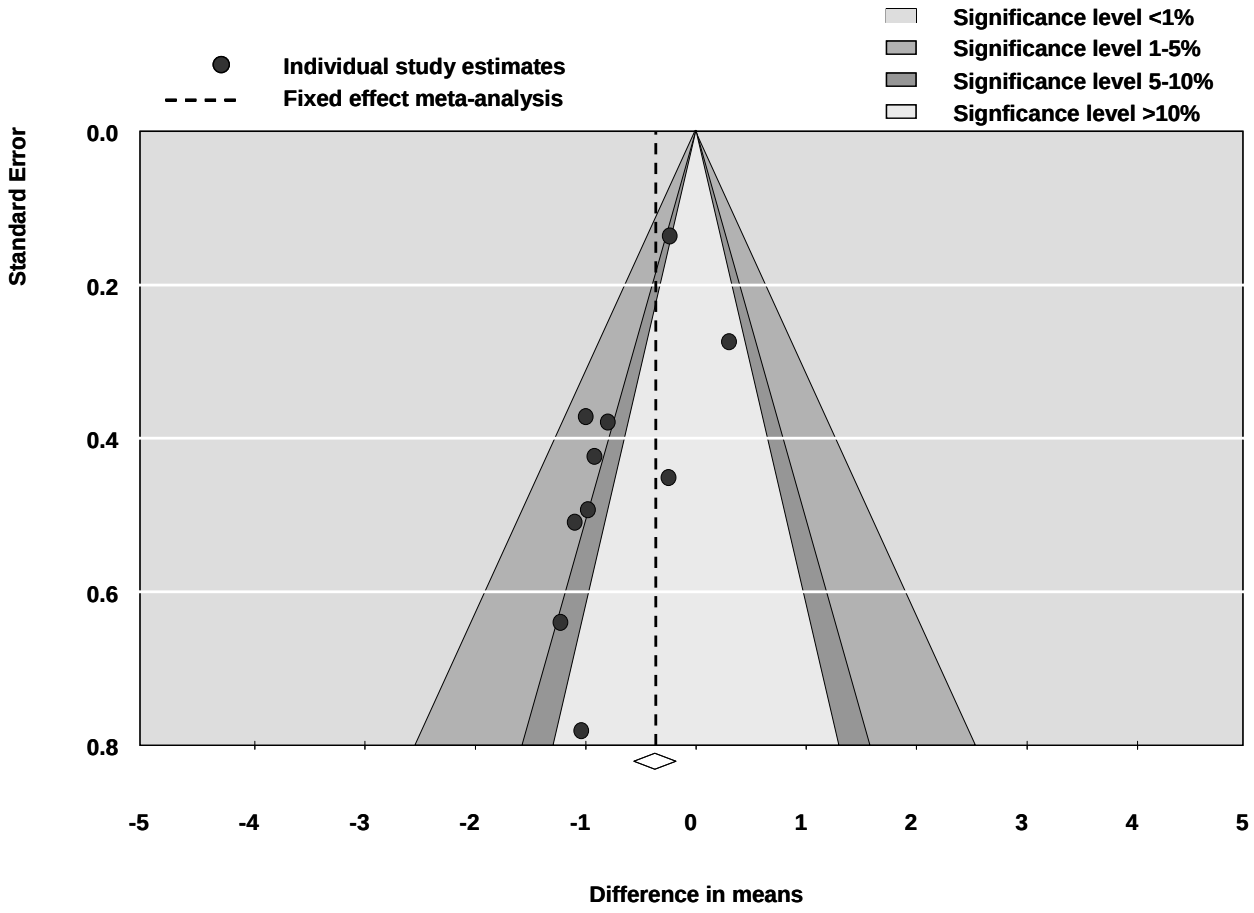
Author, Year (ID)	Intervention	Control	Cause, duration of Pain	Work outcome- end point	Results CAM	Results Control	CAM vs. Control
Spinal mobilization							
Hemmila 2005[352]	**Mobilization (22)**	**No treatment (intervention was neither offered nor denied) (20)**	**NP- N-S; Mixed/Unknown**	**Mean sick leave days prescribed due to NP- 1 year**	**4.5 (20.0)**	**16.9 (53.0)**	**NR**
Hemmila 2005[352]	**Mobilization (22)**	**No treatment (intervention was neither offered nor denied) (20)**	**NP- N-S; Mixed/Unknown**	**Number of pts prescribed sick leave- 1 year**	**3 (13.6%)**	**5 (25.0%)**	**NR**
Zaproudina 2007[353]	**Mobilization (35)**	**Physiotherapy (34)**	**NP- N-S, Chronic**	**Number of sick leave days per person- 1 year**	**0.61**	**2.6**	**S**
Kongste 2007[359]	**Mobilization (149)**	**Neck collar; (156)** **Act as usual (153)**	**NP; Specific (whiplash); Acute**	**Pts with affected work ability, % (95%CI)- 1 year**	**22% (95% CI: 15, 30)**	**28% (95%CI: 20, 36)** **25% 95%CI: 17, 33)**	**NS**
Massage							
Zaproudina 2007[353]	**Massage (35)**	**Physiotherapy (34)**	**NP- N-S, Chronic**	**Number of sick leave days**	**3.9**	**2.6**	**NR**

Data are given as mean(SD) when not indicated End point= denotes the last follow up in which the data was reported
NS= not significant; N-S=nonspecific; pt/s= patient/s; tx=treatment/intervention; acu=acupuncture; SM=spinal manipulation; LBP= low back pain; TENS= transcutaneous electrical stimulation; B=immediately post treatment; C= short term follow up (up to 3 months post treatment); D=intermediate follow up (up to 6 months post treatment); E=long term follow up (over 6 months post treatment)

Publication Bias

Visual inspection of the funnel plot (Figure 50) for the acupuncture trials comparing immediate mean post-treatment VAS scores between acupuncture and placebo treatment groups suggested some degree of asymmetry. Specifically, there was a relative lack of trials with negative results (i.e., fewer trials in areas of statistical nonsignificance), indicating a potential for publication bias. The Egger's regression-based analysis[16] yielded a statistically significant result ($p = 0.03$).

Figure 50. Funnel plot of trials comparing VAS score (acupuncture versus placebo)



KQ2 - What are the Contraindications and Safety Profile of the Three Most Prevalent CAM Therapies for Back Pain in Adults Compared to That for Other CAM Therapies, Conventional Therapies, Placebo or no Treatment? Does the Safety Profile of These Therapies Change Across Subgroups of Patients With Comorbidities?

Harms of CAM in RCTs

1 - Acupuncture for Treatment of Low Back Pain

Any information on harms was reported for 25 trials.[22,24,29,37,49,53,110,121,136,138,139,143,156,162,197,198,198,200,207,209,216,220,224,226,228] Most reported events that were of moderate and transient nature. Specific adverse events reported by subjects who received acupuncture were soreness/pain at the site of needling,[22,24,29,49,110,121,136,156,162,198,198,207,224,226,228] bruising,[226] light headedness,[226] minor bleeding,[22,24,121,136,138,139,156] dizziness,[53,136] influenza,[53] problem with circulation,[198] or headache.[136] In one trial,[143] reportedly no needle-induced adverse events had occurred.

In two trials, the proportion of subjects with any adverse events did not differ between acupuncture and placebo groups.[22,37] For example, in one of these trials,[22] 10.7 percent (15/140) and 17.1 percent (12/70) of subjects reported any adverse events for the acupuncture and the placebo group, respectively ($p = 0.20$). One trial[228] reported 3.8 percent (6/147) of the subjects in the acupuncture having an adverse event versus none in the placebo group ($p = 0.04$). In another trial,[207] one patient in acupuncture group (n=13) reported deterioration of symptoms and withdrew from the trial. There were seven patients in the acupuncture (n=32) and four patients in the placebo (minimal needling) group (n=28), respectively who reported bleeding.[156]

The proportion of subjects with at least one adverse event was similar in acupuncture and usual care (or conventional treatment) groups.[37,49,220,226] Subjects in usual care groups had epigastric pain,[139,220,226] nausea,[139] poor appetite,[139] or headache.[136,139,226] In one of these trials,[220] the medication group reported higher proportion of gastroenteric adverse events compared with the acupuncture group (15/29 versus 0/28, $p < 0.01$).

In three trials,[53,121,216] the incidence of adverse events in acupuncture (or electro-acupuncture) and TENS was numerically similar. In one of these trials,[53] there were 16.6 percent (5/30) and 14.8 percent (4/27) of the subjects who had an adverse event. In the other trial,[216] one patient dropped out due to deterioration of symptoms after receiving the combination of acupuncture and TENS.

In one trial,[29] 11 percent (10/94) of patients in the acupuncture group and 13 percent (10/78) in the massage group reported “significant discomfort or pain” during or shortly after treatment. In another trial,[200] comparing acupuncture plus exercise to exercise alone, one patient in the combination group (n=26), developed stroke. Three patients in one trial did not tolerate pain during tapping in the dermal needling group (n=88) and were excluded without receiving the treatment.[162] One patient experienced itching with electrode (acupuncture with electric stimulation group; n=31) and one patient had dullness after treatment with TENS (n=33).[209]

In one trial,[136] the proportions of subjects with an adverse event in the high-frequency acupuncture (five times per week) and the low-frequency acupuncture (two times per week) groups were 73.3 percent (11/15) and 46.6 percent (7/15), respectively (p-value not reported).

In four trials, reportedly no serious adverse events occurred in acupuncture versus massage,[29] usual care[110] 'no treatment,'[24,29] or placebo (sham-acupuncture) group.[197] For one trial,[37] after 6 months of followup, 40 and 12 serious adverse events were reported for the acupuncture (n=387) and the usual care group (n=388), respectively. Similarly, another trial,[22] reported 9.3 percent (13/140) and 5.7 percent of (4/70) of the subjects had serious adverse events in the acupuncture and placebo groups, respectively.

2 - Acupuncture for Treatment of Neck Pain

Only 13 trials reported any information on adverse events.[45,46,51,77,80,128,131,235,256,257,259,262,272] The reporting of adverse events in these trials was generally poor (i.e., inconsistent, not enough detail, not well defined, no numerical or statistical data).

For example, in two trials[45,262] comparing acupuncture to Lidocaine injection, no severe adverse events were observed[262] and one patient treated with acupuncture (n=18) withdrew from the trial due to cholecystectomy.[45] The proportions of patients with soreness in the acupuncture and Lidocaine injection groups were 50.0 percent (9/18) and 38.1 percent (8/18), respectively (p = 0.74).[45] In the same trial, none of the subjects who received acupuncture developed dizziness or haemorrhage, whereas there were two subjects each with either dizziness or haemorrhage in the Lidocaine injection group (0 percent versus 4.8 percent).

In seven trials, the proportions of patients who withdrew or those reporting adverse events were similar in acupuncture (range: 6.0 percent-33.0 percent) versus placebo (TNS) groups (range: 0 percent-21.0 percent).[77,80,128,256,257,259,272] The patients who received acupuncture reported the following events: needle reaction, mild headache, euphoria, enhanced vision, dizziness, mild hypotonia, sweating, swelling of the hand, bruising, and ulcer of the ear,[77,80,128,259] whereas patients in the placebo groups reported cephalea,[259] aggravation of symptoms,[128,256,259] tiredness, nausea, tingling in the thumb, or uncomfortable cold feeling from the electrodes.[128] No serious adverse events were reportedly noted.[77,80]

In one trial,[51] no adverse events were reported for patients receiving acupuncture (n=34) or manipulation (n=35); In total, about 6.1 percent (4/40) patients who were treated with medications (e.g., 200-400 mg/d Celebrex, 12.5-25.0 mg/d Vioxx) had indigestion, abdominal pain, or skin rash. In another trial,[131] 8.3 percent (n=1005) of the patients treated with acupuncture (both randomized and nonrandomized: n=12148) developed adverse events (minor local bleeding or hematoma, needing pain, or vegetative symptoms).

No post-needling soreness, hypotension, or hematoma was observed in two other trials comparing acupuncture alone to the combination of acupuncture either with electro-stimulation[235] or paraspinal needling.[46]

3 - Manipulation for Treatment of Low Back Pain

Any information on harms was reported for only four trials.[276,288,290,296] The reported adverse events were mostly moderate in severity and of transient nature. Most commonly reported specific event in subjects randomized to manipulation was increased pain or soreness.[276,290,296] In the first trial,[276] there were four and three subjects with worsening of LBP in the manipulation

(n=35) and exercise (n=37) groups, respectively. In the second trial,[290] there were six and four subjects with an adverse event in the manipulation (n=47) and myofascial therapy (n=50) groups, respectively. One subject in the myofascial therapy group developed constant tinnitus.[290] In one trial,[288] no adverse events were registered except for one subject (group identity not reported) who had constipation after consuming 24 Codeine Phosphate capsules in the first 4 days. Another trial[296] reported the absence of serious adverse events in subjects with subacute or chronic LBP randomized to manipulation (n=191) or standard care (Paracetamol, Acetaminophen, NSAIDs, or muscle relaxants; n=49). The number of adverse events in two manipulation groups (high-velocity low-amplitude and low-velocity variable-amplitude; n=191) was 16 (15 events of low back soreness/pain) compared to four adverse events (rash due to Celebrex, headache, leg cramps/pain across chest, slurred speech) in the standard treatment group (n=49).

4 - Manipulation + Mobilization for Treatment of Low Back Pain

Only three trials reported any harms related data.[39,56,66]

In one trial,[39] reportedly no adverse events had occurred. In another trial,[66] no treatment-related adverse events requiring institutional review board notification had occurred. One trial reported the absence of serious adverse events in subjects receiving manipulation (n=59).[56] In the same trial, 22 subjects (11 subjects in the medication - NSAIDs, analgesics group and 11 subjects in placebo group) reported dizziness, gastrointestinal disturbances, and heart palpitations.[56] One patient in the medication group (n=60) had a suspected hypersensitivity and withdrew from the trial.

5 - Flexion Distraction for Treatment of Low Back Pain

Only one trial[305] reported any information on harms. In this study, reportedly no adverse event had occurred during the study period.

6 - Manipulation for Treatment of Neck Pain

Only six trials reported any information on adverse events.[51,65,306,320,323,329] The reporting of adverse events in the majority of these trials was generally poor (i.e., inconsistent, not enough detail, not well defined, no numerical or statistical data). Results for one trial are presented in the Acupuncture section, Harms sub-section.[51,52]

In one trial of 280 patients comparing manipulation to mobilization,[65,69] after 2 weeks of treatment, patients randomized to manipulation (n=171) were at statistically nonsignificantly increased risk for having any adverse event (adjusted OR = 1.44, 95 percent CI: 0.85, 2.43) compared to patients randomized to mobilization (n=165). Most frequently reported events were neck soreness/stiffness (27.7 percent versus 22.3 percent), radiating pain (6.4 percent versus 5.8 percent), tiredness (12.1 percent versus7.9 percent), headache (15.6 percent versus 15.8 percent), and dizziness (4.3 percent versus 2.2 percent). Another trial,[329] reported proportions of patients with at least one adverse event in the manipulation plus Diazepam group and the Diazepam group alone were 9.5 percent (2/21) and 11.1 percent (2/18; superficial phlebitis), respectively. There were reportedly no serious adverse events in one trial[306] in patients randomized to the combination of manipulation and mobilization with (n=30) or without thrust (n=30). There were

nine and ten patients reporting mild-to-moderate severity adverse events in the nonthrust and thrust groups, respectively (p = 0.67).

In one trial,[323] two subjects, one in the manipulation (n=3) and the other in the manipulation combination group (n=3) experienced transient but severe neck pain/stiffness.

7 - Manipulation + Mobilization for Treatment of Neck Pain

In one trial,[81,83] although there were no important adverse events, 6.7 percent (not specified the number of subjects or a treatment group - manipulation plus exercise: n=49, manipulation alone: n=51) of the subjects reported provoked headaches as a result of the intervention.

8 - Mobilization for Treatment of Low Back Pain

None of the reviewed trials provided any information on the absence or presence of harms reported by subjects.

9 - Mobilization for Treatment of Neck Pain

Any information on adverse events was reported for two studies.[320,357] In the first study, none of the patients reported any adverse events.[357] In the other trial,[320] posterior-anterior unilateral pressure (PAUP), anterior-posterior unilateral pressure (APUP), transverse oscillatory pressure (TOP), and cervical oscillatory rotation (COR) techniques did not worsen the patients' condition. The relapse rates in the TOP and COR treatment groups after 3 months were 8.0 percent (2/24) and 12.0 percent (3/24), respectively.

10 - Mobilization for Treatment of Thoracic Pain

None of the reviewed trials provided any information on the absence or presence of harms reported by subjects.

11 - Massage for Treatment of Low Back Pain

Any information on harms was reported only for four trials.[90,366-368] For two trials,[366,368] it was explicitly stated that no adverse events had occurred during the treatment period. In one trial,[90] one subject reported worsening of back pain in the massage group (n=75) as opposed to no adverse events reported for the group of exercise (n=72) or Alexander technique lessons (n=73). In another trial,[367] five to 10 subjects from each group (Thai-massage: n=90 versus Swedish massage: n=90) reported soreness of transient nature which disappeared in 5-10 minutes. There were five additional subjects in the Swedish massage group (n=90) who reported allergic reaction (rashes and pimples) to the massage oil.[367]

12 - Massage for Treatment of Neck Pain

Only two studies reported any information on adverse events.[77,383] In one trial,[77] the proportion of patients with adverse events in massage group was numerically lower 7.0 percent

(4/57) compared to acupuncture 33.0 percent (17/51) or placebo-laser 21.0 percent (12/57). No serious adverse events were observed in this trial. In the other trial,[383] nine patients randomized to massage (n=32) had mild adverse events (discomfort or pain: n = 5, increased soreness post-treatment: n = 3, and nausea: n = 1).

Harms Reported in Nonrandomized Controlled Studies

This review identified five nonrandomized studies and one experimental controlled trial,[224] The nonrandomized studies included two cohorts,[392,393] and three case-control studies[6,394,395] that reported on the incidence of harms in subjects receiving CAM therapies.

Acupuncture for Treatment of Low Back Pain

Although one study,[224] was a trial that compared subjects with acute nonspecific LBP randomly assigned to usual care or choice of CAM care (acupuncture, massage, and chiropractic therapy), the occurrence of harms was reported only for the three groups of subjects who chose to receive acupuncture, chiropractic therapy, or massage within the choice of CAM care group (n = 300). The post-treatment rates of minor (clinically in-significant) discomfort or soreness in the acupuncture, chiropractic therapy, and massage groups were 5.0 percent (3/58), 8.0 percent (6/76), and 7.0 percent (10/152), respectively. No further details of harms were described.

Manipulation and Mobilization for Treatment of Low Back Pain

In a retrospective cohort study,[392] the rates complications were compared between two groups of subjects with nonspecific LBP of unknown duration who had received either mobilization plus manipulation (n=75) or no therapy (n=75). Findings showed no differences in rates of complications between the two groups. No further description of adverse events was provided in this study. The authors also reported that subjects who received chiropractic therapy had a longer mean length of hospital stay (4.52, 95 percent CI: 3.78, 5.36) and lower cost of treatment compared to subjects who did not receive such therapy (3.40, 95 percent CI: 2.87, 4.03), the between-group difference being statistically significant ($p < 0.01$).

In a small prospective cohort study of 68 chronic LBP patients,[393] treatment with medication-assisted manipulation or spinal manipulation alone for at least 4 – 6 weeks resulted in no complications. In this study spinal manipulation had been delivered by two chiropractors. In addition to the intervention treatment, participants received advice for exercise.

Spinal Manipulation for Treatment of Neck Pain

In a nested case-control study,[394] patients under the age of 60 years with cervical arterial dissection and ischemic stroke or TIA were followed-up (1995-2000) matched to controls (by sex and within age strata). This study showed that SMT was independently associated with a greater risk of vertebral arterial dissection, even after controlling for neck pain. In this study, patients with arterial dissection (n = 51) compared to controls (n = 100) were more likely to have had SMT within 30 days (14.0 percent versus 3.0 percent, $p = 0.032$). In multivariate analysis,

SMT within 30 days was associated with a significantly greater risk of vertebral artery dissection (OR = 6.6, 95 percent CI: 1.4 to 30.0).

In another case-control study conducted in Canada and involving 582 cases each matched with four age and sex controls, cases were five times more likely than controls to have visited a chiropractor in the week before a vertebro-basilar accident (OR= 5.03, 95 percent CI: 1.3, 43.8). These patients were also five times more likely to have had ≥ three visits to a chiropractic care in the month before the vertebro-basilar accident (OR= 4.98, 95 percent CI: 1.3, 18.6). These associations were observed only for patients aged 45 years or younger.[6]

In a recently published case control study,[395] 818 cases with and 3164 matched controls without vertebro-basilar artery (VBA) stroke were compared with respect to having received chiropractic treatment.

A chiropractic visit in the month before the index date was associated with an increased risk of VBA stroke in those under 45 years of age (OR=3.13, 95 percent CI: 1.48, 6.63). Similarly, increased risk was found for patients visiting a primary care physician in the month before the index date for patients under 45 years of age (OR= 3.57, 95 percent CI: 2.17, 5.86) and patients over 45 years of age (OR= 2.67, 95 percent CI: 2.25, 3.17).

Chapter 4. Discussion

Overview

This evidence report summarized, critically appraised, and compared the evidence on clinical benefits, costs, and harms associated with use of complementary and alternative medicine (CAM) and other therapies for the treatment of adults with low back, neck, and thoracic pain. In this report, results from 364 randomized controlled trials (RCTs) and six nonrandomized (one experimental and five observational) studies are summarized and reviewed. In general, the overall strength of the evidence was graded as low to moderate and the majority of it pertained to chronic nonspecific low back pain. Reporting quality across the trials, especially for harms was poor and inconsistent. The study results were often inconsistent probably due to substantial methodological (e.g., length of followup, blinding, design) and/or clinical (e.g., populations, treatments, and outcomes) diversity which limited the extent of comparability, interpretability, and pooling of the data. The therapy provider's experience, training, and approaches (e.g., deep or superficial massage, choice of trigger points, needling techniques) which differed across the trials may have additionally contributed to disparate results. Only a few studies measured outcomes at long-term post-treatment followup.

Acupuncture

Major Findings - Low Back Pain

- For chronic nonspecific back pain, there was moderate grade evidence that acupuncture was better than sham acupuncture in reducing pain intensity, but only immediately after the end of treatment. The degree of clinical importance for the pooled differences in pain intensity observed between acupuncture and placebo was judged as small. Acupuncture did not differ from placebo in improving post-treatment well-being, disability, use of medication, sick leave, and global improvement (grade: low to moderate).
- Acupuncture was significantly better than no treatment or usual care in reducing immediate- or short-term low back pain intensity, disability, and function (grade: moderate). The ROM and well-being were significantly better after acupuncture versus no treatment (grade: moderate). The clinical importance for the pooled differences in pain intensity observed between acupuncture and no treatment was judged as of medium degree.
- The long-term post-treatment disability and utilization of conventional healthcare did not differ between subjects with low back pain receiving acupuncture and usual care (grade: low).
- Acupuncture did not differ from pain medication but was better than physical therapy in reducing immediate-term post-treatment low back pain or disability (grade: low).
- Manipulation was significantly more effective than acupuncture in reducing immediate post-treatment low back pain intensity (grade: low). The pooled differences observed in pain intensity between acupuncture and manipulation was of significant clinical importance.

Major Findings - Neck Pain

- There was insufficient evidence regarding benefits of acupuncture compared to no treatment in subjects with neck pain.
- For subjects with chronic neck pain, acupuncture was not different from sham-acupuncture, pain medication, mobilization/traction, or laser therapy in reducing pain or disability after the treatment (grade: low).
- Manipulation was significantly better than acupuncture in reducing immediate or short-term post-treatment pain intensity or disability (grade: low).

General Issues and Harms

The results suggest that acupuncture might be an option for the treatment of acute, subacute, and chronic LBP (specific or nonspecific cause). For chronic nonspecific back pain there is evidence that real acupuncture is no better than sham acupuncture, but better than no treatment or usual care. The benefit of acupuncture was mostly evident immediately or shortly after the end of the treatment and then faded with time. The evidence base for acute, subacute, and mixed duration specific LBP was very sparse and less conclusive.

Trials that applied sham-acupuncture tended to produce negative results (i.e., statistically nonsignificant) compared to trials that applied other types of placebo (e.g., TENS, medication, laser) between acupuncture and placebo groups. These findings agree with others indicating, that indeed, different types of controls used in acupuncture trials may result in different effects.[3,396] The reasons for inconsistent results observed in acupuncture placebo-controlled trials are not readily explained. One explanation is the beneficial effect of sham-acupuncture which rests on the diffuse noxious inhibitory control (DNIC), where neurons in the dorsal horn of the spinal cord are strongly inhibited by the application of a nociceptive stimulus to any part of the body distinct from their excitatory receptive fields.[397] Another explanation could be the nonspecific effects of attention and beliefs in a potentially beneficial treatment. The next explanation is that the risk of bias of individual trials may have an influence on the treatment effect. The sensitivity analysis results of this review did not suggest that the pooled effect of acupuncture (compared to placebo) with respect to back pain intensity was strongly influenced by the risk of bias of the trials.

Since only few trials reported any information on harms, it is difficult to adequately compare the event rates across the treatment arms.

Consistency With Other Systematic Reviews

The evidence base of acupuncture for low-back pain has grown in the last decade. The first Cochrane review on this topic was published in 1999 and included only eleven RCTs.[398] The next update was published in 2005 and included 35 RCTs.[3] The present report includes 105 RCTs of acupuncture for low back pain and has a wider scope than the previous Cochrane review since additionally, it includes studies in subjects with specific causes of low back pain.

A recently published systematic review of acupuncture for low-back pain (23 trials) showed similar results to the present report.[399] The authors concluded that there was strong evidence that

acupuncture is no different from sham acupuncture, basing their conclusion on three trials with low risk of bias that showed no difference [22,37,141] and one trial with high risk of bias that showed acupuncture being superior over sham acupuncture.[207] We based our conclusion on 12 placebo-controlled trials in low back pain. There is still a lot of uncertainty regarding the physiological effects of the needles.[22,27,37,37,99,141,156,197,198,203,206,228] One explanation for the beneficial effects of sham acupuncture is the diffuse noxious inhibitory controls (DNIC) where neurons in the dorsal horn of the spinal cord are strongly inhibited when a nociceptive stimulus is applied to any part of the body, distinct from their excitatory receptive fields. [400] Another explanation could be the nonspecific effects of attention and beliefs in a potentially beneficial treatment.

We identified three systematic reviews for neck pain.[401-403] In the most recently published review completed by the Neck Pain Task Force,[402] only ten studies judged to have adequate internal validity were included and assessed. The authors concluded that acupuncture was likely helpful for neck pain not associated with whiplash associated disorders.[402] Another review by Fu and colleagues[401] included only RCTs with neck pain for at least 1 month, using traditional or electro-acupuncture. They excluded trials in subjects with multiple pain sites, with neck pain not being the main symptom, where only different forms of acupuncture were being compared or if neck pain was not the primary outcome. Based on 14 trials, they found that acupuncture was more effective than placebo or sham acupuncture in the treatment of neck pain for short-term pain reduction. In the third review,[403] ten trials of subjects with chronic neck pain were included. They concluded that there was moderate evidence that acupuncture was more effective for pain relief than some types of sham controls, measured immediately post-treatment; there was limited evidence that acupuncture was more effective than massage at short-term followup; for chronic neck disorders with radicular symptoms, there was moderate evidence that acupuncture was more effective than a wait-list control at short-term followup. Although the present review includes a much wider range of trials, it does find similar results to these reviews.

Clinical Relevance

Furlan et al., showed that improvement in acute LBP with acupuncture was on average 52.0 percent of the VAS (minimum 25.0 percent and maximum 80.0 percent) while improvement for chronic LBP was on average 32.0 percent of the VAS (min -17 percent and max - 62 percent). For people with chronic LBP receiving no treatment, the average improvement was 6.0 percent, and for sham acupuncture it was 23.0 percent (minimum -19.0 percent and maximum 44.0 percent).[3] Thus, acupuncture may be beneficial to those suffering from both acute and chronic low back pain. However, how beneficial acupuncture is when compared to standard medical care is not known.

Manipulation/Mobilization

Major Findings – Low Back Pain – Manipulation

- In subjects with nonspecific low back pain, manipulation was significantly better than placebo (grade: moderate) or no treatment (grade: low) in reducing pain intensity, but not disability, pain medication intake or ROM immediately or short-term after the treatment.
- Manipulation did not differ from pain medication in improving pain intensity (grade: low). Results for pain intensity or disability were inconsistent regarding manipulation compared to massage or physiotherapy (grade: low)

Major Findings – Low Back Pain – Mobilization

- In subjects with acute/subacute or chronic low back pain, mobilization was significantly better than no treatment in improving pain intensity and lumbar flexibility immediately and short-term after the treatment (grade: low).
- Mobilization was similar to placebo in reducing specific acute/subacute or nonspecific mixed duration pain or ROM immediately and short term post-treatment (grade: low).
- Mobilization was similar to physiotherapy (a combination of manual treatment and physical modality but not physical modalities alone) in improving ROM for nonspecific chronic or mixed duration pain immediately and short term post-treatment (grade: low).
- Mobilization was better than physiotherapy (a combination of manual treatment and physical modality but not physical modalities alone) in reducing immediate-term post-treatment pain intensity (grade: low). The differences observed in pooled pain intensity between mobilization and physiotherapy was not of significant clinical importance.

Major Findings – Neck Pain – Manipulation

- Subjects with neck pain benefited more with manipulation than placebo in terms of pain (grade: moderate), disability (grade; low), and neck flexibility (grade; low).

Major Findings – Neck Pain – Mobilization

- In subjects with neck pain (chronic, mixed duration), mobilization was better than no treatment in reducing pain intensity (grade: low), but not in reducing the intake of pain medication pills or the number of sick leave days immediately or short-term after the treatment (grade: low).
- Mobilization was more effective than placebo in improving acute/subacute neck pain but not in improving chronic neck pain (grade: low). Mobilization was better than physiotherapy or massage in reducing pain intensity and disability in subjects with chronic nonspecific neck pain at intermediate-term after the treatment (grade: low).

General Issues and Harms

In general, manipulation was shown to be more effective than placebo or no treatment in reducing pain intensity in subjects with back or neck pain. The benefits of manipulation appeared to be mostly limited to a period immediately or in the short-term (2 weeks to 6 months) following the treatment. Results regarding the comparison of manipulation to other treatments (e.g., pain medication, massage, or physiotherapy) in pain reduction were less consistent. The reviewed evidence indicated that mobilization for back or neck pain as associated with greater reductions in pain intensity compared with no treatment. However, the evidence regarding the comparison of mobilization to placebo was less consistent across subjects with low back and neck pain. Mobilization was better than placebo in reducing pain intensity amongst subjects with acute or subacute neck pain, but not amongst those with chronic neck pain. Some evidence indicated that subjects with low back or neck pain benefited from mobilization more than from physiotherapy in improving pain intensity.

There are various methods and techniques of spinal manipulation and mobilization as well skill levels of manual practitioners. In this review, there were several trials of manipulation and mobilization comparing various methods or techniques. However, due to conflicting results, clinical heterogeneity, and low methodological quality (high risk of bias) across the trials, we were unable to determine which method or technique of manipulation or mobilization is more effective and whether the skill level of the practitioners influenced the outcome.

The lack of long term benefits for spinal manipulation/mobilization is not surprising given the recurrent nature of non specific LBP.[279,309] It is uncertain whether manipulation/mobilization received during recurrent episodes (as in clinical practice) rather than during a single episode or period would result in long-term benefit including reduced frequency of recurrences.

Low back pain is one of the most common and expensive disorders in developed countries. There is a high variation in the care provided for low back pain, and the optimal approach remains still unknown.[278,404] Spinal manipulation and mobilization are common treatments for low back pain, particularly among chiropractors and low back pain is the most common complaint seen by chiropractors.[405] One third of all patients who seek care for low back pain, see chiropractors,[406] and over 90 percent of chiropractors use spinal manipulation when treating patients.[407] Physiotherapists and osteopaths also use manipulation and mobilization for the treatment of low back pain, but the evidence on the frequency of their use is limited. For physiotherapists, the use of high velocity low amplitude manipulation in patients with acute low back pain varies from 4.0 percent[408] to 2.0 percent[409] and the use of mobilization is up to 40.0 percent. Previous research has shown that 25.0 percent-40.0 percent of patients with low back pain referred to physiotherapy were positively identified as likely to benefit from spinal manipulation based on a clinical prediction rules.[306]

There is a great diversity in the outcome measures used for pain (18 methods or instruments), function/disability (nine methods), global perceived effect (four methods), patient satisfaction (three methods) and quality of life (five methods) .[410] The Cochrane Collaboration Back Group has published guidelines recommending key outcome measurement categories and related minimal clinically important difference or minimal detectable change.[14] The psychometric properties and usefulness of key condition-specific disability measures are important to adequately interpret findings. For example, the Neck Disability Index has been recently reviewed

for establishing clinically meaningful change.[411] Although this is one of the most commonly used instruments for neck pain, the minimal clinically important difference (MCID) was shown to be vary across different studies and disorder types ranging from 5/50 to 19/50. There is some evidence that individualized questionnaires like the Patient Specific Disability added to standardized self-report disability measures may enhance our ability to capture change in clinical trials. Future trials may wish to incorporate such instruments as well as specify the rationale for the MCID.

Only few trials evaluating mobilization and/or manipulation provided any information on the absence or presence of harms. The adverse events were not collected in a systematic manner and were poorly reported. Transient increase in low back pain was among the most common adverse events. Moreover, the findings of three case-control studies[6,394,395] suggested that younger adults ($\geq$ 45 years) receiving spinal manipulation were at a higher risk of having vertebral artery dissection or vertebrobasilar vascular accident. However, according to a more recent study,[395] this risk was similar to that related to the visiting a primary care physician for treatment of neck pain. Higher level of evidence from RCTs will help to draw more definitive conclusions regarding the risk of vascular events following manual therapies for neck pain.

Previous studies suggested that manual therapy including spinal manipulation or mobilization for low back pain is rarely associated with serious adverse events.[412,413]

A number of investigators have made attempts to estimate the risk for serious adverse events in patients with neck pain receiving manipulation therapy, ranging from one in several million,[414] to one in 100,000[415] but these estimations were limited by numerous methodological flaws and challenges. The evidence for serious or catastrophic events is found only in case reports and retrospective case series or surveys from neurologists.[416-418] The inherent bias of retrospective reports is the over-reporting of serious adverse events compared to minor and moderate events. While the calculation of risk for the occurrence of catastrophic events such as stroke or death from cervical manipulation is supported by temporal and biologic plausibility arguments, it is plagued by numerous biases such as measurement or selection bias. The risk for catastrophic events in RCTs could not be estimated. Long term cohort trials and the establishment of mandatory national reporting registries by manipulation therapy practitioners, physicians and neurologists can address this safety issue in CAM treatments. Currently, a paucity of reports of adverse events related to mobilization techniques exists and this needs to be corrected.

The lack of accurate incidence rates for adverse events may be attributed to numerous methodological challenges. The most common problems were: a) the lack of consensus on standardized definitions of adverse events, b) inadequate followup (the followup duration should be long enough to detect adverse events, be able to examine the persistence of benefits, and to assess the sustainability of the intervention), c) short-term followup can exaggerate benefits by overlooking any adverse events which may emerge more slowly. The problem is also impeded when typical symptoms evaluated for benefit are also considered as adverse events. For example, pain relief is a desired outcome of benefit, but if pain increases (short term) as a results of a manual therapy intervention, it is not always clear if this is an adverse event (unintended) or the lack of efficacy of the treatment. Adverse events may depend on accumulated dose or time. A framework for defining adverse events specific to manual therapy has been proposed[419] but it falls short of providing standardized definitions with regards to severity and thresholds for adversity of common symptoms .

Consistency With Other Systematic Reviews

The findings in this review are not divergent from previous reviews. For example, Assendelft et al.,[420] conducted a systematic review and meta-analysis of 39 RCTs evaluating manipulation and/or mobilization for patients with acute/subacute or chronic low back pain. This review combined manipulation and mobilization trials and excluded studies that did not assess clinically relevant outcomes such as pain, global improvement or functional status. The authors concluded that spinal manipulation (or mobilization) was more effective (both statistically and clinically important differences were found) than sham therapy or ineffective treatments and equally effective when compared to other effective treatments such as general practitioner care, physiotherapy, exercise or back school. These results were consistent regardless of symptom duration or the presence of back-related leg pain.[420] The benefits were found in the short-term for acute low back pain and in the short and long-term for chronic low back pain. The results did not differ when only trials of spinal manipulation alone were included in the analysis.

Bronfort et al.,[421] conducted a systematic review on the efficacy of manipulation or mobilization for low back pain and found moderate evidence that manipulation provided more short-term pain relief than mobilization and detuned diathermy, and limited evidence on faster recovery than the commonly used physical therapy treatment. For chronic low back pain, this review found moderate evidence that manipulation had an effect similar to nonsteroidal antiinflammatory drugs. Manipulation/mobilization was effective in the short term when compared with placebo and general practitioner care, and in the long term compared to physical therapy. There was moderate evidence that manipulation was better than physical therapy and home back exercise in both the short- and long-term. In patients with a mix of acute and chronic low back pain, this review found that manipulation/mobilization provided either similar or better pain outcomes in the short and long term compared with placebo, McKenzie therapy, medical care, management by physical therapists, soft tissue treatment or back school.

The findings of this review regarding neck pain are consistent with those of other reviews.[422-426] While some differences can be explained by the inclusion criteria and grading of trials between this and other two reviews,[422,423] the major results in general are similar. Two additional systematic reviews [427,428] assessed multimodal interventions that included mobilization and manipulation combined with other interventions. The trials included in these reviews were outside the scope of this review.

Clinical Relevance

It is uncertain what is the optimal frequency and duration of manipulation/mobilization therapy for nonspecific low back pain. In clinical practice, frequency and duration of treatment are usually tailored to the individual needs of the patient. In this review, adult patients classified as having nonspecific low back pain were assumed to be homogeneous in terms of the disease. However, some evidence suggests that there are subgroups of nonspecific LBP patients who are likely to respond differently to various types of intervention.[429,430] A clinical prediction rule with five variables (symptom duration, fear–avoidance beliefs, lumbar hypomobility, hip internal rotation range of motion, and no symptoms distal to the knee), has been recently developed and validated application of which can increase the probability of success with manipulation from 45

percent to 95 percent for subjects with nonspecific low back pain.[31,431] In clinical practice, only some patients with nonspecific low back pain may receive manipulation depending on the clinical presentation.

In our review the intervention was restricted to manipulation alone, mobilization alone, or combination of manipulation and mobilization. This was done to adequately evaluate these specific interventions. However, this may not reflect the realities of clinical practice, where multi-modal approaches are the norm. Combining various forms of manipulation, mobilization, education and exercise that is individualized to the patient is supported from a theoretical and clinical reasoning perspective. Trials that included multi-modal treatment were excluded from this review, and therefore our findings may not be readily applicable to multimodal treatments used in practice including manipulation or mobilization.

This review attempted to answer the question of efficacy: "Can manipulation or mobilization positively affect neck pain?" The included studies may not reflect typical practice in the community of manual therapy. For example, single session or low dose trials with immediate post-treatment followup tend to give positive findings and exaggerate the treatment benefit. There were some trials in this review that were pragmatic and were designed to answer how well manipulation works in practice.[51,140,307,318,320,321,330,332] These trials tended to have larger samples, a longer duration or higher dose of treatment, enroll more heterogeneous populations, and allow the manual therapy interventions to vary as they would in clinical practice. These effectiveness trials are designed to give a broader clinical applicability. Their findings were more conservative and varied relative to the less pragmatic trials.

Massage

Major Findings – Low Back Pain

- Massage was superior to placebo or no treatment (grade: low) in reducing pain (grade: moderate) and disability (grade: low) immediately post-treatment only in subjects with acute/subacute but not in subjects with chronic low back pain (grade: low).

- Massage was significantly better than relaxation (clinical importance of difference: medium degree) or physical therapy (clinical importance of difference: large degree) in reducing chronic nonspecific low back pain intensity but not ROM, immediately after the treatment (grade: low to moderate).

Major Findings – Neck Pain

- Massage was better than no treatment in reducing immediate-term post-treatment pain intensity in subjects with chronic or unknown duration of nonspecific pain (grade: low).

- Massage was better than placebo in reducing neck pain intensity immediately after the treatment in subjects with acute/subacute or unknown duration of nonspecific pain

(grade: low). Massage was not different from placebo in improving well-being or ROM in subjects with chronic pain (grade: low).

General Issues and Harms

When the outcomes of pain and function are examined, it seems that massage had a more consistent impact in pain intensity than on function or ROM for which many trials had conflicting findings. This might be due to psychological factors that contribute to disability which are not addressed by massage therapy.

Typically, massage therapy is delivered differently in many different parts of the world. The variations in practice settings, study populations, severity of the disorder, duration and number of massage sessions, types of placebo (e.g., TENS, massage) and adjuvant modalities might all contribute to different results. In the reviewed trials, practice settings as well as inclusion and exclusion criteria for study populations were often poorly specified. One bias inherent in all trials was that blinding of the patient, care provider, and often outcome assessor was often not achieved and may have led to exaggerated treatment effect estimates. Blinding of the therapist is not possible, therefore, effort is needed to blind the outcome assessor. In most of the reviewed studies, the primary outcome was a "self-reported" outcome such as pain, global perceived effect, disability/function or quality of life, in other words a "subjective" outcome type. Bias may be introduced when blinding of patients and care giver is inadequate. Furthermore, massage trials often used primary outcomes such as single-item pain scales. For such trials, the patient automatically becomes the "outcome assessor" and therefore cannot be blinded. For other multi-item self report tools, such as the Neck Disability Index, the patient may be naïve, may have lower recall of their original rating and may not always be considered to be the "outcome assessor". Outcomes utilizing performance based findings are needed to balance the inherent bias in reporting self-reported outcome measures.

Information on harms reported in the massage trials was very limited. No serious adverse events were reported. In a few trials, subjects receiving massage experienced transient back/neck soreness.

Consistency With Other Systematic Reviews

A Cochrane Review of massage for nonspecific low-back pain, updated in 2008, included 13 RCTs.[432] All 13 studies were also included in this review. The present review included four more trials. Two of these trials were published after the Cochrane review,[93,368] and two trials in subjects with disc herniation were excluded from the Cochrane review because of the population eligibility criterion.[159,362] The Cochrane review concluded that "massage was superior for pain and function compared with placebo or no treatment on both short and long-term followups. Massage was similar to exercise, and it was superior to joint mobilization, relaxation therapy, physical therapy, acupuncture, and self-care education.

In two reviews of neck pain,[433,434] limited implications for clinical practice were noted. No recommendations could be made due to unclear evidence and the difficulty in comparing very different massage forms. Four different massage therapy approaches, all in trials of very low quality (high risk of bias) and of moderate clinical applicability showed evidence of no benefit in pain relief when compared to different forms of control treatment. The trials within these two

reviews included ischemic compression, the use of a J-cane tool, Western massage, and occipital release for typically subacute or chronic neck pain.

Clinical Relevance

The application of the massage techniques can be very different in research trials relative to how it is applied in clinical practice. A standardized taxonomy is needed for massage and although one has been suggested,[435] there is no movement to adopt it within the research community.

Cost-Effectiveness of CAM Therapies

There was consistent evidence for the cost-effectiveness of acupuncture for back and neck pain relative to usual care or no treatment, but this was based on only three studies. Because the benefits of spinal manipulation were modest or absent in the six trials of spinal manipulation that included economic analyses, there is no compelling evidence for the cost-effectiveness of this treatment for back or neck pain. The only trial that included massage as a treatment found massage more costly and less effective than usual physician care. In summary, because of the small number of economic evaluations, the inconsistent standards of comparison, and the substantial heterogeneity among these studies (different countries with different health care payment systems), it is not possible to reach clear conclusions about the cost-effectiveness of any of these CAM treatments for back or neck pain or to make global application of the findings. These initial studies suggest that spinal manipulation may not be cost-effective and acupuncture is promising. There have not yet been any economic evaluations of a defined massage treatment protocol for back or neck pain.

Strengths and Limitations of Review

Strengths

This review identified a large amount of evidence on efficacy and safety of CAM treatments used in the management of back and neck pain. The reviewers used systematic, comprehensive, and independent strategies to minimize the risk of bias in searching, identifying, retrieving, screening, abstracting, and appraising the primary studies. The search strategy, which was not restricted by the language or year of publication, was applied to multiple electronic sources. Furthermore, the references of included studies were hand-searched for potentially eligible reports. Further strength of this review is that results of individual trials regarding primary outcomes were stratified and subgrouped by spine region (e.g., low back, neck), duration of pain (acute, subacute, chronic, mixed, and unknown), and cause of pain (specific or nonspecific). The reviewers were able to pool results of individual trials in series of meta-analyses for all reviewed major treatments (acupuncture, manipulation, mobilization, and massage) within subgroups of populations defined by spine region (low back, neck), duration of pain (acute, subacute, chronic, mixed, and unknown), and length of post-treatment followup for each outcome (immediate, short-term, intermediate-term, and long-term). The reviewers assessed and reported the degree

of clinical importance of the observed statistically significant pooled differences in pain intensity between the treatment groups.

This review assessed the extent of publication bias using a visual inspection of the funnel plot and the Egger's regression-based technique.[16] Although the visual inspection method is not very reliable, it conveys some general idea as to how symmetrical the dispersion of individual trial effect estimates is around more precise effect.[8] Note that methodological and clinical heterogeneity across trials may also contribute to funnel plot asymmetry.[15] The funnel plot of acupuncture placebo-controlled trials showed some degree of asymmetry which may have arisen due to publication bias. Publication bias, if present, may have led to overestimation of the treatment effect of acupuncture compared to placebo in reducing pain intensity. We aimed to minimize publication bias by supplementing the comprehensive search strategy with inclusion of grey literature and reports published in non-English journals.

The collected data allowed us to perform a sensitivity analysis which explored the influence of study quality (i.e., risk-of-bias) on the pooled treatment effect (reduction of pain intensity) in trials comparing acupuncture to placebo.

Limitations

This review is limited by the information provided in the included primary studies. Most of these studies were of high risk of bias. Many trials had small sample size (e.g. pilot, feasibility studies) or used a single treatment session and may have had limited power to detect clinically meaningful differences in the primary outcomes between the study treatment groups. A high proportion of acupuncture trials published in Chinese did not explicitly define the primary binary outcome 'curative effect,' the definition of which may have varied across these trials. Study reports did not always provide sufficient quantitative information (e.g., standard deviations, standard errors, mean endpoints) necessary for pooling the results of individual trials. Authors of many trials failed to report statistical test results for between-group differences in outcome measures after the end of treatment. The occurrence of harms was not reported in the majority of trials, making it difficult to draw definitive conclusions regarding absolute or relative safety of the reviewed treatments.

The risk-of-bias graphs indicated that the adequacy of methods for randomization was not clear for at least 40 percent of all trials. It was not clear whether or not the treatment allocation was concealed for more than half of all trials. Study participants' blinding status was reported more frequently compared to assessors' blinding status. The baseline distribution of subjects' characteristics and study participants' blinding status were better reported than methods of randomization or treatment of allocation. The overall proportion of double blind trials amongst the trials reporting this information was very low (about 10.0 percent). It should be noted that in most situations where physical treatments are applied, effective blinding is very difficult or impossible to achieve. The absence of data for the above-mentioned domains (i.e., randomization methods, treatment allocation concealment, blinding status) limits the extent of valid interpretation of the review results.

There was substantial clinical (e.g., populations, treatments, and outcomes) and methodological (e.g., length of followup, blinding, design) heterogeneity present across included trials which may have led to the disparate results. For example, there were many different treatment modalities used within acupuncture (e.g., dry needling, conventional needling,

warming needle, electro-acupuncture, trigger-point acupuncture, laser-acupuncture), spinal manipulation therapy (e.g., manual manipulation, instrument-assisted manipulation), flexion-distraction technique, osteopathy, mobilization, traditional bone-setting techniques, and massage (e.g., acupressure, reflexology) or their combinations with other therapies (e.g., pain medications, physiotherapy, traction, exercise, standard therapy, advice/education) making it very difficult to meaningfully compare and summarize the efficacy and safety parameters of the review. Moreover, the therapy provider's experience, training, and approaches (e.g., deep or superficial massage, choice of trigger points, needling techniques) which differed across the trials may have additionally impacted the trial results. The observed variability in the experimental interventions was compounded by a wide variety of control (comparison) treatments used across the trials (e.g., physiotherapy, exercise, advice/book, standard therapy, other CAM therapy, placebo, no treatment). For example, some trials used different types of placebo (detuned short-wave diathermy, superficial needling, TENS placebo, sham manipulation, sham acupuncture, sham massage) whose effects may have been different, thereby contributing additional heterogeneity. The above-mentioned clinical diversity limited the extent of statistical pooling of trial results. Some of the pooled analyses revealed unexplained statistical heterogeneity. Therefore, the results of such meta-analyses should be viewed with caution.

Quantitative subgroup analyses exploring the effects of age, gender, race, type of treatment provider, or dose of treatment could not be performed due to lack or insufficient data. For example, the largest meta-analysis in this review included only 10 trials and the remaining smaller meta-analyses included a range of two to four trials. None of the pooled trials included solely subjects from these subgroups of interest. Similarly, the results from several trials that were conducted in subjects of specific age- or gender-based subgroups (e.g., elderly, young adults, men, and women) were not comparable due to different control treatments used, duration of pain, and/or cause of pain in subjects included in these trials.

One more limitation of this review may be the use of a nonweighted system for averaging risk of bias (i.e. high, medium, low) for multiple studies for grading overall strength of evidence.

This review focused on manipulation or mobilization to estimate the efficacy. Results from these studies may not be readily applicable to various combinations of interventions used in today's practice. However, the assessment of a single intervention is the first step in teasing out which therapeutic item is more effective in reducing pain and improving function.

Future Research

Stronger efforts are needed to improve the quality of conduct and reporting of primary studies evaluating CAM therapies. The primary study authors should consider CONSORT statement as a reporting guide in order to improve the quality of reporting.[436] For example, authors of future trials should direct more attention to minimizing bias (e.g., randomization sequence generation, treatment allocation concealment, blinding, incomplete outcome data, and selective outcome reporting) in conducting, analyzing, and reporting results of primary trials.

Some factors that may influence results of clinical trials assessing patient-reported outcomes for manipulative treatments were discussed by Licciardone et al.,[437] who listed the following sources of bias: a) attrition or selection bias (e.g., differential dropout or withdrawal rates, self-selection bias), b) investigator bias (e.g., allocation concealment), and c) nonspecific treatment

effects due to investigator-subject relationship, regression to the mean, and subjects' expectation of outcomes/treatment credibility due to awareness of the treatment they are assigned to receive.

Moreover, trial authors need to characterize and report frequency (e.g., number of sessions per unit of time) and duration of treatments used, in order to help establish which of these characteristics make these therapies most optimal in terms of benefits and harms.

Trial investigators need to consider the use of validated instruments for measuring outcomes. Currently, there is a great diversity in outcome measures used for pain, function/disability, global perceived effect, patient satisfaction and quality of life. The Cochrane Collaboration Back Group has published guidelines recommending key outcome measurement categories and related minimal clinically important difference or minimal detectable change.[14] For efficiency purposes, a single trial should ideally measure maximum number of relevant outcomes (pain, function, return to work, and health care utilization). To minimize the risk of bias inherent to some subjective outcome measures (e.g., pain, disability, quality of life, GPE, patient satisfaction), investigators should additionally measure and report objective outcomes (e.g., performance-based outcomes, impairment measures, range of motion, muscle strength).

Since in most studies of low back and neck pain, the primary outcome is self-reported pain, global perceived effect, disability/function or quality of life, the lack of blinding or inadequate blinding of study subjects or outcome assessors may bias the trial results. Therefore, it is important that more efforts be directed towards better blinding methodologies applied in future trials.

For a given trial, it is important to consider an appropriate placebo treatment. For example, in this review, trials that applied sham-acupuncture or sham-manipulation tended to have negative results compared to trials that applied other types of placebo (e.g., no treatment, laser-placebo, TENS-placebo). Future head-to-head trials comparing CAM treatments should ideally have a large sample size, since in case of small trials, it is difficult to explain whether the negative results are due to true equivalence between the interventions or due to small samples.

Factorial design including randomization first to CAM therapy or no treatment, and then randomizing to other treatment modalities would be most informative to delineate the additive/subtractive and individual effects of CAM therapies relative to any given treatment.

Future trials should help to better inform the influence of treatment-, care-provider (e.g. experience, skills), and population-specific factors on treatment effect estimates. It is desirable that treatment providers (chiropractors, acupuncturists, massage therapists) employed in future trials be highly experienced. More research should be conducted elucidating clinical benefits of different forms of CAM therapies relative to each other, since at present there is no clear advantage of any particular type. It is also important to collect and report information on patients' previous experience, beliefs, and their expectations of CAM therapies to assess the impact of these factors on the success of care. More data from well-conducted trials are needed for definitive conclusions regarding the relationships between the use of CAM and conventional therapies in subjects with neck and back pain.

Finally, the exploration and explanation of key causal or biological mechanisms underlying the effects of CAM therapies and their variation across subgroups of patients are also warranted.

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Appendix A

Ovid MEDLINE(R) 1950 to February Week 1 2010

1 exp Neck/ or exp spine/ or exp back/ or Neck Muscles/ or Zygapophyseal Joint/
2 pain/ or pain, intractable/ or pain, referred/
3 (pain* or ache*).tw.
4 3 or 2
5 4 and 1
6 exp back pain/
7 exp back injuries/
8 (backpain* or backache*).tw.
9 exp spinal injuries/
10 exp spinal diseases/
11 ((disc* or disk*) adj3 (degener* or displace* or prolapse* or hernia* or bulge or protrusion* or extrusion* or sequestration* or disorder* or disease* or rupture* or slipped)).tw.
12 ((stenosis or stenoses) adj3 (lumbar or spine or spines or spinal)).tw.
13 (Spondylolys* or spondylolisthes* or Spondylisthes*).tw.
14 (Discitis or diskitis or Spondylodis*).tw.
15 (osteoporo* adj3 compression fracture*).tw.
16 vertebrogenic pain syndrome*.tw.
17 Sciatica/
18 (Sciatica or ischialgia).tw.
19 (Sciatic adj3 (Neuralgia or Bilateral)).tw.
20 Neck Pain/
21 (cervicalgia or Cervicodynia).tw.
22 ((anterior or posterior) adj3 (cervical pain or cervical ache*)).tw.
23 ((cervicogenic or cervico-genic) adj3 headache*).tw.
24 exp neck injuries/
25 (neckache* or neckpain*).tw.
26 (whiplash* or whip lash* or radiculomyelopath* or radiculo-myelopath*).tw.
27 (neck disorder* adj3 radicul*).tw.
28 (failed back or back surgery syndrome* or FBSS).tw.
29 ((Zygapophyseal or Facet or facets) adj3 (syndrome* or degenerat*)).tw.
30 ((back or neck or spine or spinal or lumbar* or thoracic) adj3 (ache* or aching or pain* or strain*)).tw.
31 (lumbago or dorsalgia).tw.
32 (myofascial adj3 (pain* or ache*)).tw.
33 or/5-32
34 Acupuncture/
35 Acupuncture Therapy/
36 Electroacupuncture/

37 (Acupuncture or acu-puncture or electroacupuncture or electro-acupuncture or electric acupuncture or electric acu-puncture or needling or acupressure or acu-pressure or mox?bustion).tw.
38 exp Manipulation, Spinal/
39 Manipulation, Chiropractic/
40 Chiropractic/
41 ((back or neck or spine or spinal or lumbar or cervical or chiropractic* or musculoskeletal* or musculo-skeletal*) adj3 (adjust* or manipulat* or mobiliz* or mobilis*)).tw.
42 (Manual adj therap*).tw.
43 (Manipulati* adj (therap* or medicine)).tw.
44 exp Massage/
45 (massag* or reflexolog* or rolfing or zone therap*).tw.
46 (Chih Ya or Shiatsu or Shiatzu or Zhi Ya).tw.
47 (Flexion adj2 distraction*).tw.
48 (myofascial adj3 (release or therap*)).tw.
49 Muscle energy technique*.tw.
50 Trigger point*.tw.
51 Proprioceptive Neuromuscular Facilitation*.tw.
52 Cyriax Friction.tw.
53 (Lomilomi or lomi-lomi or trager).tw.
54 Aston patterning.tw.
55 (Strain adj counterstrain).tw.
56 Alexander technique*.tw.
57 (Craniosacral Therap* or Cranio-sacral Therap*).tw.
58 (amma or ammo or Effleurage or Petrissage or hacking or Tapotment).tw.
59 Complementary Therapies/
60 ((complement* or alternat* or osteopathic*) adj (therap* or medicine)).tw.
61 (Tui Na or Tuina).tw.
62 or/34-61
63 33 and 62

The following filters were applied and overlap removed:

Randomized/Controlled Clinical Trials

64 exp Randomized Controlled Trials as topic/
65 Randomized Controlled Trial.pt.
66 Controlled Clinical Trial.pt.
67 (random* or sham or placebo*).tw.
68 Placebos/
69 Random Allocation/
70 Single Blind Method/
71 Double Blind Method/
72 ((singl* or doubl* or tripl* or trebl*) adj (blind* or dumm* or mask*)).tw.
73 (RCT or RCTs).tw.

74 (control* adj2 (study or studies or trial*)).tw.
75 or/64-74
76 63 and 75
77 animal/
78 human/
79 77 not (77 and 78)
80 76 not 79

Systematic Review

81 Meta-Analysis/
82 exp Meta-Analysis as Topic/
83 Meta analysis.pt.
84 (meta analy* or metaanaly* or met analy* or metanaly*).tw.
85 Review Literature as Topic/
86 (collaborative research or collaborative review* or collaborative overview*).tw.
87 (integrative research or integrative review* or integrative overview*).tw.
88 (quantitative adj3 (research or review* or overview*)).tw.
89 (research integration or research overview*).tw.
90 (systematic* adj3 (review* or overview*)).tw.
91 (methodologic* adj3 (review* or overview*)).tw.
92 exp Technology Assessment, Biomedical/
93 (hta or htas or technology assessment*).tw.
94 ((hand adj2 search*) or (manual* adj search*)).tw.
95 ((electronic adj database*) or (bibliographic* adj database*)).tw.
96 ((data adj2 abstract*) or (data adj2 extract*)).tw.
97 (Data adj3 (pool or pooled or pooling)).tw. (5850)
98 (Analys* adj3 (pool or pooled or pooling)).tw.
99 Mantel Haenszel.tw.
100 (Cochrane or PubMed or MEDLINE or EMBASE or PsycINFO or PsycLIT or PsychINFO or PsychLIT or CINAHL or Science Citation Index).ab.
101 or/81-100
102 63 and 101
103 102 not 79
104 103 not 80

Safety

81 (ae or to or po or co).fs.
82 (safe or safety or unsafe).tw.
83 (side effect* or side event*).tw.
84 ((adverse or undesirable or harm* or injurious or serious or toxic) adj3 (effect* or reaction* or event* or incident* or outcome*)).tw.
85 (abnormalit* or toxicit* or complication* or consequence* or noxious or tolerabilit*).tw.
86 or/81-85

87 63 and 86
88 87 not 79
89 88 not 80

Economics

90 economics/
91 exp "costs and cost analysis"/
92 Value of Life/
93 economics medical/
94 (econom* or cost or costs or costly or costing or price or prices or pricing).ti,ab.
95 (expenditure* not energy).ti,ab.
96 (value adj2 money).ti,ab.
97 budget.ti,ab.
98 or/90-97
99 63 and 98
100 99 not 79
101 100 not (80 or 89)

EMBASE 1980 to 2010 Week 4

1 exp Neck/ or exp spine/ or exp back/ or Neck Muscle/ or Back Muscle/ or Zygapophyseal Joint/
2 Pain/ or Intractable Pain/ or Referred Pain/
3 (pain* or ache*).tw.
4 2 or 3
5 1 and 4
6 exp Backache/
7 (backache or backpain).tw.
8 exp Spine Injury/
9 exp Spine Disease/
10 ((disc* or disk*) adj3 (degener* or displace* or prolapse* or hernia* or bulge or protrusion* or extrusion* or sequestration* or disorder* or disease* or rupture* or slipped)).tw.
11 ((stenosis or stenoses) adj3 (lumbar or spine or spines or spinal)).tw.
12 (Spondylolys* or spondylolisthes* or Spondylisthes*).tw.
13 (Discitis or diskitis or Spondylodis*).tw.
14 (osteoporo* adj3 compression fracture*).tw.
15 vertebrogenic pain syndrome*.tw.
16 Ischialgia/
17 (Ischialgia or sciatica).tw.
18 (Sciatic adj3 (Neuralgia or Bilateral)).tw.
19 Neck Pain/
20 (cervicalgia or Cervicodynia).tw.
21 ((anterior or posterior) adj3 (cervical pain or cervical ache*)).tw.

22 ((cervicogenic or cervico-genic) adj3 headache*).tw.
23 exp neck injuries/
24 (neckache* or neckpain*).tw.
25 (whiplash* or whip lash* or radiculomyelopath* or radiculo-myelopath*).tw.
26 (failed back or back surgery syndrome* or FBSS).tw.
27 (myofascial adj3 (pain* or ache*)).tw.
28 ((Zygapophyseal or Facet or facets) adj3 (syndrome* or degenerat*)).tw.
29 ((back or neck or spine or spinal or lumbar* or thoracic) adj3 (ache* or aching or pain* or strain*)).tw.
30 (lumbago or dorsalgia).tw.
31 (neck disorder* adj3 radicul*).tw.
32 or/5-31
33 exp Acupuncture/
34 Electroacupuncture/
35 (Acupuncture or acu-puncture or electroacupuncture or electro-acupuncture or electric* acupuncture or electric* acu-puncture or needling or acupressure or acu-pressure or mox?bustion).tw.
36 exp Manipulative Medicine/
37 chiropractic/
38 ((back or neck or spine or spinal or lumbar or cervical or chiropractic* or musculoskeletal* or musculo-skeletal*) adj3 (adjust* or manipulat* or mobiliz* or mobilis*)).tw.
39 (Manual adj therap*).tw.
40 (Manipulati* adj (therap* or medicine)).tw.
41 Massage/
42 (massag* or reflexolog* or rolfing or zone therap*).tw.
43 (Chih Ya or Shiatsu or Shiatzu or Zhi Ya).tw.
44 (Flexion adj2 distraction*).tw.
45 (myofascial adj3 (release or therap*)).tw.
46 Muscle energy technique*.tw.
47 Trigger point*.tw.
48 Proprioceptive Neuromuscular Facilitation*.tw.
49 Cyriax Friction.tw.
50 (Lomilomi or lomi-lomi or trager).tw.
51 Aston patterning.tw.
52 (Strain adj counterstrain).tw.
53 Alexander technique*.tw.
54 (Craniosacral Therap* or Cranio-sacral Therap*).tw.
55 (amma or ammo or Effleurage or Petrissage or hacking or Tapotment).tw.
56 Alternative Medicine/
57 ((complement* or alternat* or osteopathic*) adj (therap* or medicine)).tw.
58 (Tui Na or Tuina).tw.
59 or/33-58
60 32 and 59

The following filters were applied and overlap removed:

Randomized/Controlled Clinical Trials

61 Randomized Controlled Trial/
62 exp Controlled Clinical Trial/
63 (random* or sham or placebo*).tw.
64 Placebo/
65 Randomization/
66 Single Blind Procedure/
67 Double Blind Procedure/
68 ((singl* or doubl* or tripl* or trebl*) adj (blind* or dumm* or mask*)).tw.
69 (RCT or RCTs).tw.
70 (control* adj2 (study or studies or trial*)).tw.
71 or/61-70
72 60 and 71
73 human.sh.
74 nonhuman.sh.
75 animal.sh.
76 animal experiment.sh.
77 or/74-76
78 77 not (73 and 77)
79 72 not 78

Systematic Review

80 Meta Analysis/ (34242)
81 "systematic review"/ (24457)
82 (meta analy* or metaanaly* or met analy* or metanaly*).tw. (22067)
83 (collaborative research or collaborative review* or collaborative overview*).tw. (834)
84 (integrative research or integrative review* or integrative overview*).tw. (128)
85 (quantitative adj3 (research or review* or overview*)).tw. (1551)
86 (research integration or research overview*).tw. (59)
87 (systematic* adj3 (review* or overview*)).tw. (17008)
88 (methodologic* adj3 (review* or overview*)).tw. (1013)
89 biomedical technology assessment/ (5472)
90 (hta or htas or technology assessment*).tw. (1902)
91 ((hand adj2 search*) or (manual* adj search*)).tw. (2396)
92 ((electronic adj database*) or (bibliographic* adj database*)).tw. (2660)
93 ((data adj2 abstract*) or (data adj2 extract*)).tw. (11462)
94 (Data adj3 (pool or pooled or pooling)).tw. (4432)
95 (Analys* adj3 (pool or pooled or pooling)).tw. (3135)
96 Mantel Haenszel.tw. (1463)
97 (Cochrane or PubMed or MEDLINE or EMBASE or PsycINFO or PsycLIT or PsychINFO or PsychLIT or CINAHL or Science Citation Index).ab. (28709)

98 or/80-97 (100019)
99 60 and 98 (421)
100 99 not 78 (421)
101 100 not 79 (178)

Safety

80 (ae or co or si or to).fs.
81 (safe or safety or unsafe).tw.
82 (side effect* or side event*).tw.
83 ((adverse or undesirable or harm* or injurious or serious or toxic) adj3 (effect* or reaction* or event* or incident* or outcome*)).tw.
84 (abnormalit* or toxicit* or complication* or consequence* or noxious or tolerabilit*).tw.
85 or/80-84
86 60 and 85
87 86 not 78
88 87 not 79

Economics

89 health-economics/
90 exp economic-evaluation/
91 exp health-care-cost/
92 (econom* or cost or costs or costly or costing or price or prices or pricing).ti,ab.
93 (expenditure* not energy).ti,ab.
94 (value adj2 money).ti,ab.
95 budget*.ti,ab.
96 socioeconomics/
97 or/89-96
98 60 and 97
99 98 not 78
100 99 not (79 or 88)

AMED <1985 to January 2010>

1 exp Neck/ or exp spine/ or exp back/ or Neck Muscles/
2 pain/ or pain intractable/
3 (pain* or ache*).tw.
4 2 or 3
5 1 and 4
6 exp backache/
7 back injuries/
8 (backache* or backpain*).tw.
9 spinal injuries/

10 exp spinal disease/
11 ((disc* or disk*) adj3 (degener* or displace* or prolapse* or hernia* or bulge or protrusion* or extrusion* or sequestration* or disorder* or disease* or rupture* or slipped)).tw.
12 ((stenosis or stenoses) adj3 (lumbar or spine or spines or spinal)).tw.
13 (Spondylolys* or spondylolisthes* or Spondylisthes*).tw.
14 (Discitis or diskitis or Spondylodis*).tw.
15 (osteoporo* adj3 compression fracture*).tw.
16 vertebrogenic pain syndrome*.tw.
17 sciatica/
18 (Sciatica or Ischialgia).tw.
19 (Sciatic adj3 (Neuralgia or Bilateral)).tw.
20 neck pain/
21 (cervicalgia or Cervicodynia).tw.
22 ((anterior or posterior) adj3 (cervical pain or cervical ache*)).tw.
23 ((cervicogenic or cervico-genic) adj3 headache*).tw.
24 exp neck injuries/
25 (neckache* or neckpain*).tw.
26 (neck disorder* adj3 radicul*).tw.
27 (whiplash* or whip lash* or radiculomyelopath* or radiculo-myelopath*).tw.
28 (failed back or back surgery syndrome*).tw.
29 FBSS.tw.
30 ((Zygapophyseal or Facet or facets) adj3 (syndrome* or degenerat*)).tw.
31 ((back or neck or spine or spinal or lumbar* or thoracic) adj3 (ache* or aching or pain* or strain*)).tw.
32 (lumbago or dorsalgia).tw.
33 (myofascial adj3 (pain* or ache*)).tw.
34 or/5-33
35 exp acupuncture/
36 exp acupuncture therapy/
37 (Acupuncture or acu-puncture or electroacupuncture or electro-acupuncture or electric acupuncture or electric acu-puncture or needling or acupressure or acu-pressure or mox?bustion).tw.
38 spinal manipulation/
39 exp manipulation chiropractic/
40 chiropractic/
41 ((back or neck or spine or spinal or lumbar or cervical or chiropractic* or musculoskeletal* or musculo-skeletal*) adj3 (adjust* or manipulat* or mobiliz* or mobilis*)).tw.
42 (Manual adj therap*).tw.
43 (Manipulati* adj (therap* or medicine)).tw.
44 massage/
45 (massag* or reflexolog* or rolfing or zone therap*).tw.
46 (Chih Ya or Shiatsu or Shiatzu or Zhi Ya).tw.
47 (Flexion adj2 distraction*).tw.
48 (myofascial adj3 (release or therap*)).tw.

49 Muscle energy technique*.tw.
50 Trigger point*.tw.
51 Proprioceptive Neuromuscular Facilitation*.tw.
52 Cyriax Friction.tw.
53 (Lomilomi or lomi-lomi or trager or Tui Na or Tuina).tw.
54 Aston patterning.tw.
55 (Strain adj counterstrain).tw.
56 Alexander technique*.tw.
57 (Craniosacral Therap* or Cranio-sacral Therap*).tw.
58 (amma or ammo or Effleurage or Petrissage or hacking or Tapotment).tw.
59 complementary therapies/
60 ((complement* or alternat* or osteopathic*) adj (therap* or medicine)).tw.
61 or/35-60
62 34 and 61

The following filters were applied and overlap removed:

Randomized/Controlled Clinical Trials

63 randomized controlled trials/
64 randomized controlled trial.pt.
65 controlled clinical trial.pt.
66 (random* or sham or placebo*).tw.
67 Placebos/
68 double blind method/ or random allocation/
69 ((singl* or doubl* or tripl* or trebl*) adj (blind* or dumm* or mask*)).tw.
70 (RCT or RCTs).tw.
71 (control* adj2 (study or studies or trial*)).tw.
72 randomised controlled trial.pt.
73 or/63-72
74 62 and 73

Systematic Review

75 meta analysis/
76 meta analysis.pt.
77 (meta analy* or metaanaly* or met analy* or metanaly*).tw.
78 (collaborative research or collaborative review* or collaborative overview*).tw.
79 (integrative research or integrative review* or integrative overview*).tw.
80 (quantitative adj3 (research or review* or overview*)).tw.
81 (research integration or research overview*).tw.
82 (systematic* adj3 (review* or overview*)).tw.
83 (methodologic* adj3 (review* or overview*)).tw.
84 (hta or htas or technology assessment*).tw.
85 ((hand adj2 search*) or (manual* adj search*)).tw.
86 ((electronic adj database*) or (bibliographic* adj database*)).tw.

87 ((data adj2 abstract*) or (data adj2 extract*)).tw.
88 (Data adj3 (pool or pooled or pooling)).tw.
89 (Analys* adj3 (pool or pooled or pooling)).tw.
90 Mantel Haenszel.tw.
91 (Cochrane or PubMed or MEDLINE or EMBASE or PsycINFO or PsycLIT or PsychINFO or PsychLIT or CINAHL or Science Citation Index).ab.
92 or/75-91 (2843)
93 62 and 92 (150)
94 93 not 74

Safety

75 (safe or safety or unsafe).tw.
76 (side effect* or side event*).tw.
77 ((adverse or undesirable or harm* or injurious or serious or toxic) adj3 (effect* or reaction* or event* or incident* or outcome*)).tw.
78 (abnormalit* or toxicit* or complication* or consequence* or noxious or tolerabilit*).tw.
79 adverse effects/
80 or/75-79
81 62 and 80
82 81 not 74

Economics

84 Economics/
85 exp "costs and cost analysis"/ or patient satisfaction/ or "quality of life"/
86 (econom* or cost or costs or costly or costing or price or prices or pricing or budget*).ti,ab.
87 (expenditure* not energy).ti,ab.
88 (value adj2 money).ti,ab.
89 (QOL or QOLY or QOLYs or HRQOL or QALY or QALYs).ti,ab.
90 or/84-89
91 62 and 90
92 91 not (74 or 82)

ACP Journal Club <1991 to August 2008>

1 (backpain* or backache*).tw.
2 ((disc* or disk*) adj3 (degener* or displace* or prolapse* or hernia* or bulge or protrusion* or extrusion* or sequestration* or disorder* or disease* or rupture* or slipped)).tw.
3 ((stenosis or stenoses) adj3 (lumbar or spine or spines or spinal)).tw.
4 (Spondylolys* or spondylolisthes* or Spondylisthes*).tw.
5 (Discitis or diskitis or Spondylodis*).tw.

6 (osteoporo* adj3 compression fracture*).tw.
7 vertebrogenic pain syndrome*.tw.
8 (Sciatica or ischialgia).tw.
9 (Sciatic adj3 (Neuralgia or Bilateral)).tw.
10 (cervicalgia or Cervicodynia).tw.
11 ((anterior or posterior) adj3 (cervical pain or cervical ache*)).tw.
12 ((cervicogenic or cervico-genic) adj3 headache*).tw.
13 (neckache* or neckpain*).tw.
14 (whiplash* or whip lash* or radiculomyelopath* or radiculo-myelopath*).tw.
15 (failed back or back surgery syndrome* or FBSS).tw.
16 ((Zygapophyseal or Facet or facets) adj3 (syndrome* or degenerat*)).tw.
17 ((back or neck or spine or spinal or lumbar* or thoracic) adj3 (ache* or aching or pain* or strain*)).tw.
18 (lumbago or dorsalgia).tw.
19 (myofascial adj3 (pain* or ache*)).tw.
20 (neck disorder* adj3 radicul*).tw.
21 or/1-20
22 (Acupuncture or acu-puncture or electroacupuncture or electro-acupuncture or electric acupuncture or electric acu-puncture or needling or acupressure or acu-pressure or mox?bustion).tw.
23 ((back or neck or spine or spinal or lumbar or cervical or chiropractic* or musculoskeletal* or musculo-skeletal*) adj3 (adjust* or manipulat* or mobiliz* or mobilis*)).tw.
24 (Manual adj therap*).tw.
25 (Manipulati* adj (therap* or medicine)).tw.
26 (massag* or reflexolog* or rolfing or zone therap*).tw.
27 (Chih Ya or Shiatsu or Shiatzu or Zhi Ya).tw.
28 (Flexion adj2 distraction*).tw.
29 (myofascial adj3 (release or therap*)).tw.
30 Muscle energy technique*.tw.
31 Trigger point*.tw.
32 Proprioceptive Neuromuscular Facilitation*.tw.
33 Cyriax Friction.tw.
34 (Lomilomi or lomi-lomi or trager or Tui Na or Tuina).tw.
35 Aston patterning.tw.
36 (Strain adj counterstrain).tw.
37 Alexander technique*.tw.
38 (Craniosacral Therap* or Cranio-sacral Therap*).tw.
39 (amma or ammo or Effleurage or Petrissage or hacking or Tapotment).tw.
40 ((complement* or alternat* or osteopathic*) adj (therap* or medicine)).tw.
41 or/22-40
42 21 and 41

CINAHL <1982 to September Week 3 2008>

1 Neck/
2 Back/
3 exp Spine/
4 Neck Muscles/
5 or/1-4
6 pain/
7 Referred Pain/
8 (pain* or ache*).tw.
9 or/6-8
10 5 and 9
11 exp Back Pain/
12 exp Back Injuries/
13 (backache* or backpain*).tw.
14 exp Spinal Injuries/
15 exp Spinal Diseases/
16 ((disc* or disk*) adj3 (degener* or displace* or prolapse* or hernia* or bulge or protrusion* or extrusion* or sequestration* or disorder* or disease* or rupture* or slipped)).tw.
17 ((stenosis or stenoses) adj3 (lumbar or spine or spines or spinal)).tw.
18 (Spondylolys* or spondylolisthes* or Spondylisthes*).tw.
19 (Discitis or diskitis or Spondylodis*).tw.
20 (osteoporo* adj3 compression fracture*).tw.
21 vertebrogenic pain syndrome*.tw.
22 Sciatica/
23 (Sciatica or Ischialgia).tw.
24 (Sciatic adj3 (Neuralgia or Bilateral)).tw.
25 Neck Pain/
26 (cervicalgia or Cervicodynia).tw.
27 ((anterior or posterior) adj3 (cervical pain* or cervical ache*)).tw.
28 ((cervicogenic or cervico-genic) adj3 headache*).tw.
29 exp Neck Injuries/
30 (neckache* or neckpain*).tw.
31 (whiplash* or whip lash*).tw.
32 (failed back or back surgery syndrome* or FBSS).tw.
33 (neck disorder* adj3 radicul*).tw.
34 ((Zygapophyseal or Facet or facets) adj3 (syndrome* or degenerat*)).tw.
35 ((back or neck or spine or spinal or lumbar* or thoracic) adj3 (ache* or aching or pain* or strain*)).tw.
36 (lumbago or dorsalgia).tw.
37 (myofascial adj3 (pain* or ache*)).tw.
38 or/10-37
39 exp Acupuncture/

40 (Acupuncture or acu-puncture or electroacupuncture or electro-acupuncture or electric* acupuncture or electric* acu-puncture or acupressure or acu-pressure or mox?bustion).tw.
41 exp chiropractic/ or manipulation, chiropractic/
42 ((back or neck or spine or spinal or lumbar or cervical or chiropractic* or musculoskeletal* or musculo-skeletal*) adj3 (adjust* or manipulat* or mobiliz* or mobilis*)).tw.
43 (Manual adj therap*).tw.
44 (Manipulati* adj (therap* or medicine)).tw.
45 exp Massage/
46 (massag* or reflexolog* or rolfing or zone therap*).tw.
47 (Chih Ya or Shiatsu or Shiatzu or Zhi Ya or Tui Na).tw.
48 (Flexion adj2 distraction*).tw.
49 (myofascial adj3 (release or therap*)).tw.
50 Muscle energy technique*.tw.
51 Trigger point*.tw.
52 Proprioceptive Neuromuscular Facilitation*.tw.
53 Cyriax Friction.tw.
54 (Lomilomi or lomi-lomi or trager or Tui Na or Tuina).tw.
55 Aston patterning.tw.
56 (Strain adj counterstrain).tw.
57 Alexander technique*.tw.
58 (Craniosacral Therap* or Cranio-sacral Therap*).tw.
59 (amma or ammo or Effleurage or Petrissage or hacking or Tapotment).tw.
60 Alternative Therapies/
61 ((complement* or alternat* or osteopathic*) adj (therap* or medicine)).tw.
62 or/39-61
63 38 and 62

The following filters were applied and overlap removed:

Randomized/Controlled Clinical Trials

64 exp Clinical Trials/
65 clinical trial.pt.
66 (random* or sham or placebo*).tw.
67 Placebos/
68 Random Assignment/
69 ((singl* or doubl* or tripl* or trebl*) adj (blind* or dumm* or mask*)).tw.
70 (RCT or RCTs).tw.
71 (control* adj2 (study or studies or trial*)).tw.
72 or/64-71
73 63 and 72

Systematic Review

74 systematic review.pt.
75 Meta Analysis/
76 (meta analy* or metaanaly* or met analy* or metanaly*).tw.
77 (collaborative research or collaborative review* or collaborative overview*).tw.
78 (integrative research or integrative review* or integrative overview*).tw.
79 (quantitative adj3 (research or review* or overview*)).tw.
80 (integrative research or research integration or research overview*).tw.
81 (systematic* adj3 (review* or overview*)).tw.
82 (methodologic* adj3 (review* or overview*)).tw.
83 (hta or htas or technology assessment*).tw.
84 ((hand adj2 search*) or (manual* adj2 search*)).tw.
85 ((electronic adj database*) or (bibliographic* adj database*)).tw.
86 ((data adj2 abstract*) or (data adj2 extract*)).tw.
87 (data adj3 (pool or pooled or pooling)).tw.
88 (analys* adj3 (pool or pooled or pooling)).tw.
89 Mantel Haenszel.tw.
90 (Cochrane or PubMed or MEDLINE or EMBASE or PsycINFO or PsycLIT or PsychINFO or PsychLIT or CINAHL or Science Citation Index).ab.
91 or/74-90
92 63 and 91
93 92 not 73

Safety

74 (safe or safety or unsafe).tw.
75 (side effect* or side event*).tw.
76 ((adverse or undesirable or harm* or injurious or serious or toxic) adj3 (effect* or reaction* or event* or incident* or outcome*)).tw.
77 (abnormalit* or toxicit* or complication* or consequence* or noxious or tolerabilit*).tw.
78 (ae or po or co).fs.
79 or/74-78
80 63 and 79
81 80 not 73

Economics

84 exp economics/ (258163)
85 exp financial management/ (17991)
86 exp financial support/ (168377)
87 exp "financing organized"/ (51967)
88 exp "business"/ (26100)
89 or/85-88 (249186)
90 84 not 89 (24912)

91 health resource allocation/ (3423)
92 health resource utilization/ (4982)
93 exp "Quality of Life"/ (23733)
94 Patient Satisfaction/ (14059)
95 (econom* or cost or costs or costly or costing or price or prices or pricing or budget*).ti,ab. (53804)
96 (expenditure* not energy).ti,ab. (2243)
97 (value adj2 money).ti,ab. (187)
98 (QOL or QOLY or QOLYs or HRQOL or QALY or QALYs).ti,ab. (3012)
99 or/90-98 (107583)
100 63 and 99 (255)
101 100 not (73 or 81)

MANTIS <1880 to October 2008>

1 neck.de.
2 (spine or Cervical Vertebrae or Coccyx or Intervertebral Disk or Lumbar Vertebrae or Sacrum or Spinal Canal or Thoracic Vertebrae).de.
3 (Back or Lumbosacral Region or Sacrococcygeal Region).de.
4 neck muscles.de.
5 Zygapophyseal Joint.de.
6 or/1-5
7 pain.de.
8 pain, intractable.de.
9 pain, referred.de.
10 (pain* or ache* or aching).tw.
11 or/7-10
12 6 and 11
13 (back pain or low back pain).de.
14 back injuries.de.
15 (backpain* or backache*).tw.
16 (spinal injuries or spinal fractures).de.
17 (spinal diseases or Intervertebral Disk Displacement or Spinal Stenosis or Spondylolisthesis or Spondylolysis).de.
18 ((disc* or disk*) adj3 (degener* or displace* or prolapse* or hernia* or bulge or protrusion* or extrusion* or sequestration* or disorder* or disease* or rupture* or slipped)).tw.
19 ((stenosis or stenoses) adj3 (lumbar or spine or spines or spinal)).tw.
20 (Spondylolys* or spondylolisthes* or Spondylisthes*).tw.
21 (Discitis or diskitis or Spondylodis*).tw.
22 (osteoporo* adj3 compression fracture*).tw.
23 vertebrogenic pain syndrome*.tw.
24 Sciatica.de.
25 (Sciatica or ischialgia).tw.
26 (Sciatic adj3 (Neuralgia or Bilateral)).tw.

27 neck pain.de.
28 (cervicalgia or Cervicodynia).tw.
29 ((anterior or posterior) adj3 (cervical pain or cervical ache*)).tw.
30 ((cervicogenic or cervico-genic) adj3 headache*).tw.
31 (neck injuries or Whiplash Injuries).de.
32 (neckache* or neckpain*).tw.
33 (whiplash* or whip lash* or radiculomyelopath* or radiculo-myelopath*).tw.
34 (neck disorder* adj3 radicul*).tw.
35 failed back surgery.de.
36 (failed back or back surgery syndrome* or FBSS).tw.
37 facet syndrome.de.
38 ((Zygapophyseal or Facet or facets) adj3 (syndrome* or degenerat*)).tw.
39 ((back or neck or spine or spinal or lumbar* or thoracic) adj3 (ache* or aching or pain* or strain*)).tw.
40 (lumbago or dorsalgia).tw.
41 (myofascial pain syndromes or myofascial).de.
42 (myofascial adj3 (pain* or ache*)).tw.
43 or/12-42
44 Acupuncture.de.
45 Acupuncture Therapy.de.
46 electroacupuncture.de.
47 (Acupuncture or acu-puncture or electroacupuncture or electro-acupuncture or electric acupuncture or electric acu-puncture or needling or acupressure or acu-pressure or mox?bustion).tw.
48 Manipulation, Spinal.de.
49 Manipulation, Chiropractic.de.
50 Chiropractic.de.
51 ((back or neck or spine or spinal or lumbar or cervical or chiropractic* or musculoskeletal* or musculo-skeletal*) adj3 (adjust* or manipulat* or mobiliz* or mobilis*)).tw.
52 (Manual adj therap*).tw.
53 (Manipulati* adj (therap* or medicine)).tw.
54 (Massage or Acupressure).de.
55 (massag* or reflexolog* or rolfing or zone therap*).tw.
56 (Chih Ya or Shiatsu or Shiatzu or Zhi Ya).tw.
57 (Flexion adj2 distraction*).tw.
58 (myofascial adj3 (release or therap*)).tw.
59 Muscle energy technique*.tw.
60 Trigger point*.tw.
61 Proprioceptive Neuromuscular Facilitation*.tw.
62 Cyriax Friction.tw.
63 (Lomilomi or lomi-lomi or trager).tw.
64 Aston patterning.tw.
65 (Strain adj counterstrain).tw.
66 Alexander technique*.tw.
67 (Craniosacral Therap* or Cranio-sacral Therap*).tw.

68 (amma or ammo or Effleurage or Petrissage or hacking or Tapotment).tw.
69 Complementary Therapies.de.
70 ((complement* or alternat* or osteopathic*) adj (therap* or medicine)).tw.
71 (Tui Na or Tuina).tw.
72 or/44-71
73 43 and 72

The following filters were applied and overlap removed:

Randomized/Controlled Clinical Trials

74 (Randomized Controlled Trial or Randomized Controlled Trials).de.
75 (Controlled Clinical Trial or Controlled Clinical Trials).de.
76 (random* or sham or placebo*).tw.
77 Placebos.de.
78 Random Allocation.de.
79 Single Blind Method.de.
80 Double Blind Method.de.
81 ((singl* or doubl* or tripl* or trebl*) adj (blind* or dumm* or mask*)).tw.
82 (RCT or RCTs).tw.
83 (control* adj2 (study or studies or trial*)).tw.
84 or/74-83
85 animal.de.
86 human.de.
87 85 not (85 and 86)
88 73 and 84
89 88 not 87

Systematic Review

90 Meta-Analysis.de.
91 (meta analy* or metaanaly* or met analy* or metanaly*).tw.
92 (collaborative research or collaborative review* or collaborative overview*).tw.
93 (integrative research or integrative review* or integrative overview*).tw.
94 (quantitative adj3 (research or review* or overview*)).tw.
95 (research integration or research overview*).tw.
96 (systematic* adj3 (review* or overview*)).tw.
97 (methodologic* adj3 (review* or overview*)).tw.
98 Technology Assessment, Biomedical.de.
99 (hta or htas or technology assessment*).tw.
100 ((hand adj2 search*) or (manual* adj search*)).tw.
101 ((electronic adj database*) or (bibliographic* adj database*)).tw.
102 ((data adj2 abstract*) or (data adj2 extract*)).tw.
103 (Data adj3 (pool or pooled or pooling)).tw.
104 (Analys* adj3 (pool or pooled or pooling)).tw.
105 Mantel Haenszel.tw.

106 (Cochrane or PubMed or MEDLINE or EMBASE or PsycINFO or PsycLIT or PsychINFO or PsychLIT or CINAHL or Science Citation Index).ab.
107 or/90-106
108 73 and 107
109 108 not 87
110 109 not 89

Safety

90 (safe or safety or unsafe).tw.
91 (side effect* or side event*).tw.
92 ((adverse or undesirable or harm* or injurious or serious or toxic) adj3 (effect* or reaction* or event* or incident* or outcome*)).tw.
93 (abnormalit* or toxicit* or complication* or consequence* or noxious or tolerabilit*).tw.
94 adverse effects.de.
95 complications.de.
96 toxicity.de.
97 or/90-96
98 73 and 97
99 98 not 87
100 99 not 89

Economics

101 economics.de.
102 "costs and cost analysis".de.
103 "value of life".de.
104 economics, medical.de.
105 (econom* or cost or costs or costly or costing or price or prices or pricing).ti,ab.
106 (expenditure* not energy).ti,ab.
107 (value adj2 money).ti,ab.
108 budget.ti,ab.
109 cost benefit analysis.de.
110 or/101-109
111 73 and 110
112 111 not 87
113 112 not (89 or 100)

Cochrane Library 2010 Issue 1

Systematic Review and RCT/CCT

1 MeSH descriptor Neck explode all trees
2 MeSH descriptor Spine explode all trees

3 MeSH descriptor Back explode all trees
4 MeSH descriptor Neck Muscles explode all trees
5 MeSH descriptor Zygapophyseal Joint explode all trees
6 MeSH descriptor Pain explode all trees
7 MeSH descriptor Pain, Intractable explode all trees
8 MeSH descriptor Pain, Referred explode all trees
9 (pain* or ache*):ti,ab,kw
10 (1 OR 2 OR 3 OR 4 OR 5)
11 (6 OR 7 OR 8 OR 9)
12 (10 AND 11)
13 MeSH descriptor Back Pain explode all trees
14 MeSH descriptor Back Injuries explode all trees
15 (backpain* or backache*):ti,ab,kw
16 MeSH descriptor Spinal Injuries explode all trees
17 MeSH descriptor Spinal Diseases explode all trees
18 (disc* or disk*) NEAR/3 (degener* or displace* or prolapse* or hernia* or bulge or protrusion* or extrusion* or sequestration* or disorder* or disease* or rupture* or slipped):ti,ab,kw
19 (stenosis or stenoses) NEAR/3 (lumbar or spine or spines or spinal):ti,ab,kw
20 (Spondylolys* or spondylolisthes* or Spondylisthes*):ti,ab,kw or (Discitis or diskitis or Spondylodis*):ti,ab,kw
21 (osteoporo* NEAR/3 compression fracture*):ti,ab,kw
22 (vertebrogenic pain syndrome*):ti,ab,kw
23 MeSH descriptor Sciatica explode all trees
24 (Sciatica or ischialgia):ti,ab,kw or (Sciatic NEAR/3 (Neuralgia or Bilateral)):ti,ab,kw
25 MeSH descriptor Neck Pain explode all trees
26 (cervicalgia or Cervicodynia):ti,ab,kw or (anterior or posterior) NEAR/3 (cervical pain or cervical ache*):ti,ab,kw or (cervicogenic or cervico-genic) NEAR/3 headache*:ti,ab,kw
27 MeSH descriptor Neck Injuries explode all trees
28 (neckache* or neckpain*):ti,ab,kw or (whiplash* or whip lash* or radiculomyelopath* or radiculo-myelopath*):ti,ab,kw or (failed back or back surgery syndrome* OR FBSS):ti,ab,kw or (lumbago or dorsalgia):ti,ab,kw
29 (neck disorder*) NEAR/3 radicul*:ti,ab,kw or (Zygapophyseal or Facet or facets) NEAR/3 (syndrome* or degenerat*):ti,ab,kw or (back or neck or spine or spinal or lumbar* or thoracic) NEAR/3 (ache* or aching or pain* or strain*):ti,ab,kw or (myofascial adj3 (pain* or ache*)):ti,ab,kw
30 (12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29)
31 MeSH descriptor Acupuncture explode all trees
32 MeSH descriptor Acupuncture Therapy explode all trees
33 MeSH descriptor Electroacupuncture explode all trees
34 (acupuncture or electric acupuncture or electric acu-puncture or needling or acupressure or acu-pressure or mox?bustion):ti,ab,kw
35 MeSH descriptor Manipulation, Spinal explode all trees

36 MeSH descriptor Manipulation, Chiropractic explode all trees
37 MeSH descriptor Chiropractic explode all trees
38 (back or neck or spine or spinal or lumbar or cervical or chiropractic* or musculoskeletal* or musculo-skeletal*) NEAR/3 (adjust* or manipulat* or mobiliz* or mobilis*):ti,ab,kw or (Manual NEXT therap*):ti,ab,kw or (Manipulati* NEXT (therap* or medicine)):ti,ab,kw
39 MeSH descriptor Massage explode all trees
40 (massag* or reflexolog* or rolfing or zone therap*):ti,ab,kw or (Chih Ya or Shiatsu or Shiatzu or Zhi Ya):ti,ab,kw or (Flexion NEAR/2 distraction*):ti,ab,kw or (myofascial NEAR/3 (release or therap*)):ti,ab,kw or (Muscle energy technique*):ti,ab,kw
41 (Trigger point*):ti,ab,kw or (Proprioceptive Neuromuscular Facilitation*):ti,ab,kw or (Cyriax Friction):ti,ab,kw or (Lomilomi or lomi-lomi or trager or Tui Na or Tuina):ti,ab,kw or (Aston patterning):ti,ab,kw
42 (Strain NEAR/1 counterstrain):ti,ab,kw or (Alexander technique*):ti,ab,kw or (Craniosacral Therap* or Cranio-sacral Therap*):ti,ab,kw or (amma or ammo or Effleurage or Petrissage or hacking or Tapotment):ti,ab,kw or (complement* or alternat* or osteopathic*) NEXT (therap* or medicine):ti,ab,kw
43 MeSH descriptor Complementary Therapies, this term only
44 (31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43)
45 (30 AND 44)

Safety

46 Any MeSH descriptor with qualifier: AE
47 Any MeSH descriptor with qualifier: TO
48 Any MeSH descriptor with qualifier: PO
49 Any MeSH descriptor with qualifier: CO
50 (safe or safety or unsafe):ti,ab,kw or (side effect* or side event*):ti,ab,kw or (adverse or undesirable or harm* or injurious or serious or toxic) NEAR/3 (effect* or reaction* or event* or incident* or outcome*):ti,ab,kw or (abnormalit* or toxicit* or complication* or consequence* or noxious or tolerabilit*):ti,ab,kw
51 (46 OR 47 OR 48 OR 49 OR 50)
52 (45 AND 51)

Economics

53 MeSH descriptor Economics, this term only
54 MeSH descriptor Economics, Medical, this term only
55 MeSH descriptor Costs and Cost Analysis explode all trees
56 MeSH descriptor Value of Life explode all trees
57 MeSH descriptor Quality-Adjusted Life Years explode all trees
58 MeSH descriptor Patient Satisfaction explode all trees
59 Any MeSH descriptor with qualifier: EC

60 (econom* or cost or costs or costly or costing or price or prices or pricing or budget*):ti,ab,kw or (expenditure* not energy):ti,ab,kw or (value NEAR/2 money):ti,ab,kw or (QOL or QOLY or QOLYs or HRQOL or QALY or QALYs):ti,ab,kw
61 (53 OR 54 OR 55 OR 56 OR 57 OR 58 OR 59 OR 60)
62 (45 AND 61)
63 (62 AND NOT 52)

Index to Chiropractic Literature
2008 Oct 10

S1 Subject:: "BACK PAIN" OR "BACK INJURIES" OR "NECK INJURIES" OR "NECK PAIN" OR "SPINAL DISEASES" OR "SPINAL INJURIES" OR "SCIATICA" OR All Fields:backpain* or backache* OR "back pain" OR "back ache" OR "back pains" OR "back aches" OR neck pain* OR neck ache* OR "neck pain" OR neck ache" OR "neck pains" OR "neck aches" OR All Fields:Spondylolys* or Spondylolisthes* or Spondylisthes* or Discitis or Diskitis or Spondylod* OR Sciatica OR Ischialgia* OR Cervicalgia OR Cervicodynia

S2 All Fields:whiplash* or "whip lash" OR "whip lashes" or radiculomyelopath* or "radiculo-myelopathy" OR "radiculo-myelopathies" OR All Fields:"failed back" or "back surgery syndrome" or "back surgery syndromes" or FBSS OR All Fields:lumbago or dorsalgia or "myofascial pain" OR "myofascial ache"

S3 All Fields: "cervical pain" OR "cervical ache" OR "vertebrogenic pain syndrome" OR "vertebrogenic pain syndromes" OR All Fields:"degenerated disk" OR "degenerative disk" OR "degenerated disks" OR "degenerative disks" OR All Fields:"degenerated disc" OR "degenerative disc OR "degenerated discs" OR "degenerative discs"

S4 All Fields:"prolapsed disk" OR "prolapsed disks" OR "prolapsed disc" OR "prolapsed discs" OR "disk prolapse" OR "disc prolapse" "herniated disk" OR "herniated disks" OR "herniated disc" OR "herniated discs" OR All Fields:"displaced disk" OR "displaced disks" OR "displaced disc" OR "displaced discs" OR "osteoporotic compression fracture" OR "osteoporotic compression fractures" OR All Fields::"lumbar stenosis" OR "lumbar stenoses" OR "spinal stenosis" OR "spinal stenoses" OR "cervicogenic headache" OR "cervicogenic headaches" OR "cervico-genic headache" OR "cervico-genic headaches"

S5 All Fields:radiculomyelopathy OR radiculomyelopathies OR "radiculo-myelopathy" OR "radiculo-myelopathies" OR All Fields:"Zygapophyseal joint syndrome" OR "Zygapophyseal joint syndromes" OR "Z-joint syndrome" OR "Z-joint syndromes" OR "facet joint syndrome" OR "facet joint syndromes" OR All Fields:"thoracic pain" OR "thoracic ache" OR "spinal pain" OR "spinal ache" OR "lumbar pain" OR "lumbar ache"

S6 S1 OR S2 OR S3 OR S4 OR S5

S7 Subject:"ACUPUNCTURE" OR "ACUPRESSURE" OR "ACUPUNCTURE THERAPY" OR "ELECTROACUPUNCTURE" OR "MANIPULATION, LUMBAR" OR "MANIPULATION, CERVICAL" OR "MANIPULATION, CHIROPRACTIC" OR "MANIPULATION, SPINAL" OR "MANIPULATION, THORACIC" OR Subject:"MASSAGE" OR "CHIROPRACTIC" OR All Fields: acupuncture or "acu-puncture" or electroacupuncture or "electro-acupuncture" or "electric acupuncture" or "electric acu-puncture" or needling or acupressure or "acu-pressure" or moxibustion or moxabustion

S8 All Fields:"manual therapy" OR "manual therapies" OR massage* or reflexology* or rolfing or "zone therapy" or "zone therapies" OR All Fields:"Chih Ya" or Shiatsu or Shiatzu or "Zhi Ya" or "Flexion distraction" OR "Trigger point" OR "Trigger points" OR "Proprioceptive Neuromuscular Facilitation" OR "Proprioceptive Neuromuscular Facilitations" OR All Fields:"myofascial release" or "myofascial therapy" OR "myofascial therapies" OR "Muscle energy technique" OR "Muscle energy techniques" OR "Cyriax Friction"

S9 All Fields:: Lomilomi or "lomi-lomi" or trager or "Aston patterning" or "Strain counter strain" or "Alexander technique" or "Alexander techniques" or "Toy Na" or Tuna OR All Fields:Craniosacral Therapy" or "Craniosacral Therapies" or "Cranio-sacral Therapy"or "Cranio-sacral Therapies" or amma or ammo or Effleurage or Petrissage or hacking or Tapotment OR All Fields:manipulat* or mobiliz* or mobilis*

S10 All Fields:"complementary therapy" OR "complementary therapies" OR "complementary medicine" OR All Fields:"alternative therapy" OR "alternative therapies" OR "alternative medicine" OR All Fields:"osteopathic therapy" OR "osteopathic therapies" OR "osteopathic medicine"

S11 S7 OR S8 OR S9 OR S10

S12 S6 AND S11

Randomized/Controlled Clinical Trials

S13 , Publication Type:Randomized Controlled Trial

S14 Subject:"RANDOMIZED CONTROLLED TRIALS AS TOPIC" OR "CONTROLLED CLINICAL TRIALS" OR "PLACEBOS" OR All Fields:random* or sham or placebo* or RCT or RCTs or CCT or CCTs OR All Fields:"controlled clinical trial" or "controlled clinical trials" or "controlled study" or "controlled studies" or "control study" or "controlled studies"

S15 S12 AND S14

S16 S13 OR S15

Safety

S17 All Fields:safe or safety or unsafe or "side effect" or "side effects" or "side event" or "side events" OR All Fields:abnormalit* or toxicit* or complication* or consequence* or noxious or tolerabilit* OR All Fields:adverse or undesirable or harm* or injurious or serious or toxic

S18 S12 AND S17

Economics

S19 Subject:"ECONOMICS" OR "ECONOMICS, MEDICAL" OR "COSTS AND COST ANALYSIS" OR All Fields:econom* or cost or costs or costly or costing or price or prices or pricing or budget* or expenditure or value or money

S20 S12 AND S19

LILACS
2008 Oct 13

((((("BACK PAIN" or "NECK PAIN") or "SPINAL DISEASES") or "BACK INJURIES") or "SPINAL INJURIES") or "NECK INJURIES") or "SCIATICA" [Descritor de assunto] and acupuncture or electroacupuncture or acupressure or massage or manipulation or chiropractic or osteopathic [Palavras]

Acubriefs
2008 Oct 10

KW: Back pain + SPECIALTY: RCT/randomized controlled trials
KW: neck pain + SPECIALTY: RCT/randomized controlled trials
KW: thoracic pain + SPECIALTY: RCT/randomized controlled trials
KW: spinal diseases + SPECIALTY: RCT/randomized controlled trials
KW: lumbago + SPECIALTY: RCT/randomized controlled trials
KW: facet joint + SPECIALTY: RCT/randomized controlled trials

Excluded PubMed refs, ACP Jnl Club, Cochrane, ClinicalTrials.gov, animal studies

Appendix B

Data extraction and related forms

General Data

Data element	Comments, coding
Ref id	
First author, year	
Companion ref id	
Inclusion Criteria	
Exclusion Criteria	
country/ region in which study was conducted	
N assessed for eligibility	
Intervention	
Intervention description	**(if applicable)**
dose, frequency of treatment, duration of treatment	
Type of treatment provider	**(describe in brief)**
mean n of treatments / study period	
SD [SEM] treatments	
N of patient in each group	
Mean age	
SD age **[SEM age]**	
Males %	
Ethnicity %	
Work status	**(i.e. unemployed= n/N, %)- if this outcome is reported for end of treatment, please fill in the corresponding worksheet**
Education status	**(i.e. post secondary education= n/N, %)**
Other social status data	**(provide detail)**
Previous surgery related to pain (n)	
Co-interventions	**(describe per group)**

Data element	Comments, coding
Co-morbidities	**(describe and provide number for each group)**
Location of pain	**low back (LBP)** **neck (NP)** **thorax (TP)**
Pain Grading	**(categories of intensity)**
Duration of pain	**acute (0 - 4 weeks)** **subacute (4 - 12 weeks)** **chronic (=/> 12 weeks)** **unknown (mix)**
mean duration of pain	
SD duration of pain	**(convert SEM to SD)**
Past episodes of pain if acute	
Specify cause of pain	**NS = Non Specific** **1= disc/joint disease** **2 = spinal stenosis** **3 = facet joint syndrome** **4 = spondylosysis** **5= osteoporotic fracture** **6 = myofascial pain** **7 = degenerative disease** **8 = whiplash** **9 = mechanical** **10 = work related** **11 = cervico-genic** **12 = radiculopathy** **13 = mixed specific (flag this)** **NR = Not reported**
n (%) with radiating pain	
List all relevant outcomes/instruments evaluated in this study (at which time point)	
Patients lost at each follow up	**A = Baseline** **B = Immediate followup** **C = Short term followup** **D = Intermediate term followup** **E = Long term followup**
Overall conclusions on efficacy from an abstract if no/little results reported	
Additional Comments or important notes about this study	

Abbreviations: tx = treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Pain Data

Data element	Comments, coding for data extraction
Ref id	
First author, year	
Intervention groups	(number each group 1-10)
comparison groups	(group 1 vs. group 2)
Instrument/s (describe full detail of the instrument used, use as many rows as needed to include all reported)	VAS (0-100) for pain PDI n of words Other (specify each instrument in the respective cell of the worksheet to which you are extracting)
Baseline	
N evaluated / group	
Baseline mean	
Baseline SD	
Intermediate follow-up	
N evaluated	
Post treatment mean	
Post treatment SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
Between group difference in post treatment mean	(in column E clearly state which group is being subtracted from which group. Also be mindful of the sign of the difference [+ or -])
Between group difference SD	
95% CI- Low	
95% CI- High	
P value	

Between group difference in mean changes from baseline	
Between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction	**(please specify)**
% of patients with >50% or 100% pain reduction	
Risk Ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Short term follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction	
% of patients with >50% or 100% pain reduction	

Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Intermediate follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction (please specify)	
% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Long Term follow-up	
N evaluated / group	
Post tx mean	

Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction (please specify)	
% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	

Abbreviations: tx= treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Function / Disability Data

Data element	Comments, coding for data extraction
Ref id	
First author, year	
Intervention groups	**(number each group 1-10)**
comparison groups	**(group 1 vs. group 2)**
Instrument/s (describe full detail of the instrument used, use as many rows as needed to include all reported)	**VAS (0-100) for pain** **PDI** **n of words** **Other (specify each instrument in the respective cell of the worksheet to which**

	you are extracting)
Baseline	
N evaluated / group	
Baseline mean	
Baseline SD	
Intermediate follow-up	
N evaluated	
Post treatment mean	
Post treatment SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
Between group difference in post treatment mean	**(in column E clearly state which group is being subtracted from which group. Also be mindful of the sign of the difference [+ or -])**
Between group difference SD	
95% CI- Low	
95% CI- High	
P value	
Between group difference in mean changes from baseline	
Between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction	**(please specify)**
% of patients with >50% or 100% pain reduction	
Risk Ratio	
Risk difference	

95% CI- Low	
95% CI- High	
P value	
Short term follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction	
% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Intermediate follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	

Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction (please specify)	
% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Long Term follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	

P value	
n of patients with > 50% or 100% pain reduction (please specify)	
% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	

Abbreviations: tx= treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Quality of Life Data

Data element	Comments, coding for data extraction
Ref id	
First author, year	
Intervention groups	**(number each group 1-10)**
comparison groups	**(group 1 vs. group 2)**
Instrument/s (describe full detail of the instrument used, use as many rows as needed to include all reported)	**VAS (0-100) for pain** **PDI** **n of words** **Other (specify each instrument in the respective cell of the worksheet to which you are extracting)**
Baseline	
N evaluated / group	
Baseline mean	
Baseline SD	
Intermediate follow-up	
N evaluated	
Post treatment mean	
Post treatment SD	
Mean change from baseline	

Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
Between group difference in post treatment mean	**(in column E clearly state which group is being subtracted from which group. Also be mindful of the sign of the difference [+ or -])**
Between group difference SD	
95% CI- Low	
95% CI- High	
P value	
Between group difference in mean changes from baseline	
Between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction	**(please specify)**
% of patients with >50% or 100% pain reduction	
Risk Ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Short term follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	

95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction	
% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Intermediate follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction (please specify)	

% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Long Term follow-up	
N evaluated / group	
Post tx mean	
Post tx SD	
Mean change from baseline	
Change from baseline SD	
95% CI- Low	
95% CI- High	
P value	
between group difference in mean changes from baseline	
between group difference SD	
95% CI- Low	
95% CI- High	
P value	
n of patients with > 50% or 100% pain reduction (please specify)	
% of patients with >50% or 100% pain reduction	
Risk ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	

Abbreviations: tx= treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Work Data

Data element	Comments, coding for data extraction
Ref id	
First author, year	
Intervention groups	**(number each group 1-10)**
comparison groups	**(group 1 vs. group 2)**
Instrument/s (describe full detail of the instrument used, use as many rows as needed to include all reported)	**VAS (0-100) for pain** **PDI** **n of words** **Other (specify each instrument in the respective cell of the worksheet to which you are extracting)**
Baseline	
N evaluated / group	
N at full time work	
N at part time sick leave	
N at full time sick leave	
continuous measures of work	**(specify: unemployed; homemaker; retired- all not due to pain)**
Other – mean	
Other- SD (SEM)	
Other data	**(describe with numeric details)**
Intermediate follow-up	
N of patient at full time work	
Risk ratio	
Odds ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
N of patient at part time sick leave	
Risk ratio	

Odds ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
N of patient at full time sick leave	
Risk ratio	
Odds ratio	
Risk difference	**(please specify)**
95% CI- Low	
95% CI- High	
P value	
Other- continues measure, specify	
Other post tx- mean	
Other- post tx SD [SEM]	
95% CI- Low	
95% CI- High	
P value	
Other dichotomous measure, provide numeric data, n	
Risk ratio [odds ratio]	
95% CI- Low	
95% CI- High	
Short term followup	
N of patient at full time work	
Risk ratio	
Odds ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	

N of patient at part time sick leave	
Risk ratio	
Odds ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
N of patient at full time sick leave	
Risk ratio	
Odds ratio	
Risk difference	**(please specify)**
95% CI- Low	
95% CI- High	
P value	
Other- continues measure, specify	
Other post tx- mean	
Other- post tx SD [SEM]	
95% CI- Low	
95% CI- High	
P value	
Other dichotomous measure, provide numeric data, n	
Risk ratio [odds ratio]	
95% CI- Low	
95% CI- High	
Intermediate followup	
N of patient at full time work	
Risk ratio	
Odds ratio	
Risk difference	
95% CI- Low	

95% CI- High	
P value	
N of patient at part time sick leave	
Risk ratio	
Odds ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
N of patient at full time sick leave	
Risk ratio	
Odds ratio	
Risk difference	**(please specify)**
95% CI- Low	
95% CI- High	
P value	
Other- continues measure, specify	
Other post tx- mean	
Other- post tx SD [SEM]	
95% CI- Low	
95% CI- High	
P value	
Other dichotomous measure, provide numeric data, n	
Risk ratio [odds ratio]	
95% CI- Low	
95% CI- High	
Long Term followup	
N of patient at full time work	
Risk ratio	
Odds ratio	

Risk difference	
95% CI- Low	
95% CI- High	
P value	
N of patient at part time sick leave	
Risk ratio	
Odds ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
N of patient at full time sick leave	
Risk ratio	
Odds ratio	
Risk difference	**(please specify)**
95% CI- Low	
95% CI- High	
P value	
Other- continues measure, specify	
Other post tx- mean	
Other- post tx SD [SEM]	
95% CI- Low	
95% CI- High	
P value	
Other dichotomous measure, provide numeric data, n	
Risk ratio [odds ratio]	
95% CI- Low	
95% CI- High	

Abbreviations: tx= treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Utility - HealthCare Data

Data element	Comments, coding for data extraction
Ref id	
First author, year	
Intervention groups	(number each group 1-10)
Comparison groups	(group 1 vs. group 2)
Instrument/s (describe full detail of the instrument used, use as many rows as needed to include all reported)	VAS (0-100) for pain PDI n of words Other (specify each instrument in the respective cell of the worksheet to which you are extracting)
Baseline Conventional care	Continuous outcomes
N evaluated	
Describe outcome	(units of measure)
Baseline mean	
Baseline SD	
Between group difference in post treatment mean	
SEM	(convert SD to SEM)
95% CI- Low	
95% CI- High	
P value	
Between group difference in mean changes from baseline	
SEM	(convert SD to SEM)
95% CI- Low	
95% CI- High	
P value	
Baseline Conventional Care	Dichotomous data
Describe conventional care used and units	(diagnostic procedure, treatment sessions per patient per duration, etc.)
Reported n for column AE	

Reported % for Column AE	
Risk ratio	
Odds ratio	
Risk difference	
95% CI- Low	
95% CI- High	
P value	
Post Treatment Conventional care	**Continuous outcomes**
N evaluated	
Describe outcome	**(units of measure)**
Baseline mean	
Baseline SD	
Between group difference in post treatment mean	
SEM	**(convert SD to SEM)**
95% CI- Low	
95% CI- High	
P value	
Between group difference in mean changes from baseline	
SEM	**(convert SD to SEM)**
95% CI- Low	
95% CI- High	
P value	
Post Treatment Conventional Care	**Dichotomous data**
Describe conventional care used and units	**(diagnostic procedure, treatment sessions per patient per duration, etc.)**
Reported n for column AE	
Reported % for Column AE	
Risk ratio	
Odds ratio	
Risk difference	

95% CI- Low	
95% CI- High	
P value	

Abbreviations: tx= treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Cost Data

Data element	Comments, coding for data extraction
Ref id	
First author, year	
Intervention groups	**(number each group 1-10)**
Comparison groups	**(group 1 vs. group 2)**
Instrument/s (describe full detail of the instrument used, use as many rows as needed to include all reported)	**VAS (0-100) for pain** **PDI** **n of words** **Other (specify each instrument in the respective cell of the worksheet to which you are extracting)**
Unit of cost	**(for example US dollars)**
Cost 1	**(cost in health care sector, cost of production loss, costs in other sectors, patient and family costs, total costs)**
N evaluated	
Cost 1	**(describe all, including method of calculation)**
Cost 1, mean	
Cost 1, SD	**(convert SEM to SD)**
Between group difference in cost per treatment	**in column E clearly state which group is being subtracted from which group. Also be mindful of the sign of the difference [+ or -])**
SEM	**(convert SD to SEM)**
95% CI- Low	
95% CI- High	
Cost 2	**(cost in health care sector, cost of production loss, costs in other sectors, patient and family costs, total costs)**

N evaluated	
Cost 2	**(describe all, including method of calculation)**
Cost 2, mean	
Cost 2, SD	**(convert SEM to SD)**
Between group difference in cost per treatment	**in column E clearly state which group is being subtracted from which group. Also be mindful of the sign of the difference [+ or -])**
SEM	**(convert SD to SEM)**
95% CI- Low	
95% CI- High	
Cost 3	**(cost in health care sector, cost of production loss, costs in other sectors, patient and family costs, total costs)**
N evaluated	
Cost 3	**(describe all, including method of calculation)**
Cost 3, mean	
Cost 3, SD	**(convert SEM to SD)**
Between group difference in cost per treatment	**in column E clearly state which group is being subtracted from which group. Also be mindful of the sign of the difference [+ or -])**
SEM	**(convert SD to SEM)**
95% CI- Low	
95% CI- High	
Cost 4	**(cost in health care sector, cost of production loss, costs in other sectors, patient and family costs, total costs)**
N evaluated	
Cost 4	**(describe all, including method of calculation)**
Cost 4, mean	
Cost 4, SD	**(convert SEM to SD)**
Between group difference in cost per treatment	**(in column E clearly state which group is being subtracted from which group. Also be mindful of the sign of the difference [+ or -])**
SEM	**(convert SD to SEM)**

95% CI- Low	
95% CI- High	

Abbreviations: tx= treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Harms Data

Data element	Comments, coding for data extraction
Ref id	
First author, year	
Intervention groups	**(number each group 1-10)**
Describe Adverse event	
N evaluated	
N with any Adverse event	**At least one AE**
Rate (%)	
Rate ratio	
Odds	
Odds ratio	
95% CI- Low	
95% CI- High	
P value	
Withdrawal due to AE	
Rate (%)	
Rate ratio	
Odds	
Odds ratio	
95% CI- Low	
95% CI- High	
Describe Serious Adverse Events	
N of patients with serious AE	
Rate (%)	

Rate ratio	
Odds	
Odds ratio	
95% CI- Low	
95% CI- High	
Specific AE	
N of patients with specific AE	
Risk/rate	
Rate ratio	
P value	
Specific AE	

Abbreviations: tx= treatment; SD = Standard Deviation, AE = Adverse Events, % = Percent SEM = Standard Error of the Mean

Table 1.1 Low Back Pain - Acupuncture – Acute/Sub-acute - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Huang, SR (2006)[1] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 8 wks Final assessments: immediately post tx N screened: 98 N randomized: 98 N completed tx: 98 N attended last fu: NR **Inclusion:** L4/5 Disc herniation or with other disc herniation; Age < 65 yrs; Duration of pain ≤ 2w; Non-use of glucocorticoid and non-steroidal anti-inflammatory drugs in the study period **Exclusion:** pregnant/breast-feeding women; After operation; Up L3/4 Disc herniation or L5/S1 Disc herniation; syndrome; Other chronic pain diseases; Hypertension; Heart disease; Mental Pt	Mean age (SD/range): IG = 42.8 vs. CG = 46.2 yrs % of male: IG = 52.8%; CG = 46.7% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc herniation Duration of Pain: Acute ≤ 2wk, IG = 7.2 ds; CG = 6.9 ds Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 53)– local single-point E-acu: At Yaotu; 0.6ms, 15Hz, 50min/time, 2times/wk x 4- total of 9 tx Drop outs: 0 CG (n = 45) – Routing E-acu: acupuncture at Dachangyu, Guangyuanyu, Bamiu, Jiaji, Xubian, Huantiao, Fengshi, Yinmen, Weizhong, Yanglinquan, Chenshan, Kunlun; same as IG Drop outs: 0	**Outcome instruments:** Pain: NA Disability: ODQ (A, B) **Results:** Baseline: Pain: NA Disability: NR Immediate post tx: Mean chg from A: IG = 18.7; CG = 35.65 Pain: NA Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary** local single-point electro-acu group is more effective than routine electro-acu group

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Lai, Y (2004)[2] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Final assessments: immediately post tx N screened: Don't know N randomized: 76 N completed tx: 76 N attended last fu: NR **Eligibility criteria:** inclusion: 1. Diagnostic using Chinese New Medicine Clinical Trial Reference 1993 ref[2] exclusion: Pt with server protrusion, which press the nerve	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** disc/joint disease Duration of Pain: IG - 12 hr- 39 ds for whole study, It mentioned in the report as acute.; CG – 13 hr -39 ds for whole study, acute as well Severity of pain (Grading): NR NR Co-interventions: NR	**Groups** IG (n = 41)– Acupuncture Xi-cleft and normal points: 38mmX25-40mm needle for Xi-cleft point, retention 30min+point injection of Angelicate, 2 ml/point,; 1tx/d, 10 tx/course x 2 Drop outs: 0 CG (n = 35) – Acupuncture normal points: 38 mm x 40-75 mm needle for normal point acu, retention 30 min + point injection of Angelicate, 2 ml/point,; same as IG Drop outs: 0	**Outcomes:** Pain: Pain VAS, B, pain difference from baseline Disability: NA **Results:** Baseline: Pain: NR Disability: NA Immediate post tx: Pain: IG = 5.63 (1.12); CG = 4.51 (0.92) Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Well being, Chinese Standard, B **Results:** Immediate post tx: IG = 97.6%, CG = 85.7% improved Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** acu can relieve the pain in Pts with lumbar intervertebral disc protrusion. The effect of needling Xi-Cleft points as a main tx in cooperation with point injection is better than that of routine acu therapy in cooperation with point injection

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Wen-Jun, L (2000)[3] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 238 N completed tx: NR N attended last fu: NR **Eligibility criteria:** - inclusion: Pts with acute lumbar sprain - exclusion: NR	Mean age (SD/range): 14-65 yrs % of male: 84.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Sprain Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG1 (n = 112)– Acu-Tx: Lumbar acupoint chosen at L2-4, needles inserted perpendicular, manipulation: pushing and withdrawal, retained for 15-20 min, after acu, moxibusion applied; 5 tx total Drop outs: NR IG2 (n = 126) – Acu-Control: needle is rapidly inserted into S16 point to 0.5-1.0 cun depth and twisted for 30-60 sec to obtain response; retain for 10-20 min; after relief of pain, the Ashi point is treated by inserting the needle to 1.5-2.5 cun depth; moxibustion given at the same site for 10-15 min; 5 tx total Drop outs: NR	**Outcome instruments:** Pain: NR Disability: NA **Results:** Baseline: NA Pain: NR Disability: NR Immediate post tx: NA Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Response rate Immediate post tx: IG1: 69.7% vs. IG2 94.4% $p < 0.01$ Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** NA

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Xing-wei (2007)[4] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 15 ds Final assessments: immediately post tx N screened: NR N randomized: 78 N completed tx:78 N attended last fu: NR **Inclusion:** Diagnosed as lumbar herniation according to "People's Republic of China in the pharmaceutical industry standards - traditional Chinese medicine diagnostic efficacy standards". Diagnosis verified with CT or MRI; Age < 70 **Exclusion:** other vertebral disc or joint disease; chronic Pts with multiple reoccurrence at remission stage; heat resistance-type	Mean age (SD/range): IG = 47 Vs. CG = 44 yrs % of male: IG = 51.3%, CG = 56.4% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** 1-disc/joint disease Duration of Pain: acute; subacute (up to 12 wks), IG = 9.7 ds; CG = 10.6 ds Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 39) – routine acu. +warming needle moxibustion: unilateral and bilateral stinulated at BL 23, GV 4, GV 3,BL 40 etc. with needles until "deqi" sensation reached ret. 30 min; 1sess/d x 15 sess. Drop outs: A= 0 CG (n = 39) – Routin Acu.: same routine acupunture as in intervention grp was applied; same as IG Drop outs: A=0	**Outcome instruments:** Pain: NR Disability: NR **Results:** Baseline: NA Pain: NR Disability: NR Immediate post tx: NA Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other:cure rate, effective rate **Results:** Immediate post tx: Cure rate: 29 vs. 16% effective: 8 vs. 12% ineffective: 2 vs. 11% total efficacy: 94.9% vs. 71.8% Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Table 1.2 Low Back Pain - Acupuncture – Acute/Sub-acute - Non –Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Araki, S (2001)[5] Country: Japan Quality score: 10/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: single tx Final assessments: immediately post tx N screened: 40 N randomized: 40 N completed tx: 40 N attended last fu: 33 **Inclusion:** Pts with acute low-back pain (who have gait disturbance; information from author.) **Exclusion:** no information (more than 3 ds duration of LBP, sciatica; information from author.)	Mean age (SD/range): IG = 44.25 (15) vs. CG = 43.3 (13.8) yrs % of male: 70% total Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 20)– Acu: needle(s) inserted into SI3 bilaterally with deqi sensation at supine position and then pts were made to perform back EX, needles left in situ during EX, insertion depth was 2.5 cm, acu needles(50 mm length, 0.20 mm diameter); single tx Drop outs: 7 total in both grps CG (n = 20) – Sham: needling performed to SI3 bilaterally point at supine position, mimicked needle insertion: tapped head of guide tube then pts made to perform back EX, needling gesturing performed during back EX; single tx	**Outcome instruments:** Pain: VAS (mm)of pain and LBP score (JOA) Disability: JOA Score **Results:** Baseline: Pain: IG = 66.6 (4.7), CG = 71.5 (4.84) Disability: IG = 4.45 (0.57), CG = 5.35 (0.6) Immediate post tx: Pain: IG = 49.55 (5.06), CG = 55.65 (6.13) Disability: IG = 6.6 (0.72), CG = 6.5 (0.69) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: NA **Results:** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Cao, W (2001)[6] Country: China Quality score: 0/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 6hrs – 9 ds Final assessments: immediately post tx N screened: 400 N randomized: 400 N completed tx: NR N attended last fu: NR **Inclusion**: pts with acute lumbago (severe and very severe pain) who sought medical advice from Dep. of Acu and Moxi and the surgical Dep. Of orthopedics - 338 were outPts and 62 inPts, 106 pts were seen for the first time **Exclusion:** NR	Mean age (SD/range): 18-72 yrs % of male: 33.8% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** 24.5% acute sprain in the waist;21.5%; hyperosteogency and osteoporosis of LV, 14.8% acute prolapse of the LVD, 10.3% musculus piriformis, and other causes **Duration of Pain:** Acute, NR **Severity of pain (Grading):** grade I vs. grade II - IG1= 7 vs. 28; IG2 = 67 vs.33; IG3 = 73 vs. 27; CG = 69 vs. 31	**Groups** IG1 (n = 100)– Acu with filiform needle: 1 - point through point method with twisting manipulation;; 5-10tx, 1tx/2ds Drop outs: NR IG2 (n = 100) – As IG1 + cupping: acu as IG1, cupping used after needling on the sore points Retained for 5-15 minutes; same as IG1 Drop outs: NR IG3 (n = 100) – Same as IG2 + pricking collateral same as IG1 Drop outs: NR CG (n = 100) – As IG3 + moxibusion: As IG3 + moxibustion on affected part using 5 moxa cones until local skin turned from purple; same as IG1 Drop outs: NR	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain:** Immediate post tx: NA Pain: Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Curative Effect at 5: IG1(n =7), IG2 (n = 8), IG3 (n = 15), CG (n = 32) improved; CE at 10: IG1 (n = 10), IG2 (n = 11), IG3 (n = 38), CG (n = 33) improved **Results:** Baseline:NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Eisenberg, DM (2007)[7] Country: US Quality score: 8/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 5 wks Final assessments: immediately post tx N screened: NR N randomized: 434 N completed tx: 418 N attended last fu: NR **Inclusion**: Pts with acute LBP for 21 d or less aged > 18 yrs **Exclusion:** Pain not in LB; pain lasting > 21 d; back of neck surgery in past 5 yrs; history of vertebral fracture or dislocation; unexplained fever or weight loss; (fibromyalgia, drug abuse, arthritis), history of cancer other than non-melanoma skin cancer, osteoporosis, clotting disorders, use of anticoagulant drugs, systemic corticosteroids, pregnancy	Mean age (SD/range): IG1 – IG3 = 43.2 (12.7) vs. CG = 42.7 (12.7) yrs % of male: IG1 – IG3 = 45 vs. CG = 50 Racial composition: 63.9% White Work status: IG1-IG3= 86.5%; CG =82.4%, NS Other socio-demographics: 65.45% Married or with partner Co morbidities: NR Prior episode of pain if acute: NR **Prior CAM intervention:** NR Prior surgery related to current complaint: NR	**Cause of Pain:** N- S Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions: Same as interventions	**Groups** IG (n = 58)– Acu: NR; 10 sessions over 5 wks Drop outs: 4 IG2 (n = 76) – Chiro: NR same as IG1 Drop outs: 4 IG3 (n = 152) - Massage: NR; same as IG1 Drop outs: 4 CG (n = 148) – Usual care: NSAIDs, muscle relaxants, limited bed rest, education, activity alterations; 5 wks Drop outs: 2	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR Efficacy data reported for the combination of CAM txs and is not used in this report.	**Outcome instruments:** QoL/ well being: NR Short term: NR Intermediate: NR Long term: NR **Harms:** Harms (B): Minor discomfort/soreness; IG1 = 5%, IG2 = 8%, IG3 = 7%, CG = NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Kenndy, (2008)[8] Country: Irelnad Quality score:8/13	**Trial Design** RCT- Tx duration: Final assessments: 3 mos after last intervention N screened: 55 N randomized: 48 N completed tx: 45 N attended last fu: 40 **Inclusion:** 18-70 yrs adults with N-S LBP, with/out referred pain, up to 12 wks duration. **Exclusion:** red flags (defined by CSAG*), contra-indications to acu; previous acu tx; conflilcting or ongoing tx	**Mean age (SD/range):** % of male: 54.2 vs. 417% Racial composition: Work status: employed= 54.2% vs. 45.8% sick leave= 29.2% vs. 20.8% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Acute Severity of pain (Grading): NR Co-interventions: 1- strd advice to remain active (to all pts: back book, evidence-based booklet) 2- uncontrolled Med (prescribed or over the counter -mg and n/d) 3- analgesic use in n=44 (92%) grp 1+ grp2 at baseline	**Groups** IG (n = 24) **–** Acupuncture: unilateral or bilateral points with 8-13 needles stimulated manually every 5 min until 30 sec of "de qi" sensation reached; needle retention time = 30 min. The Park Sham Device (AcuPrime, UK) with verum acu single use needles with guide tube, size 0.25 mm x 40 mm; at least 3, max 12 tx in a 4-6 wk Drop outs: 3 CG (n = 24) – Placebo: same device as intervention grp; non-penetrating sham needles (size 0.3 mm x 40 mm, AcuPrime Dong Bang) in same acu points and clinical protocol; schedule as IG Drop outs: 8	**Outcomes:** Pain: VAS (average and worst, 0 - 100) Disability: RMDQ **Results:** Immediate post tx: Pain, average: 27.3 vs. 36.3 RMDQ: 6.0 vs. 12.8 Short term (3 mos post tx): Pain, average: 26.5 vs. 40.7 RMDQ: 50. vs. 7.0 Intermediate: Long term: NR	**Outcomes:** QoL/ well being: NR Other: work absenteeism; Med used, exit questionnarie **Results:** Immediate post tx: tablet use: 1.0 (0.3) vs. 4.2 (0.6) Days off work: 13.9 vs. 10.9 ds Short term: NR Intermediate: NR Long term: NA **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Kittang, G (2001)[9] Country: Norway Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 10 ds/2 wks Final assessments: 6 mos N screened: NR N randomized: 60 N completed tx: 57 N attended last fu: 57 **Inclusion:** 18-67 yrs with acute LBP (lasting less than 10 ds) **Exclusion:** Neurologic outcomes, rheumatic illness, malign disease, systemic use of anti-inflammatory drugs or steroids before inclusion and use of medicine that may interact with anti-inflammatory drugs	**Mean age (SD/range):** NR % of male: NR Racial composition: NR Work status: 2 of 3 on sick leave at time of inclusion Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:Advice and EX	**Groups** IG (n = 30) **–** Acupuncture: needling in "lumbago 1 and 3" with medical lumbago and in "upper lip" with more lateral pain. Later txs were 5 needles across at level L2, at Ashi points (local pain point) and in both ankles. Analgesia was allowed and sick leave provided when necessary**;** 4 tx, within 2 wks Drop outs: 3 (not clear which grp or at what time point) CG (n = 30) – Medication: Naproxen 500 mg twice daily for 10 ds Drop outs: NR	**Outcomes:** Pain: VAS **Results:** Baseline: Pain: NR Immediate post tx: Pain: IG = 13 (0), CG = 12.9 (0) Short term: IG = 6.4 (0), CG = 8.7 (0) Intermediate: IG = 9.6 (0), CG = 14.4 (0) Long term: NR	**Outcomes:** QoL/ well being: NR Other: use of analgesic drugs: IG used significantly less drughs during the 1st wk after start of tx than those receiving naproxen: 2/28 vs. 11/29, P < 0.01 **Harms:** gastroenteric side effects (0/28 vs. 15/29, p < 0.01)

Table 1.3 Low Back Pain- Acupuncture – Chronic Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Ceccherelli, F (2001)[10] Country: Italy Quality score: 9/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 6 wks Final assessments: 3 mo N screened: NR N randomized: 42 N completed tx: 42 N attended last fu: 42 **Inclusion:** Lumbar myofascial pain, continuous pain > 3 mo or recurrent acute pain >1 mo, not been resolved with drug therapy **Exclusion:** Paraplegia or quadriplegia, radiographic evidence of osteoporosis or neurological signs; systemaic organic diseases, psychiatric inllnes	Mean age (SD/range): IG = 41.65 (11.37) vs. CG = 41.63 (8.87) yrs % of male: full sample: 71% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	LBP **Cause of Pain:** N-S (lumbosacral myofacial pain) Duration of Pain: chronic (lumbosacral myofacial pain), NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 21)– Deep-Acu: Sedatelec 300um, 10, 29 and 49mm lengths. Points were extra 19, VG6, bilaterally: GB34, UB54, UB62 + 4 TP or most painful points in lumbar area. Needles stimulated for 1 min after insertion and for 20s/5, 10, 15min, Freq was 2 Hz; 20min/session, 8 sessions total in 6 wks Drop outs: none CG (n = 21) – Superficial Acu: same as described for acupunture, but the depth of insertion was only 2mm in the skin; same as IG Drop outs: none	**Outcome instruments:** Pain: McGill Pain Questionnaire: No. of words; total scores (B, C) **Results:** Baseline: Pain: IG = 13.81 (3.95), CG = 13.7 (3.49); IG = 35.4 (14.53), CG = 34.75 (11.43) Immediate post tx: Pain: IG = 7.81 (4.88), CG = 10.4 (6.76); IG = 14.54 (10.88), CG = 22.25 (16.08) Short term: IG = 3.63 (6.13), CG = 8.5 (7.12); IG = 7.5 (12.94), CG = 18 (17.16) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA **Results:** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Gunn, CC (1980)[11] Country: Canada Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 5-10 wks Final assessments: immediately post tx N screened: 146 N randomized: 55 N completed tx: NR N attended last fu: NR **Inclusion:** male workers disabled from injury for at least 12 wks ;with 8 wks run in period of standard Clinical regimen before admission into the trial; disability periods(12 to 168 wks) wks **Exclusion:** psychosomatic backache; pts with spontaneous recovery	Mean age (SD/range): Total: 40.6 (range 20-62) yrs % of male: 100% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: pts with prior surgery were included Prior CAM intervention: NR Prior surgery related to current complaint: NR	LBP **Cause of Pain:** Fracture Duration of Pain: Chronic, disability period: 28.6 (12-168) wks Severity of pain (Grading): NR Co-interventions: Standard Tx	**Groups** IG (n = 28)– Acu+ standard care: dry needling of muscle motor points using traditional acu methods; Needles: 3, 4, and 5 cm L; diameter of 30 gauge; inserted perpendicularly to the skin of muscle zone of innervations; mechanical stimulation by pecking and twirling movements- e stimulation with low voltagle of 9 V for a few sec to each pint or a phasic current applied for 15 min until visible muscle fibrillation until Teh Ch'i phenomenon (soreness, heaviness or pressure, numbness, fullness or distention); once or twice/wk for 10 tx Drop outs: NR CG (n = 27) – STD Tx: NR; NR Drop outs: NR	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Pain + work status questionnarie n (%) with full recovery;partial recovery; slight recovery; no recovery Other: **Results:** Baseline: Immediate post tx: IG = 4 (13.8), CG= 0; IG = 14 (48.3), CG = 4 (14.8); IG = 10 (34.5), CG = 11 (40.7); IG = 1 (3.4); CG = 11 (40.7) Short term: Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Hollisaz, MT(2008) [12] Country: Iran Quality score: 2/13	**Trial Design-**RCT Tx duration: NR Final assessments: immediately post tx (last fu is immediately post tx) N screened: NR N randomized: 119 N completed tx: assume 119 N attended last fu: assume 119 **Inclusion:** Pts with LBP of sciatica origin (> 6 mo) aged ≥ 20 yrs **Exclusion:** Indication for surgery, reluctance/compliance for attendance < 5 Tx sessions, > 50 yrs old, contraindications of acu Tx (systemic disease, prosthesis, cutaneous infections)	Mean age (SD/range): NR % of male: 45.4 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: Buttock pain: 80.5% vs. 79% vs. 70%; Paravertebral muscle spasm: 61 vs. 71% vs. 45.5%; Scoliosis: 22 vs. 42% vs. 12; Claudication: 14 vs. 23.7% vs. 12.6% Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Duration of Pain: chronic Severity of pain (Grading): NR Pts were classified into 4 pain intensity groups (VAS 0 – 100) mild = 0-25; moderate 25-50; severe=50-75, dn very severe = 75-100 Co-interventions: NR	**Groups** IG (n = 41)– Acupncture: 10-15 needles inserted in painful points to depth of 1-5cm. Each session lasted 20 min and a current with 2-10 mA intensity and 4 HZ frequency; 15 sessions in total Drop outs: NR IG2 (n = 38) – Physiottherapy: hot packs, ultrasound, short-wave diathermy, TENS, muscle strengthening; 30 minutes per session; 15 sessions in total Drop outs: NR CG (n = 40) – Placebo needles set on the intended points by adhesives and after turning the machine on the current intensity was zero; every other d over 1 mo: Drop outs: NR	**Outcome instruments:** Pain: VAS Pain reduction % (intensitiy of last session/ that of beginning) Disability: NR **Results:** Immediate post tx: % of pain reduction: 62.1% vs. 52.5% vs. 17.5% Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** Complication reduction **Results:** Immediate post tx: Complication reduction: 89.3% vs. 51.8% vs. 31.9% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Pain reduction in sever grp was 50.5 vs. 51.6 vs. 37.1 vs. 29% in very severe, sever, moderate, and mild group respectively; % of resolved compications did not differ significantly in 4 pain groups

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Itoh, K (2004)[13] Country: Japan Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 6 wks Final assessments: immediately post tx N screened: NR N randomized: 35 N completed tx: 27 N attended last fu: NR **Inclusion:** Lumbar LBP of at least 6 mo, normal neurologic function of lumbosacral nerves, no pain radiation, persisting pain intensity VAS => 5 (0=no pain, 10=worst pain imaginable) despite after taking therapy with lornoxicam and tramadol **Exclusion:** Major trauma or systemic disease, other ongoing txs	Mean age: G1 = 70.1 – 73.8 yrs % of male: 28.6% Racial composition: NR Work status: NR Other socio-demographics:NR Co morbidities: Spondylosis (n=8) Osteoporosis IG1, CG (n=2), IG2 (n = 3) Compression fracture IG1, CG (n=1), IG2 (n = 2) Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	LB **Cause of Pain: NR** Duration of Pain: Chronic, IG1 = 5.2 (2.6), IG2 = 7.4 (4.35), CG = 5.4 (3.7) yrs Severity of pain (Grading): NR Co-interventions:Poultice:IG1 (n=7), IG2(n = 6), CG (n =5) Analgesic IG1, IG2(n=3), CG (n = 2) Vit. D IG1 (n=1), IG2 (n = 3), CG (n = 2)	**Groups** IG1 (n =12)– Superficial-Acu: needles 0.2mm x 50 mm inserted in the skin over the TP to 3 mm depth, when pt felt dull pain, manipulation stppd but retained for 10 min; 3 wks x 2tx periods, 2 wks between tx periods Drop outs: A = 3 IG2 (n = 10) – Deep-acu: Same as IG1 but 20 mm in depth, stransverse oscillatory rotped when twitch was elicited and retained for 10 min; same as IG1 Drop outs: A = 1 CG (n = 13) – Standard-acu: in lumbar and lower extremity (depth of 20mm) and the "sparrow pecking" technique needle was retained for 10 more min; same as IG1 Drop outs: A = 3	**Outcome instruments:** Pain: VAS (B) Disability:RMDQ)immediate post tx **Results:** Immediate post tx: Pain: (n = 9): IG1 = 48.2 (30.5), IG2 = 33.1 (19.2), CG = 53.7 (21.9) (P>0.05) Disability: (n= 9): IG1 = 4.3 (2.2), IG2 = 4.2 (1.2), CG = 4.2 (4.3) (P>0.05) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Nan, L (2005)[14] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: not clear Final assessments: immediately post tx N screened: 366 N randomized: 360 N completed tx: 360 N attended last fu: NR **Inclusion:** pts age 18 - 65 yrs with lumbar strain hyperplastic spondylitis in reference with relevant stand. implementation in Traumatology in Chinese Medicine **Exclusion:** not in conformity of the dx/ or associated with other syndromes or complications; poor compliance; other severe primary diseases	Mean age (SD/range): IG = 45.8 (11.2) vs. CG = 46.2 (10.9) yrs % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Group 1a & 2a – Lumbar strain; 1b & 2b – hyperplastic spondylitis Duration of Pain: Chronic, IG = 3.14 (0.98), CG = 3.11 (0.90) yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG 1a (n = 88), 1b(n = 92– 1a – Dermal needling: gentle tapping method in local pain/or along the meridian till the local skin turned red; heavy tapping for obvious pain till slightly bleeding; 5 tx/course, 2 courses, 10 tx sessions total; 1b – Dermal needling: same as above; 5 tx course, x 2 courses, 10 sessions total Drop outs: 3 CG 2a (n = 91), 2b (n = 89) – 2a - Body Acu: accord. differentiation of syndromes in Chinese medicine; Needles: 0.34 gauge, and 30 - 70 mm L, 15 - 60 mm deep perpendicular or oblique needling till soreness and distension appeared- points: (BL 25), (BL 23); 2b – Same as above; 7 tx, once/ 2ds/ course, 14 txs Drop outs: 3	**Outcome instruments:** Pain: Pts with grade II pain(easily neglected) **Results:** Baseline: Pain: NA Immediate post tx: Pain: IG 1a = 29, 1b (34); CG 2a = 32, 2b = 29 Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: Pts with no pain(B) **Results:** Baseline: Immediate post tx: IG 1a = 37, 1b = 24; CG 2a = 27, 2b = 22 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Wang, BX (2004)[15] Country: Pakistan Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 5-7 ds Final assessments: immediately post tx N screened: NR N randomized: 40 N completed tx: 37 N attended last fu: NR **Eligibility criteria:** - inclusion: Pts with intervertebral disc protrusion aged => 18 yrs suffering from radiating pain to the lower limb for > 2 yrs - exclusion: NR	Mean age (SD/range): Mean: 46 yrs Range: 20-59 % of male: 75% Racial composition: Pakistani Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Mechanical conditions but not cancer % NS: 100% of all pts % S: Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 23)– E-Acu: Needles inserted in acupoints huantiao and weizhong and twirled until pts felt soreness, heaviness, and distention; G6805-II type electric stimulator was used for 25 min.; 1tx/d for 7d Drop outs: 3 (NR) CG (n = 17) – Medication: Diclofenic - 25 mg/tablet; Given post cibum at 50 mg tid for 5 ds Drop outs: NR	**Outcome instruments:** Pain: Pain intensity (tenderness) at buttock (B) Disability: NA **Results:** Baseline: Pain: IG = 49.5 (1.4), CG = 50.3 (1.2) Disability: NA Immediate post tx: Pain: IG = 25.7 (2.3), CG = 33.3 (2.5) (P<0.05) Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA **Results:** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** Greater decrease in pain intensity in the buttock for pts treated with E-Acu compared to those treated with the Med

Table 1.4 Low Back Pain - Acupuncture - Chronic - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Brinkhaus (2006)[16,17] Country: Germany Quality score: 8/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 8 wks Final assessments: N screened: 301 N randomized: 297 N completed tx: 397 N attended last fu: NR **Inclusion:** clinical diagnosis of CLBP, aged 40 - 75 yrs, pain intensity of at least 40, on a 100 mm VAS on last 7 ds, only use of steroid anti-inflammatory drugs for pain in last 4 wks **Exclusion:** protrusion or prolapse of 1 or more intervertebral discs with concurrent neurological symptoms, radicular pain, prior vertebral column surgery; other S causes of pain	Mean age (SD/range): IG1 = 59.1 (8.8), IG2 = 58.2 (9.4), CG = 58.9 (9.5) yrs % of male: IG1 = 36.6%, IG2 = 24.7%, CG = 31.6% Racial composition: NR Work status: NR Other socio-demographics:NR Co morbidities:NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, IG1 = 14.7 (11), IG2 = 13.6 (10.5), CG = 15.8 (11.8) yrs Severity of pain (Grading): NR Co-interventions:an algestic med. use in last 6 mos(n,%): IG1 = 59 (40.4), IG2 = 27 (37), CG = 26 (32.9)	**Groups** IG (n = 145)– Acu: 4 local points: bladder 20-34; bladder 50-54; gallbladder 30; governing vessel 3, 4, 5, and 6; extraordinary points Huatojiaji and Shiqizhuixia. needled at least 2 distant points from (bilaterally): small intestine 3; bladder 40, 60, and 62; kidney 3, and 7; gallbladder 31, 34, and 41; liver 3; and governing vessel 14 and 20- in addition other acu;12 sessions, 30 min/session over 8 wks Drop outs: C = 7, D = 1,E = 2 IG2 (n = 71) –Sham-Acu: NR; NR Drop outs: C = 5, E = 2 CG (n = 79) – Waiting list: no tx; NR Drop outs: C= 5	**Outcome Instrumets:** Pain: VAS-ITT analysis Disability: FFbH-R score; PDI score **Results:** Baseline: Pain: IG1 = 63.2 (13.2), IG2 = 66.6 (15.7), CG = 66.1 (13.6) Disability: IG1 = 57.1 (18.6), IG2 = 57.2 (17.3), CG = 56.7 (20); IG1 = 28.9 (11.1), IG2 = 31.5 (11.1), CG = 31 (13.3) Immediate post tx: Pain: IG1 = 34.5 (28.5), IG2 = 29.8 (23.6), CG = 25.1 (6.9) Disability: IG1 = 66.8 (18.3), IG2 = 62.9 (20.3), CG = 57.7 (19.9); IG1 = 18.8 (13.1), IG2 = 21.5 (13.2), CG = 27.1 (14.1)	**Outcome instruments:** QoL/ well being: SF-36 (physical health) Other: **Results:** Baseline: IG1 = 32.8 (8.2), IG2 = 31.8 (8.3), CG = 31.6 (8.2) Immediate post tx: IG1 = 40.5 (9.7), IG2 = 36.2 (10.3), CG = 33.9 (9.5) IG1 vs. CG =p<0.001, IG1 vs. IG2 = p=0.16 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

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Carlsson, CPO (2001)[18] Country: Sweden Quality score: 6/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 8 wks Final assessments: 6 mos N screened: NR N randomized: 50 N completed tx: N-S N attended last fu: NR **Inclusion:** lumbar or lumbosacral LBP for at least 6 mos; no radiation of pain below the knee level; normal neurologic examination findings of lumbosacral nerve function **Exclusion:** major trauma or systemic disease; pregnancy; hx of acu tx	Mean age (SD/range): total = 49.5 (15.4) yrs % of male: 34% total Racial composition: NR Work status: total: retired 17 (34%), full time 12 (24%), unemployed 1 (2%) Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: total 2 (4%)	**Cause of Pain:** N-S **Duration of Pain:** total= 9.5 (7.0)yrs **Severity of pain (Grading):** NR **Co-interventions:**corsets, nerve blocks, analgestics, TENS, and internse PT includingtraction, warmth, and EX	**Groups** IG1 (n = 18)– Manual acu: local points, BL24, BL25, BL26, Ex Jiaji and distal points, LI11, LI4, BL40, BL57 and BL60; "de qi" feeling sought at needle-tip depth of 2-3 cm, needles (0.3 and 0.32 mm and length 30 and 70 mm) stimulated 3 times during 20 min tx sessions to restore de qi feeling; once/wk for 8 wk Drop outs: 13 IG2 (n = 16) – EA: 4 needles, 1 pair/side in LB, freq 2Hz every 2.5s, interrupted by a 15 Hz train for 2.5s using Chinese acu ES; 2-3 sessions/as IG1 Drop outs: -- CG (n = 16) – TENS: mock TENS given by impressive, stationary, disconnected GRASS, electrodes placed on most painful area in LB; same as IG1 Drop outs: 10	**Outcome instruments:** **Pain:** VAS (A, B)in the morning; in the evening **Results:** Baseline: Pain: IG1 + IG2 = 57 (21), CG = 47 (23) Immediate post tx: Pain: NR Short term: % change from baseline in the morning: 1st = 88%, 2nd = 76% % change from baseline in the evening 1st = 87%, 2nd = 74% Intermediate: NR Long term: NR	Outcome instruments: QoL/ well being: NA Other: Results: Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR Harms: NR Summary:

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Cecherelli, F (2003)[19] Country: Italy, Padova Quality score: 7/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 5-10 wks Final assessments: immediately post tx N screened: 31 N randomized: 31 N completed tx: 31 N attended last fu: NR **Inclusion:** Pts with chronic "lombalgia" meaning LBP (pain > 3 mos) **Exclusion:** radicular signs associated with scoliosis as demonstrated on X-ray or degenerative disc disease with significant reduction of interdiscal spaces, radicular symptoms with dural sac signs, Pts showing signs of neuro-muscular disease	Mean age (SD/range):IG = 57.17 (±13.06), CG = 49.36 (±11.98) yrs % of male: IG= 31%, CG = 27% Racial composition: Europian-Italian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR **Duration of Pain:** Chronic > 3 mos **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 16)– Acu: the needles were inserted in the muscles and in the intraspinal ligaments. The following points were stimulated manually for 20 seconds per tx: Ex 29 (Shiqizhuixia) 3 GV (yaoyangguan) 30 BL (Baihuanshu)) 31 BL (Shanglio) 60 BL (Kunlun) 62 BL (Shenmai); 1 session/wk for 5 wks Drop outs: None CG (n = 15) – Acu: same as IG; 10 tx of acu, 1 tx/wk for 10 wks Drop outs: None	**Outcome instruments:** Pain: NA **Results:** Baseline: Pain: NA Immediate post tx: Pain: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Results: Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR Harms: NR **Summary**: IG = 11 pts obtained a good result (68.8%), 1 an unsatisfactory result, and 4 a poor result (25%). The remaining pain was 65.5% of the original pain. CG= 13 pts (86.7) had a good result) and 2 a poor result (13.3%). The remaining pain was 43.9% of the original pain

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Cherkin, DC (2001)[20]	**See LBP massage section**	**See LBP massage section**	**See LBP massage section**	**See LBP massage section**	**See LBP massage section**	**See LBP massage section**
Cherkin, DC (2009)[21] Country: US Quality score: 6/13 Initial of reviewer: SG	**Trial Design – RCT** Tx duration: 7 wks Final assessments: 3 mos N screened: 2605 N randomized: 638 N completed tx: 638 N attended last fu: 606 **Inclusion:** Pts aged 18-70 yrs receiving care for CLBP (3-12 mo) within the past yr **Exclusion:** Specific causes of BP (cancer, fractures, spinal stenosis, infection), back problem complication (back surgery, sciatica), contraindication to acu	Mean age (SD/range): 46 – 49 yrs % of male: IG1 = 32, IG2 = 54, IG3 = 40, CG = 36% Racial composition: White/Hispanic Work status: employed IG1 = 22, IG2 = 20, IG3 = 22, CG = 19 Other socio-demographics: Married: 58.3% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S, 21.5% with radiating pain **Duration of Pain:** Chronic, NR **Severity of pain (Grading):** NR **Co-interventions:** Electro-stimulation, moxibustion, herbs were also prescribed	**Groups** IG1 (n = 157)– Ind-Acu: 32-gauge needles were used (0.25 mm) at least 1.5" in length; needling depth varied from 1 to 3 cm, 10.8 (5-20) needles retained for 18 (15-20) min, twice for 3 wks, then once/wk for 4 wks Drop outs: C=10,D = 16 IG2 (n = 158) – St-Acu: same as IG1 with 8 commonly used acu points Du 3, Bladder 23-bilateral, LB ashi point, Bladder 40-bilateral, Kidney 3-bilateral, needled for 20 min; same as IG1 Drop outs:C=6, D=11 IG3 (n = 162) – Sham: toothpick in a needle guide tube, twirling for 10 min; same as IG1 Drop outs: C=3, D=10 CG (n = 161) – Usual care: self-care book; NA Drop outs: C=13, D=18	**Outcome instruments:** Disability: RMDQ short- and intermediate-term post-tx **Results:** Baseline: Disability: IG1 = 10.8 (5.2), IG2 = 10.8 (5.6), IG3 = 9.8 (5.2), CG = 11 (5.2) Immediate post tx: Disability: NR Short term: IG1 = 6.4 (5.3), IG2 = 6.3 (5.7), IG3 = 5.4 (4.9), CG = 8.9 (6) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: **Results:** Immediate post tx:NR Short term: NR Intermediate: NR Long term: NR **Harms:** 11 pts had moderate short-term and 1 pt had severe AE; IG1 = 6, IG2 = 6, P = 0.04

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Chu, J (2004)[22] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 3 wks Final assessments: 2 wks N screened: NR N randomized: 36 N completed tx: NR N attended last fu: NR **Inclusion:** Pts with CLBP (duration ≥ 3 mo) **Exclusion:** Radiation of pain below the buttock, drug/alcohol abuse, sciatica, spinal surgery, spinal nerve root or spinal cord injury, previou use of Acu, skin infections, open wounds, bleeding disorders, immune deficiency, valvular heart disease, pace makers, pregnancy	Mean age (SD/range): 53.4 (13.9) yrs % of male: 50% **Racial composition:** NR **Work status:** NR **Other socio-demographics:** NR **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Herniated nucleus pulposus (n=4) Lumbar spondylosis (n=4) Spondylolisthesis (n=2) **Duration of Pain:** Chronic, 28.2 (19.1) yrs **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG1 (n =12) **–** E-MS(ETOIMS): Monopolar 37 mm-long EMG needle electrode inserted into paraspinal muscle sites (T10 - S1), kept for 2 secs stationary then withdrawn, electric current (frqcy: 2 HZ and intensity: 2 mA) was supplied at individual points; 20 min/session Drop outs: NR IG2 (n = 12) – MS: same as IG1 minus electric current; same as IG1 Drop outs: NR CG (n = 12)–SS: Skin stimulation, insertion of EMG needle electrode limited to skin (no penetration, no electricity) Drop outs: NR	**Outcomes:** Pain: Pain intensity (VAS): B (right after, 1 wk post-Tx, and 2 wks post-Tx) Disability: NA **Results:** Baseline: **Pain:** IG1 = 4.3 (2.3), IG2 = 4.6 (2.1), CG = 4.2 (1.9) Immediate post tx: Pain: IG1 = 2.3 (1.1), IG2 = 3.9 (1.8), CG = 3.5 (2.3) (P < 0.01) Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NA **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

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Coan, R (1980)[23] Country: USA Quality score: 3/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: NR Final assessments: 3-6 mos N screened: NR N randomized: 39 N completed tx: NR N attended last fu: NR **Inclusion:** LBP for 6 mos or more, no previous acu tx, no history of diabetes, infection or cancer, not more than 2 back surgeries **Exclusion:** NR	Mean age (SD/range): IG = 47.2, CG = 47 yrs % of male: IG = 43.5%, CG = 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR **Duration of Pain:** Chronic, IG = 8.2, CG = 12.6(assuming yrs)-SG **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 23)– Acu (immediate): performed according to the classical Oriental meridian theory of promoting healing by stiumlating the energy flow in the body. In some pts, E-Acu was used; NR Drop outs: NR CG (n = 16) – Acu (delayed): same as IG; NR Drop outs: NR	**Outcome instruments:** **Pain:** VAS 10cm for pain (0-10) (A, C, D) **Results:** Baseline: Pain: IG = 5.5, CG(A1) = 4.8, CG (A2)= 4.7 Immediate post tx: Pain: NR Short term: IG = 2.7 (2.8), CG (A1) = 2.8 (2), CG (A2) = 2.8 (1.9) Intermediate: IG = 3.8 (1.7), CG (A1) = 3.4 (1.4), CG (A2) = 4.6 (-0.1) Long term: NR	Outcome instruments: QoL/ well being: NR Results: Baseline: NA Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** NR

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Fu ZH 2006[24] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 60 N completed tx: 60 N attended last fu: NR **Inclusion:** Adults (20-60 yrs) with CLBP between the 12th rib and gluteal fold **Exclusion:** systemic disorders, disc/spine surgery, psychiatric diseases, taking analgesics, hormones	Mean age (SD/range): IG = 53.3 (12.4) vs. CG = 58.8 (10.8) yrs % of male: IG = 0.437%, CG = 0.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain: N=-S** Duration of Pain: Chronic, IG = 5.43 (7.45); CG = 5.56 (6.54) Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 32)– Fu's subcutaneous needling: needle penetrates subcutaneously into layer in insertion points chosen based on experience and ancient Chinese medical book; insertion points were chosen at the same side with suffered back; if both sides afflicted, one more severe side was treated; NR Drop outs: NR CG (n = 28) – minimal needling: NR; NR Drop outs: NR	**Outcome instruments:** Pain: MRP -VAS (B); PUP - VAS (B) Disability: **Results:** Baseline: Pain: IG = 5.22 (2.47), CG = 4.32 (2.13); IG = 5.28 (2.22), CG = 4.07 (2.19) Disability: Immediate post tx: Pain: IG = 2.56 (2.59), CG = 3.79 (2.33); IG = 2.91 (2.48), CG = 3.71 (2.09) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

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Giles, LG (2003)[25,26] Country: Australia Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 9 wks Final assessments: 1 yr N screened: 533 N randomized: 115 N completed tx: 69 N attended last fu: 62 I**nclusion**: pts at least 17 yrs old with uncomplicated mechanical spinal pain for minimum of 13 wks **Exclusion**: pts with nerve root involvement, spinal anomalies (other than sacralization or lumbarization), pathology other than mild to moderate osteroarthrosis, spondylolisthesis of L5 or S1 exceeding Grade 1	Mean age (SD/range): IG1 = 23.8 (4.8), IG2 = 25 (8.1), CG = 29.5 (2.07) yrs % of male: IG1 = 55.9, IG2 = 51.4, CG = 57.5 Racial composition: NR Work status: NR Other socio-demographics: skilled trade: 28.8% Co morbidities: Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N- S Duration of Pain: chronic (> 13 wks) Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 36)– Acu(LB, neck, thorax): needling the TP & distal analgesia producing sypatholytic acu points below the elbow or knee, intervals for 20 min- insertion depth 20-50 mm, kin the maximum pain area and up to 5 mm in the distal points; same as IG2 Drop outs: B = 14, E = 6/20 IG2 (n = 36) – Spinal manipulation: high velocity, low amp thrust to a joint; 20 min/session, 2 tx/wk up to 9 wks Drop outs: B = 11, E= 4/23 CG (n = 43) – Medication that has not been tried: Drop outs: B = 21, E= 12/19	**Outcome instruments:** Pain: VAS (1 - 100)- ITT Disability: Oswestry **Results:** Baseline: Pain: IG1 = 6 (2.2), IG2 = 6 (2.9), CG = 5 (3.7) Disability: IG1 = 30 (17.03), IG2 = 22 (22.96), CG = 32 (19.3) Immediate post tx: Pain: IG1 = 4 (3.7), IG2 = 3 (5.2), CG = 5 (3.7) Disability: IG1 = 26 (20.74), IG2 = 14 (24.4), CG = 32 (23.7) Short term: NR Intermediate: IG1 = 13 (22.9), IG2 = 16 (17.8), CG = 24 (25.2)	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx:NR Short term: NR Intermediate: NR Long term: NR **Harms:** N=22, 13 in IG1, 4in IG2, 5 in CG, n=1 committed suicide after end of tx; most frequent AEs were hematoma and bleeding

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Grant, DJ (1999)[27] Country: U.K Quality score: 6/13 Initial of reviewer: SG	**Trial Design** **RCT** **Tx duration:** 4 wks **Final assessments:** 3 mos **N screened:** 81 **N randomized:** 60 **N completed tx:** 60 **N attended last fu:** 60 **Inclusion:** Pts at least 60 yrs old with complain of back pain of at least 6 mos duration **Exclusion:** Tx with anticoagulants, tx with systemic corticosteroids, dementia, previous tx with acu or TENS, cardiac pacemaker, other severe concomitant disease, inability of Pt or caregiver to apply TENS machine.	Mean age (SD/range): IG = 75 range (60-83), CG = 72 (60-90) yrs % of male: 6.25%, vs. 14.28% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	LBP **Cause of Pain:** N-S **Duration of Pain:** Chronic, NR **Severity of pain (Grading):** NR **Co-interventions:**Pts were allowed to continue the analgesic use	**Groups** IG (n = 32)– Acu: (32 gauge, 1.5 inch length with guide tube). Points were as in routine clinical practice, using only points on the back. 6 needles used on average at each tx with minimum of 2 and a max of 8.; 2 tx of 20min/wk for 4 wks Drop outs: 2 CG (n = 28) – TENS: standard make and model of machine (TPN 200, Physio-Med-Servics) using 50 Hz stimulation iwht the intensity adjusted to suit the Pts. Units were used by Pts or the caregiver at home; 30 min/session, max of 6 hrs/d, fu of 20 min/session, twice/d Drop outs: 1	**Outcome instruments:** **Pain:** VAS-reported as Median (IQR), converted to mean (SD) **Disability:** NHP-reported as median (IQR) converted to mean (SD) **Results:** Baseline: Pain: IG = 140(P =66), CG = 101 (P = 43.7) Disability: IG = 76.7 (35.3)(P = 33.2), CG = 50.1 (40) (P = 34.4) Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Results: Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** (n = 2): influenza and immobility following dental tx which required hospitalization; (n = 1): acute depression

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Haake, M (2007)[28] Country: Germany Quality score: 10/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: up to 7 wks Final assessments: immediately post tx N screened: 1802 N randomized: 1162 N completed tx: 1117 N attended last fu: NR **Inclusion:** > 18 yrs old adults with CLBP for ≥ 24 wks **Exclusion:** Received acu for LBP at any time in the past, history of spinal fracture, disc or spinal surgery, infections/tumor of the spine, bone/joint disorder, scoliosis, chronic pain, drug abuse, pregnancy or epilepsy	Mean age (SD/range): IG1 = 49.6 (14.6), IG2 = 51.3 (14.5), CG = 49.2 (14.8) yrs % of male: IG1 = 42.6%, IG2 = 42.5%, CG = 36.2% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic, 8 yrs (same for all grps) Severity of pain (Grading): NR Co-interventions:None	**Groups** IG1 (n = 387)– Acu (verum): Acu included fixed points and individual points according to Chinese medicine; 14-20 needles inserted to a depth of 5-40 mm depending on location. Induction of de Qi in the body was elicited by ME; 2 sessions/ wk, 5 more session if pts experienced 10-50% reduction in pain Drop outs: C = 10 IG2 (n = 388) – Standard therapy: 10 sessions of PT, EX, NSAIDs, pain Med up to max daily dose; same as IG1 Drop outs: C = 24 CG (n = 387) – Sham acu: sham needles were only superficially (1-3 mm) inserted without stimulation; up to 7 wks Drop outs: C = 11	**Outcome instruments:** Pain: Pain: CPGS (D) Disability: HFAQ (D) **Results:** Baseline: Pain: IG1 = 67.7 (13.9), IG2 = 67.8 (14.6), CG = 67.8 (13.2) Disability: IG1 = 46.3 (14.7), IG2 = 46.7 (14.5), CG = 46.3 (15.3) Immediate post tx: Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: SF-12 (physical score) Other: **Results:** Baseline: IG1 = 31.8 (6.8), IG2 = 31.6 (6.8), 31.5 (6.9) Immediate post tx: NA Short term: NR Intermediate: IG1(n = 373) = 41.6 (10.5), IG2 (n = 364) = 35.8 (9.5), CG (n = 372) = 39.5 (10.1) Long term: NR **Harms:** NR

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Hirota, S (2005)[29] Country: Japan Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 5 wks Final assessments: immediately post tx N screened: 12 N randomized: 9 N completed tx: NR N attended last fu: NR **Inclusion:** pts with chronic (> 6 mos) LBP **Exclusion:** NR	Mean age (SD/range): NR, aged 65+ % of male: NR Racial composition: Assuming all Asians Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Not S % NS: all pts Duration of Pain: chronic, Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 4) **–** Trigger point needling 1tx/wk for 5 wks Drop outs: NR CG (n = 5) – Tender point needling 1 tx/wk for 5 wks Drop outs: NR	**Outcomes:** Pain: VAS Disabilty: RDQ Disability: RDQ **Results:** Baseline: Pain: 72.3 (3.1) vs. 71.6 (3.9) Disability: 3.1 (1.4) vs. 5.8 (4.0) Immediate post tx: Pain: 61.5(29.3) vs. 71.5 (24.3) Disability:7.5 (1.9) vs. 9.0 (4.1) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Other: NA **Results:** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** After tx period, VAS and RDQ values improved sign. In IG, no sign. improvements in CG

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Hollisaz , MT (2008)[12] Country: Iran Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 1 mo Final assessments: immediately post tx N screened: NR N randomized: 119 N completed tx: NR N attended last fu: NR **Eligibility criteria:** - inclusion: Pts with LBP of sciatical origin (> 6 mo) aged => 20 yrs - exclusion: Indication for surgery, reluctance/compliance for attendance < 5 Tx sessions, > 50 yrs old, contraindications of acu Tx (systemic disease, prosthesis, cutaneous infections)	Mean age (SD/range): NR % of male: 45.4% Racial composition: NR Work status:NR Other socio-demographics: NR Co morbidities: Buttock pain: 80.5% Paravertebral muscle spasm: 61.0% Scoliosis: 22.0% Claudication: 14.6% Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 41)– E-Acu: 10-15 needles inserted in painful points to depth of 1-5cm.20min/session, current with 2-10 mA intensity and 4 HZ frequency; NR Drop outs: NR IG2 (n = 38) – Physiotherapy: 30min/session, hot packs, ultrasound, short-wave diathermy, TENS, muscle strengthening; NR Drop outs: NR CG (n = 40) – Placebo: instead of needles, pts set on intended points by adhesives, after turning machine on the current intensity was zero; sessions every other d for 1 mo Drop outs: NR	**Outcome instruments:** Pain: Pain reduction (%) Disability: NA **Results:** NA Baseline: Pain: Disability: Immediate post tx: Pain reduction, mean % (SD): 62.1 (18.6) vs. 52.5 (17.5) vs. 17.5 (12.7), p < 0.05 Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Other: complication reduction **Results:** Immediate post tx: 89.3% vs. 51.8% vs. 31.9% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** E-Acu more effective in resolving symptoms compared to PT or placebo

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Inoue, M (2006)[30] Country: Japan Quality score: 9/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: single tx Final assessments: immediately post tx N screened: NR N randomized: 31 N completed tx: 31 N attended last fu: NR **Inclusion:** pts consulted for LBP, newly referred and those re-attending, with only LBP in a limited area, which was exacerbated in particular posture **Exclusion:** pts with leg symptoms, those unable to locate area of pain, pain was not worsened by changes in posture; pts with symptoms or findings on imaging indicating need for Med /surgery/underlying disease	Mean age (SD/range): IG = 68 (6), CG = 70 (8) yrs % of male: IG = 73.3%, CG = 62.5% Racial composition: NR (assume 100% Asians) Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** lumbar vertebral arthritis (dx by MRI or radiological findings) **Duration of Pain:** Subacute; chronic, IG = 83 (39), CG = 84 (46) mos **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 15)– Acu: needle (L: 40 mm; D: 0.18 mm- by Seirin Co. Shizauoka, Japan) inserted to a depth of 20 mm at the most painful point and stimulated the needle with sparrow pecking method for 20 seconds; 1 tx Drop outs: 0 CG (n = 16) – Sham Acu: therapist taped the end of guide tube on the skin at the most painful point, without a needle and acted as if they were insuring a needle; 1 tx Drop outs: 0	**Outcome instruments:** **Pain:** Pain (VAS- 0= no pain; 100= worse pain) at time B while adopting the most painful position **Disability:** range of lumbar spinal flx- not abstracted **Results:** Baseline: Pain: IG = 61 (11), CG = 61 (9) Disability: NR Immediate post tx: Pain: IG = 47 (7), CG = 55 (13) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Other: Results: Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR Harms: NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Inoue, M (2000)[31] Country: Japan Quality score: 10/13 Initial of reviewer: SG	**Trial Design - RCT** Tx duration: single tx Fu duration: NR N screened: NR N randomized: 27 N completed tx: 27 N attended last fu: NR **Inclusion:** Pts with chronic lumbago who attended the university acu clinic as outpt, consent to attend trial **Exclusion:** neurological findings, pain or numbness in lower extremity; malignancy, infection or inflammatory disease; fracture; lumbago due to urological problem, gynecological problem, digestive problem or cardio-vascular problem; dementia; pregnancy	Mean age (SD/range): IG = 59.6 (21.1) vs. CG = 60.1 (20.7) yrs % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Non S Duration of Pain: chronic, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 15) **–** Acu: two needling points chosen bilaterally from lumbar area(4 points): BL52 and EX-B7, needles inserted and sparrow-picking technique performed for 20 sec, pts treated one time immediately before regular acu tx; single tx Drop outs: 0 CG (n = 12) – Sham acu: two needling points chosen bilaterally from lumbar area (4 in total) same points as IG, mimicked needle insertions: tapped head of needle guide tube, gesture needling performed for 20 sec, pts treated one time immediately before regular acu tx; single tx Drop outs: 0	**Outcomes:** Pain: VAS of pain at the most restricted action (10 cm) **Results:** Baseline: **Pain:** IG = 6 (1.7), CG = 5.4 (1.8) Immediate post tx: Pain: IG = 3.9 (2.6), CG = 3.6 (2.1) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Other: NR **Results:** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Itoh, K (2009)[32] Country: Japan Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 5 wks Final assessments: 10 wks N screened: NR N randomized: 32 N completed tx: 25 N attended last fu: 26 **Inclusion:** outpts older than 60 yrs+; with lumbar or lumbosacral LBP for at least 6 mos; no radiation of LBP; normal neurological findings of lumbosacral nerve **Exclusion:** if receiving acu > 6 mos; major trauma or systemic disease; receiving conflicting or ongoing co-interventions	Mean age (SD/range): total: range 61-81 yrs % of male: 37.5% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S **Duration of Pain:** chronic (> 6 mos) **Severity of pain (Grading): NR** **Co-interventions:**n o intake of other tx including analgesics, anti-inflammatory agents or poultice containing methylsalicylic acid during the study	**Groups** IG1 (n = 8)– Acu: (BL23), (BL25), (BL32), (BL40), (BL60), (GB30) and (GB34). Stainless steel needles (0.2 mm x 40 mm, Seirin Co Ltd) inserted into the muscle to a depth of 10 mm using 'sparrow pecking' technique for 15 minutes on the affected LBP; 1 tx/wk for 5 wks Drop outs: 1 IG2 (n = 8)– TENS: 15 min on most tender point and near side of point; as IG1 Drop outs: 2 IG3 (n = 8)– Acu + TENS: 15 minutes of TENSE + 15 min of acu as described for grp 1 and 2; as IG1 Drop outs: 3 CG (n = 8) – transverse oscillatory rotical poutice: transverse oscillatory rotical poutice only when necessary; NR Drop outs: 1	**Outcomes:** **Pain:** VAS 10 cm (lower better) **Disability:** (RDQ)-24 items **Results-Baseline:** **Pain** **Immediate post tx:** IG1 = 37.4 (25.9), IG2 = 53.2 (25.1), IG3 = 36.8 (53.1 (27.9) RMD, mean: IG1 = 5.4, IG2 = 6.2, IG3 = 3.8, CG = 7.3 **Short term:** IG1 = 43.3 (25.7), IG2 = 58 (23.7), IG3 = 49.2 (10.3), 58.1 (28.9) RMD-mean: IG1 = 6.7, IG2 = 7.5, IG3 = 6.5, CG = 7.7 Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Results: Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR Harms: deterioration of symptoms: IG3 = 1 dropout, 12.5%

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Itoh, K (2006)[33] Country: Japan Quality score: 8/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 3-12 wks Final assessments: immediately post tx N screened: 26 N randomized: 26 N completed tx: 23 N attended last fu: NR **Inclusion:** pts aged at least 65 yrs with tx of LBP- lumbar or lumbosacral pain for at least 6 mo; leg pain if minor severity in comparison to back pain; normal neurological exam findings of lumbosacral nerve function **Exclusion:** major trauma or systemic disease; other conflicting or on-going txs; pts with medical conditions were included if there had been no change in drugs or dosage	Mean age (SD/range): IG = 73.5 (10) vs. CG = 78.8 (4.7) yrs % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Spondylosis/ Osteoporosis/ compression /fracture Duration of Pain: chronic, IG = 4.2 (3.5); CG = 5.4 (6.2) yrs Severity of pain (Grading): NR Co-interventions: baseline meds: anti-inflammatory poulitice Med CG=3/13	**Groups** IG (n = 13)– Trigger point Acu: needles (0.2 mm x 50 mm, Seirin, Japan) were inserted into the skin over the TP to a depth of 10-* 40 mm, appropriate to the target muscle. Attempt to elicit a local muscle twitch response using the 'sparrow pecking' technique- needle retained for 10 min post appropriate response; 3 tx/wk, 3-12 wks trial, total 36 tx Drop outs: B = 1 CG (n = 13) – Sham: similar needles as IG used but the tips had been cut off to prevent the needle penetrating the skin. The cut ends were smoothed with sandpaper manually; same as IG Drop outs: B = 2	**Outcome instruments:** Pain: Pain: VAS 10 cm scale, A, B Disability: RMQ (RMQ) **Results:** Baseline: Pain: IG = 65 (13.1); CG = 69 (12.5) Disability: NR Immediate post tx: Pain: IG = 27.3 (13.5); CG (n = 11)= 69.6 (10.9) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** deterioration of symptoms (n = 1) withdrawal due to AE **Summary:** RMQ: IG scored significantly lower scores (P < 0.01) than CG - harms of tx are NR (1 WDAE, which was after the 1st period-data is not extracted)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Kerr, P (2003)[34] Country: Northern Ireland Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 6 wks Final assessments: 6 mo N screened: 60 N randomized: 60 N completed tx: 32 N attended last fu: 34 **Inclusion:** LBP symptoms > 6 mos (rule out natural recovery processes), with or without leg pain, and with no neurologic deficits **Exclusion:** contraindications to acu therapy, <18 yrs, pregnancy, underlying systemic disorders and diagnoses of rheumatoid arthritis, osteoarthritis of the spine or cancer.	Mean age (SD/range): IG1 = 42. 6 (11.5), IG2 = 42.8 (12), CG = 36.1 (14.9) yrs % of male: IG1 = 50%, IG2 = 35%, CG = 57% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities:NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S (IG1-some with leg pain, detail NR) Duration of Pain: Chronic, IG1 = 86.1 (84.9), IG2 = 72.8 (77.4), CG = 51.6 (44.2) mos Severity of pain (Grading): NR Co-interventions: Pts already on pain Med but details are NR	**Groups** IG1 (n = 26)– Acu: Bl23, Bl25, GB 30, Bl40, Ki3 and Governor Vessel 4. 11 needles/session, (Seirin acu needles N8, 0.30 x 50mm, c-type needle). The needles were inserted until the sensation of 'ch'i" was produced in prone position. Pts also given leaflet regarding LBP that included standardized advice and EXs; 30min/tx, 1tx/wk for 6 wks Drop outs: 14 IG2 (n = 20)– Placebo-TENS: A nonfunctioning TENS machine was attached to 4 electrodes placed over the lumbar spine; same as IG1 Drop outs: 14 CG (n = 14) – Non-attendees: NR; NR Drop outs: NR	**Outcome instruments:** Pain: PRI; VAS (mm) Disability: NA **Results:** Baseline: Pain: IG1 = 29 (11.1), IG2 = 28.5 (13); IG1 = 79.7 (20.3), IG2 = 76 (17.6) Disability: NA Immediate post tx: Pain: IG1 = 20.3 (9), IG2 = 23.7 (13); IG1 = 51.3 (22.4), IG2 = 61.7 (30.6) Disability: NA Short term: NR Intermediate: N of pts with >50% pain reduction on scale: IG1 = 91%, IG2 = 75% Long term: NR	**Outcome instruments:** QoL/ well being: SF- 36 (short form 36) Other: **Results:** Baseline: IG1 = 52.3 (18.7), IG2 = 47.3 (23.7) Immediate post tx: IG1 = 63.9 (20.3), IG2 = 57.5 (23.2) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Kwon, Y.D (2007)[35] Country: China Quality score: 7/13 Initial of reviewer: SG	**Trial Design-** RCT Tx duration: 4 wks Final assessments: immediately post tx N screened: 57 N randomized: 50 N completed tx: 47 N attended last fu: 50 **Inclusion:** lumbar or lumbosacral pain for duration of at least 3 mos; older than 20 yrs of age, LBP as main complaint; normal neurological examination; **Exclusion:** potential lumbar disease; other diseases such as bleeding, dementia, epilepsy, neurogenic disorder or systemic disease), planned lumbar surgery, prior use of acu within past 6 mo, current use of systematic corticosteroids	Mean age (SD/range): NR (no sign. diff. between grps in age) % of male: IG = 46%, CG = 21% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Non S Duration of Pain: unit NR – mean: IG = 7.38 (6.66), CG = 9.96 (7.14) Severity of pain (Grading): mild: IG = 6 (25%), CG = 5 (21.7%); moderate: IG = 14 (58%), CG = 14 (60.9%); severe: IG = 4 (16.7%), CG = 4 (17.4%) Co-interventions:NR	**Groups** IG (n = 25) – Acu: ME by reinforcing and reducing by lifting and thrusting needle in 20 min and pts felt de-qi sensation(needles 0.25 mm x 40 mm) inserted into acupoints at depth of 25-30 mm, acupoints: BL 23, BL 52, BL 29, CV2, and GB 30; 3 tx/wk for 4 wks, total of 12 sessions Drop outs: A = 2 CG (n = 25) – Sham acu: ME was not used during the 20 mintues period and subjects did not feel De-qi. Same needles inserted into non acupoints, at depth of 10 - 20 mm away from the acupoints of intervention grp; same as IG Drop outs: A = 1	**Outcome instruments:** Pain: VAS scores Disability: RDQ **Results:** Baseline: Pain: IG = 52.24 (19.76), CG = 51.28 (21.24) Disability: IG = 6.32 (3.86), CG = 6.76 (4.75) Immediate post tx: Pain: IG = 33 (15.75), CG = 35.52 (15.22) Disability: IG = 5.16 (4.86), CG = 4.92 (4.83) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: PGA, Pt global assessment **Results:** Baseline: IG = 20.76 (8.97), CG = 21.08 (10.02) Immediate post tx: IG = 16.6 (7.2), CG = 18 (6.7) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Lehmann, TR (1983)[36] Country: Iowa-University hospital Quality score: 1/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 3 wks Final assessments: 3-6 mos N screened: NR N randomized: 54 N completed tx: 32 N attended last fu: NR **Inclusion:** Pts with chronic disabling LBP who demonstrate at least minimal levels of motivation and in whom the level of disability would warrant the expense of inPt tx **Exclusion:** candidates for lumbar surgery; LBP < 3 mos; pregnancy; osteomyelitis of spine, discitis, tumor, ankylosing spondylitis, vertebral fractures and structural scoliosis	Mean age (SD/range): Rprtd for total grp: 39 yrs (range 20-59) % of male: total: 67% Racial composition: NR Work status: total: 94% receiving compensation Other socio-demographics: total: 93% married Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S **Duration of Pain:** Chronic, total: 48% > 18 mo; 35% between 6-18 mo; 17% between 3-6 mo **Severity of pain (Grading):** NR **Co-interventions:**comprehensive multidisciplinary educational program and twice daily EX training sessions. 2 pts were depressed and received tx by a psychiatrist	**Groups** IG (n = 17)– Acu: stimulus was a biphasic wave at a frequ of 2-4 Hz and increased to the pts level of tolerance. Visible muscle contractions usually occurred. Stimulation loci were along the inner and outer bladder m; 2 tx/wk for 3 wks Drop outs: A = 0, B = 5 D = 0 IG2 (n = 18) –TENSE: stimulated the pts at a pulse width of 250/sec, freq of 60 Hz, and sub threshold intensity- point of stimulation were over the center of pain. pts with leg pain, stimulation was also performed over related nerves.; 1tx/daily for 3 wks Drop outs: B = 4, D = 0 CG (n = 18) – Sham TENSE: same as IG2; same as IG2 Drop outs: B = 3, D = 2	**Outcome instruments:** Pain: NA Disability: NA **Results:** NA Baseline: Pain: Disability: Immediate post tx: Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Results: Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Leibing, E (2002)[37] Country: Germany Quality score: 2/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 24 ds Final assessments: 1 yr + N screened: 208 N randomized: 131 N completed tx: 114 N attended last fu: 131 **Inclusion:** Non-radiating pain for more than 6 mo. Age 18-65 yrs **Exclusion:** Abnormal neurological status, concomitant severe disease, psychiatric illness, current psychotherapy, pathological lumbosacral anterior-posterior and lateral X-rays (except for minor degenerative changes), rheumatic inflammatic disease	Mean age (SD): IG1 = 47.9 (11.1), IG2 = 49 (9.4), CG = 47.5 (8.9) yrs % of male: NR Racial composition: NR Work status: Employed, n (%):107 (81.4%) Other socio-demographics: Married: 74.8% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: IG1 = 4 (10), IG2 = 2 (4.4), CG = 4 (10.9)	**Cause of Pain:** N-S **Duration of Pain:** Chronic, IG1 = 8.7 (7.7), IG2 = 9.5 (8.3), CG = 10.6 (8.7) yrs **Severity of pain (Grading):** NR **Co-interventions:**analgesic Med use, n (%): IG1 = 24 (60), IG2 = 20 (44.4), CG = 22 (47.8)	**Groups** IG1 (n = 40)– Body and ear Acu+ Physio: 20 fixed body acupoints) and 6 on the ear (alternately on one ear); 20 sessions total, 5 tx/wk for first 2 wks and once/wk for next 10 wks Drop outs: A-B = 5, E= 2 IG2 (n = 45) – Physio: According to Bruggar-concept, aim was to remove a muscle imbalance through special training of proper posture and motion; total of 26 sessions, 30 min/tx over 12 wks Drop outs: A-B = 5, D= 9 CG (n = 46) – Sham-Acu + Physio: Needles were inserted superficially, 10-20 mm distant to the verum-acupoints, outside the meridians, and were not stimulated (no "de qi"); as other groups Drop outs: A-B= 7, D = 9	**Outcome instruments:** **Pain:** 10cm VAS**;** Pain Disability Index **Results:** **Baseline:** **Pain:** IG1 = 4.8 (1.8), IG2 = 5.3 (1.8), CG = 5.4 (1.9) P = 0.0009; IG1 = 25.2 (13.4), IG2 = 25.5 (10.4), CG = 24.9 (13.7) P = 0.0001 **Immediate post tx:** **Pain:** NR Short term: P value: IG1 = 1.8, IG2 = 2.2, CG = 2; IG1 = 12.5, IG2 = 11.3, CG = 10 Intermediate: NR Long term: NR	Outcome instruments: QoL/ well being: NA Results: Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** painfulness of acu (2), problem with circulation (1), IG1 = 7.5%

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Li, N (2005)[38] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 4 wks Final assessments: immediately post tx N screened: 60 N randomized: 60 N completed tx:60 N attended last fu: NR **Inclusion:** LBP and duration of pain >1 yr; age:18- 70 yrs; Oswestry LBP disability index > 30; Pts adhere to be follow-up **Exclusion:** Infection, tumor, osteoporosis, rheumatoid arthritis, fracture, radiating pain	Mean age (SD/range): IG = 57 (16) vs. CG = 56 (19) yrs % of male: IG = 38.7%; CG = 48.3% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic (>1yr), IG = 7.4 (5.3) yrs; CG = 8.1 (5.7) yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 31)– Acupuncture: acu at Shenyu, Dachangyu, Ashi, Weizhong, Chengshan, Kunlun, Fuliu; 35min/d x 5/wk x 4 Drop outs: 0 CG (n = 29) – Physiotherapy: light, electricity, heat; same as IG Drop outs: 0	**Outcome instruments:** Pain: Ovarall efficiency(B); Relapse rate(D) Disability: Oswestry LBP disability index(A,B) **Results:** Baseline: Pain: NR; NR Disability: IG = 38.58 (5); CG = 40.24 (5.8) Immediate post tx: Pain: NR; NR Disability: IG = 11.55 (3.24); CG = 18.83 (5.24) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms: NR** **Summary of results (if provided)** Acupuncture is better than hysiotherapy

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
MacDonald, AJR (1983)[39] Country: England/UK Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 17 N completed tx: NR N attended last fu: NR **Inclusion:** Patients with CLBP which had failed to derive relief from conventional methods; referred back pain for at least one yr. **Exclusion:** NR	Mean age (SD/range): NR % of male: IG = 25% vs. CG = 33% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Mixed-Specific, NR Duration of Pain: Chronic, NR Severity of pain (Grading): VAS rating 0-10 (measurement of pain; pain relief) Co-interventions:Asked to continue existing drug regimens and other forms of support as required	**Groups** IG (n = 8)– Acu: TPs found by palpation 30-guage(0.32mm diameter) needles inserted to depth of 4mm for 5 min for 1st tx to provide noxious stimulus, doubled if failed, E-acu performed if failed; 1tx/wk, increased as required Drop outs: NR CG (n = 9) – Placebo: TPs found by palpation and standard electroenceplalographic electrodes (1cm in diameter) were attached over tender regions. The electrodes were attached by wires to the apparatus. Tx time was doubled if no beneficial results produced; same as IG Drop outs: NR	**Outcome instruments:** Pain: numerical scale: 1 - 3 improvements recored as minimal (1 – 24%), moderate (25-49%), good (50-74%) and excellent (75-99%) **Results:** Immediate post tx: proportion with pain relief: 77.35 vs. 30.14 pain score reduction (%): 57.15 vs. 22.74 activity pain score reduction (%): 52.04 vs. 5.83 Physical sign reduction (%): 96.78 vs. 29.17, p < 0.01 Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: Combined average reduction (%) Immediate post tx: 71.7 vs. 21.35 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Mendelson, G (1983)[40] Country: Australia Quality score: 6/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 4 wks Final assessments: immediately post tx N screened: NR N randomized: 77 N completed tx: 72 N attended last fu: NR **Inclusion:** CLBP, no litigation or compensation claims pending, no overt psychiatric illness, ability to read and write in English **Exclusion:** NR	Mean age (SD/range): IG = 54.5 (11.8), CG = 53.6 (11.9) % of male: IG = 52.8%, CG = 43.9% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: 13 for both groups Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR **Duration of Pain:** Chronic, IG = 12.3 (10.9), CG = 12.1 (10.8) yrs **Severity of pain (Grading):** NR **Co-interventions:** NR	**Groups** IG (n = 36)– Acu: pt prone, needles inserted: for LBP, points 23,25,36 & 40 on urinary bladder meridian; if sciatica present, points 30, 34,39 & 60 on gallbladder meridian. Needles stimulated mentally until "the 'chi" sensation of heaviness and numbness elicited, then left for 30 min, avg of 8needles/tx; 30 min/tx, 2tx/wk for 4 wks Drop outs: A=? B=5 (total for both groups) CG (n = 41) – Placebo: intradermal injection of 2% lidocaine given at non-acu, non-tender sites in lumbar area, acu needles superficially inserted into infiltrated areas for 30 min, similar n of needles used; same as IG Drop outs: see IG	**Outcome instruments:** **Pain:** 1)VAS 100mm for pain (0-100) (A, B); McGill Pain Questionnaire (PRI, PPI) (A, B) **Results:** Baseline: Pain: VAS: IG = 50.5 (20.4), CG = 53.7 (25) Immediate post tx: Pain: VAS: IG = 30.2 (18), CG = 40 (24.3) (P<0.001) McGill(PRI)-mean: IG = 38%, CG = 42%; McGill (PPI)-mean: IG = 27%, CG = 30% Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Other: Results: Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR Harms: NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Mendelson, G (1978)[41] Country: Australia Quality score: 1/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 4 wks Final assessments: immediately post tx N screened: NR N randomized: 77 N completed tx: NR N attended last fu: NR **Inclusion:** CLBP, no Litigation or compensation claims pending, no overt psychiatric illness, fluent in English, referred by their attending doctor **Exclusion:** NR	Mean age (SD/range): 53.5 yrs(of both groups) % of male: 48% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR **Duration of Pain:** Chronic, 11.7 yrs(for both groups) **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 36)– Acu: Inserting a N of needles intramuscularly in the LB region and stimulating them manually; 30 min/tx, 2 tx/wk for 4 wks Drop outs: NR CG (n = 41) – Placebo: Acu needles were inserted subcutaneously, a small amount of local anesthetic was injected through them and the needles were not stimulated; same as IG Drop outs: NR	**Outcome instruments:** **Pain:** VAS 100mm for pain (0-100) (A, B) **Results:** Baseline: Pain: IG = 50.8 (20.4), CG = 52.3 (24.3) Immediate post tx: Pain: IG = 35 (22.2), CG = 38.5 (26.9) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Results: Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR Harms: NR **Summary:** No raw data reported for the following outcomes: 1) McGill Pain Questionnaire 2) Analgesic Intake 3) Spinal Mobility 4) Subjective rating of pain and disability

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Meng, CF (2003)[42] Country: NY-US Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 2 wks Final assessments: immediately post tx N screened: 250 N randomized: 55 N completed tx: 55 N attended last fu: 55 **Inclusion:** chronic N-S LBP > 12 wks; age 60 yrs or more; radiography within past yr **Exclusion:** S LBP; lumbar surgery; prior use of acu; use of corticosteroids, muscle relaxants, narcotics, anticoagulants, epidural steroid injections within past 3 mo	Mean age (SD/range): IG = 72 (5) vs. CG = 70 (6) yrs % of male: IG = 42%, CG = 37.5% Racial composition: 84.7% Caucasian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S % S: buttock pain: IG = 48.4%, CG = 25% Duration of Pain: chronic, IG 12 (16), CG = 12 (14) yrs Severity of pain (Grading): NR Co-interventions: Nsaids: Non-narcotic analgesic agents: aspirin: Muscle Relaxants	**Groups** IG (n = 31)– Acu: aseptic technique and disposable, sterile needles .. Deqi sensation; ES 4-6 Hz; 10-14 needles; 20 minutes; acu protocol; biwkly 5 sessions, 10 sessions total Drop outs: NR CG (n = 24) – Usual care: NSAIDs, analgesics, EXs; NR Drop outs: NR	**Outcome instruments:** Pain: VAS- word anchors (ITT) Disability: mRDQ-(ITT) **Results:** Baseline: Pain: IG = 1.6 (1); CG = 1.7 (1) Disability: IG = 9.8 (3.6); CG = 11.8 (5.3) Immediate post tx: Pain: IG = 1.6 (NR); CG = 1.1 (NR) Disability: IG = 13.1; CG = 12.4 Short term: VAS: IG = 1.4 (NR), CG = 2.4 (NR); RDQ: IG = 6.3 (4.4), CG = 11.4 (4.8) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: **Results:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** acu is effective, safe adjunctive tx for CLBP in elderly-small sample size study.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Molsberger, AF (2002)[43] Country: Germany Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: 3 mos N screened: NR N randomized: 186 N completed tx: 174 N attended last fu: 186 **Inclusion**: pain for at least 6 wks; average pain score of at least 50mm on a 100mm VAS during the last wk, age 20 - 60 yrs, the ability to communicate in German **Exclusion:** sciatica or other neurological disorders; history of disc or spine surgery; systematic bone and joint disorder	Mean age (SD/range): IG1 = 49 (8), IG2 = 50 (6), CG = 49 (7) yrs % of male: IG1 = 44.6 – 53.3% Racial composition: NR Work status: NR Other socio-demographics:# of d in hospital: IG1 = 31.4 (5.4), IG2 = 32.4 (6.2), CG = 31.7 (5.8) Co morbidities:NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, IG1 = 11.5 (9.2), IG2 = 9.9 (7.7), CG = 8.1 (5.7) Severity of pain (Grading): NR Co-interventions: % of pts with diclofenac intake: IG1 = 18%, IG2 = 20%, CG = 15%	**Groups** IG1 (n = 65)– Verum acu+conventional orthopedic therapy. Always a numb, warm feeling around the acu point (Deqi) was achieved; 30min/tx, 3tx/wk Drop outs: B = 7, C = 11 IG2 (n = 61)– Sham Acu+ conventional orthopedic tx: 10 needles applied at depth < 1 cm at lumbarnon-acu points, and 5 needles on either side of the back; same as IG1 Drop outs: B = 3, C = 17 CG (n = 60) – nil + conventional orthopedic therapy: daily PT, physical EXs, back school, mud packs, infrared heat therapy. 50mg diclofenac on demand up to 3 /d; NR Drop outs: B = 2, C = 22	**Outcome instruments:** Pain: VAS: mean pain intensity (ITT) Disability: NA **Results:** Baseline: Pain: IG1 = 68 (17), IG2 = 64 (11), CG = 67 (14) Disability: NA Immediate post tx: Pain: IG1 = 26 (21), IG2 = 36 (19), CG = 39 (21); N of pts with >50% pain reduction: IG1 = 65%, IG2 = 34%, CG = 43% Disability: NA Short term: IG1 = 23 (20), IG2 = 43 (23), CG = 52 (19) N of pts with >50% pain reduction:IG1 = 77%, IG2 = 29%, CG = 14% Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA **Results:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** night pain (n of no ro mild/no of moderate to severe):IG1 = 31/28, IG2 = 28/32, CG = 23/36

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Sakai, T (1998)[44] Country: Japan Quality score: 0/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 2 wks Final assessments: Post-tx N screened: NR N randomized: 26 N completed tx: 26 N attended last fu: 26 **Inclusion:** N-S LBP **Exclusion:** osteoarthritis of lumbar-spine, osteoporosis, other S causes of pain; diabetes or malignancy; increase of CRP or ESR; Med of corticosteroid, immunosuppressant agent, NSAID or muscle relaxant; problem of general condition; dementia; pregnancy; elderly pt.	Mean age (SD/range): IG = 50.8 (18.1) vs. CG = 53.8 (8.5) yrs % of male: IG = 28.6%, CG = 25% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, IG = 92.5, CG = 25.5 Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 14)– Acupuncture: There is no information about stimulation technique and insertion depth. Needling points in lumbar part were chosen from BL23, 25, 32, 52 and 2 extra channel points, and that in L/E were chosen from BL37, 40, 57, ST36, GB34 by palpation. Acupuncture tx was performed 3 times; 2 tx/ wk, 2 wks, 4 tx total Drop outs: NR CG (n = 12) – Medication (NSAID): Medication which includes NSAID or kampo medicine; NR Drop outs: NR	**Outcomes:** Pain: Subjective symptoms in JOA score(3 pt); Pain relief score Disability: ADL in JO score (14 pt) **Results:** Baseline: Pain: IG = 1.3 (0.5), CG = 1.4 (0.5); IG = 10 (0) Disability: IG = 7.6 (2.3), CG = 10.3 (1) Immediate post tx: Pain: IG = 2.4 (0.5), CG = 2.5 (0.5); IG = 2.3 (1.5) Disability: IG = 12.1 (2), CG = 13.3 (0.8) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Other: NA **Results:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Duration of LBP in acu group may be longer than that in Med group. ADL score in JOA score in acu group was lower than that in Med group, disability in acu group may be more severe than that in Med group

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Sator-Katzenschlager, SM (2004)[45] Country: Austria Quality score: 9/13 Initial of reviewer: SG	**Trial Design**RCT- Tx duration: 6 wks Final assessments: immediately post tx N screened: 87 N randomized: 61 N completed tx: 55 N attended last fu: NR **Inclusion:** Lumbar LBP of at least 6 mo, normal neurologic function of lumbosacral nerves, no pain radiation, persisting pain intensity VAS => 5 despite after taking therapy with lornoxicam and tramadol **Exclusion:** Allergy against lornoxicam or tramadol, history of drug abuse, pregnancy, concomitant use of TENS or pacemaker, history of Acu	Mean age (SD/range): IG = 54.1 (12.3) vs. CG = 53.1 (12.1) yrs % of male: 0.3% **Racial composition:** NR **Work status:** NR **Other socio-demographics:** NR **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** 36 pts had LBP of muscular origin, 25 pts had additional severe skeletal changes on radiograph/resonance imaging of spine, including spondylarthrosis and localized disc protrusion **Duration of Pain:** Chronic, 4.6 (1) yrs **Severity of pain (Grading):** VAS ≥ 5 **Co-interventions:**NR	**Groups** IG (n = 31)– Auricular E-Acu: frequency of stimulation was 1 Hz, high phase was from 1 to 10 ms. After 3 hrs of stimulation, 3 hrs break, max current: 4 mA and Titan needles (27-gauge, 3 mm length) inserted in lumbar spine, 40; shen men, 55; and cushion 29; 48hrs/session, 1 session/wk for 6 wks Drop outs: 2 CG (n = 30)– Auricular Acu: same as IG Drop outs: 4	**Outcomes:** Pain: Pain intensity (VAS) = numerical data NR Disability: NA **Results:** Baseline: **Pain: NR** Immediate post tx: Pain: NR Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: QOL, well being = numerical data NR **Return to work:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR Return to work 10 (77%) vs. 3 (25%) **Harms:** NR **Summary:** Decrease in pain intensity significantly greater in E-Acu vs. Acu. Increase in psychological well-being, physical activity, and quality of sleep greater in E-Acu vs. Acu.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Takeda, H (2001)[46] Country: Japan Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Final assessments: immediately post tx N screened: NR N randomized: 20 N completed tx: 18 N attended last fu: NR **Inclusion:** Students of acu college who are suffering from lumbago **Exclusion:** no information [students who have sciatica(info from author)]	Mean age (SD/range): IG = 26.4 (6.4) vs. CG = 35.8 (9.3) yrs % of male: ratio: IG – 8/2, CG – 9/1, majority male Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, IG = 40.4 (75.9); CG = 810 (76.5) mos Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 10)– Distal point needling: acupoints in lumbar area: BL23 and EX-B7, mimicked needle insertion:tapped head of needle guide tube, gesture of needle performed. Acu points in BL37, 40 and 58 needles by real acu needle (40 mm in length and o.2 mm in diameter) insertion depth of 1-2 cm, sparrow pecking techn. Done 5 times then removed; 2tx/wk for 3 wks Drop outs: 1 CG (n = 10) – Lumbar area needling: same point in lumbar area needled by real acu needle, same needles as IG used, sparrow pecking tech. 5 times, same acupoint for lower extremity mimicked needle insertion: tapped head of needle guide tube, gesture needling performed; same as IG Drop outs: 1	**Outcome instruments:** Pain: VAS; PPT threshold at lumbar; PPT threshold at foot Disability: ADL score **Results:** Baseline: Pain: IG = 35.9 (16.2), CG = 27.4 (21.9); IG = 5.2 (3.3), CG = 6.6 (2); IG = 2.4 (1.6), CG = 3 (1.1) Disability: IG = 13.9 (2), CG = 14.2 (2.5) Immediate post tx: Pain: IG = 28 (24.3), CG = 17 (20.9); IG = 5.3 (3.3), CG = 6.5 (2.1); IG = 2.7 (2), CG = 2.7 (1.5) Disability: IG = 14.4 (1.6), CG = 15 (1.4)	**Outcome instruments:** QoL/ well being: **Results:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Thomas, A (1994)[47] Country: Sweden Quality score: 4/13 Initial of reviewer: SG	**Trial Design** **RCT** **Tx duration:** 6 wks **Final assessments:** 6 mos **N screened:** NR **N randomized:** 43 **N completed tx:** 40 **N attended last fu:** NR **Inclusion:** pts with chorinc LBP treated at two clinics; sudden or insidious onset of LBP with or without trauma; duration > /= 6 mo; remissions and occasional pain free intervals; recurrences with pain of variable intensity; **Exclusion:** major depressive illness or neurosis, past back surgery; other significan systemic or neurological disorders	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Osteroarthiris of lumar, or sacrolilac joint with sciatica, intervertebral disc degeneration, lubar strain with sciatica, osteoporosis with dorsolumar strain; chronic disc prolapse; chronic lumbar strain **Duration of Pain:** chronic (at least 6 mos) **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 33)– Acu: ME of needles, low freq. e-stimul. At 2Hz and high freq. at 80 Hz 3 tx, each 30 min of MS, LFES or HFES, then continued tx with preferred mode for 6 wks Drop outs: A = 3 CG (n = 10) – Waiting list: NR; NR Drop outs: 0	**Outcomes:** **Pain:** activities with < 50% pain- no numerical data- p values reported **Short term: NR** **Intermediate: NR** **Long term: NR** **Note:** data is presented in bar graphs and not extracted in this report.	Outcome instruments: QoL/ well being: Other: ROM Results: Immediate post tx: no numeric data provided Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Results suggest that 2Hz ES is the mode of choice when using acu in the tx of chronic nociceptive LBP

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Tsui MLK (2004)[48] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 4 wks Final assessments: 3 mos N screened: NR N randomized: 42 N completed tx: 42 N attended last fu: 42 **Inclusion:** Pts aged 20-55 yrs with LBP radiating down to the thigh or calf for => 3 mo mechanical cause but not from cancer or TB, with positive SLR findings **Exclusion:** Repeated history of LBP, hip/back previous surgery, spinal stenosis with claudication, spine fracture, systemic arthritis, spondylolisthesis grade 3-4,osteoporosis	Mean age: 40.0 yrs % of male: IG1 = 24%, IG2 = 29%, CG = 40% Racial composition: All Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Mechanical conditions but not cancer Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR **Duration of Pain:** Chronic, NR **Severity of pain (Grading):** NR **Co-interventions:**instructed to perform same set of back EX as in the Exercise group; analgesics	**Groups** IG1 (n = 14)– E-acu: dual channel machine with freq. of 1 Hz-999 Hz, 4 local points over bilateral side of LB and 2 over the buttock/ leg, needles inserted to achieve “de qi”, needles in acu points BL-26 and GB-30 were attached to the machine; 2 tx/wk for 4 wks, 8 sessions total each 20 min Drop outs: 3 total NR IG2 (n = 14) – E-heat acu: machine used to produce heat + needles, 4 channels delivered 38-48°C, same acupoints as IG1; same as IG1 CG (n = 14) – Exercise: back Mob and abdominal stabilization; 6 BM x 20, 1 AS x 10, 3 times/d	**Outcomes:** **Pain:** Pain intensity (VAS) Disability: RMDQ **Results:** Immediate post tx: Pain: IG1 = 3.07 (1.9), IG2 = 2.86 (1.75), CG = 5.5 (1.83) Disability: IG1 = 8.57 (4.01), IG2 = 7.93 (5.14), CG = 9.36 (3.56) Short term: VAS-IG1 = 2.43 (1.87), IG2 = 2.27 (2.15), CG = 5.21 (1.88) P = 0.001 RMDQ – IG1 = 7.64 (3.75), IG2 = 8.36 (4.65), CG = 8.79 (3.4) Intermediate: RMDQ – IG1 = 5.93 (3.79), IG2 = 8 (5.66), CG = 8.57 (3.48)	**Outcome instruments:** QoL/ well being: NA Results: NA Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Witt, CM (2006)[49] Country: Germany Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 3 mos Final assessments: 1 yr N screened: 11630 N randomized: 2840 N completed tx: 2840 N attended last fu: 2518 **Inclusion:** clinical diagnosis of CLBP lasting more than 6 mo; aged ≥ 18, provision of written informed consent **Exclusion:** protusion or prolapse of one or more intervertebral discs with concurrent neurologic symptoms; other S causes of pain	**Mean age (SD/range):** IG = 53.1 (13.5) vs. CG = 526 (13.2) yrs **% of male**: IG = 42.3%; CG = 43.1% **Racial composition:** NR **Work status:** NR **Other socio-demographics:** NR **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S **Duration of Pain:** Chronic, IG = 7.2 (8) yrs; CG = 7.2 (7.8) yrs **Severity of pain (Grading):** NR **Co-interventions:**usual care	**Groups** IG (n = 1451) –Acu: disposable needles- at acu points decided by the treating physician; 3 mo tx phase, max 15 tx, 74% received 5-10 sessions, 21 received>10 sessions, 5% received< 5 sessions Drop outs: C = 88, D= 130 CG (n = 1390) –Control: NR; 3 mo tx phase Drop outs: C = 130, D = 193	**Outcomes:** Pain: BP score Disability: Back function; HFAQ **Results:** Baseline: Pain: mean-change from A: IG = 37%; CG = 9.8% Immediate post tx: Pain: --- Disability: Mean change from A: IG = 33.3%, CG = 11.3%; IG = 12.1, CG = 2.7 Short term: Pain: IG = 33.5%, CG = 30.8% Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: SF-36- health related QoL A, B, C **Results:** Baseline: IG = 34.3 (9), CG = 34.6 (9.6) (P<0.001) Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Yeung, KN (2003)[50] Country: Hong Kong Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4 wks Fu duration (last assessment: 3 mos N screened: NR N randomized: 52 N completed tx: 52 N attended last fu: 49 **Inclusion:** pts with chronic N-S LBP (> 6 mo) with or without radiation- aged 18-75 yrs **Exclusion:** structural deformity (ankylosing spondylitis, scoliosis); lower limb fracture; tumors; spinal infection; caudaequina syndrome; pregnancy; spinal cord compression; pts unable to keep appointments; receiving acu tx within the past 6 mo; receiving physio tx within the past 3 mo	Mean age (SD/range): IG = 50.4 (16.3) vs. CG = 55.6 (10.4) yrs % of male: IG = 15.4%; CG = 19.2% **Racial composition:** NR **Work status:** NR **Other socio-demographics:** NR **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S(CG = 12% with prolapsed disc) % NS:14 (53.8%) **Duration of Pain:** Chronic, NR **Severity of pain (Grading):** NR **Co-interventions:** analgesic use: IG =3.8%, CG =0% other tx (tui na, massage, chiropractor, bone setter or corset):IG = 5 (19.2%), CG = 6 (23.1%)	**Groups** IG (n = 26) **–** Acu + EX: E-Acu points: BL23, BL40, and SP6. Needles applied to ipsilateral pain side needles, #30 (0.3 mm) 40 mm long needles inserted and manipulated until Teh Chi obtained. Stimulation on needle sat a freq of 2Hz for 30 min-n the intensity of stimulation set at tolerable to the Pts and often with evoked visible muscle contraction; 3times/wk for 4 wks Drop outs: C = 2 CG (n = 26) – Exercise: Standard group EX program, back strengthening and stretching EXs; 1 hr session/wk for 4 wks Drop outs: C = 1	**Outcomes:** Pain: NRS: avg pain; worst pain Disability: Aberdeen LBP scale **Results-**Baseline: **Pain:** IG = 6.38 (1.77), CG = 5.88 (1.84); IG = 6.65 (1.77), CG = 6.5 (1.56) **Disability:** IG = 35.32 (11.72), CG = 32.49 (13.79) Immediate post tx: Pain: IG = 3.81 (2.1), CG = 5.12 (2.18); IG = 3.92 (2.43), CG = 5.35 (2.04) Disability: IG = 20.02 (10.41), CG = 30.82 (13.03) Short term: Aberdeen: IG = 19.86 (10.12), CG = 25.82 (13.11) Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NA **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms**: 1 Pt- stroke before 3 mos fu

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Yu, W (1997)[51] Country: China Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 10-20 ds Final assessments: immediately post tx N screened: Don't know N randomized: 200 N completed tx: 200 N attended last fu: NR **Inclusion:** pain in waist and leg **Exclusion:** NR	Mean age (SD/range): NR % of male: NR **Racial composition:** Asian **Work status:** NR **Other socio-demographics:** NR **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S with leg pain **Duration of Pain:** >6 mos **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 103) **–** Acu local point: eletro-acu, local pain point, retention 30 min; 1 tx/d, 20 tx/course, 1-2 courses Drop outs: B=0 CG (n = 97) – Acu local point and weizhong point: eletro-acu, local pain point + weizhong, retention 30 min; same as IG Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results: NA** Baseline: **Pain:** Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B **Results:** Immediate post tx: N (%) improved – IG = 99 (96.1%), CG = 86 (88.7%) P<0.01 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Yuan, J (2009)[52] Country: UK Quality score: 9/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 5 and 2 wks Final assessments: 1 yr N screened: NR N randomized: 30 N completed tx: 30 N attended last fu: 21 **Inclusion:** Subjects with chronic NS LBP **Exclusion:** Infection, tumor, osteoporosis, fracture, structural deformity, inflammatory disorder, radicular syndrome or cauda equina syndrome	Mean age (SD/range): 43.53 (9.67) vs. 43.87 (10.45) yrs % of male: 60% in both groups Racial composition: NR Work status: employed (%): 7 vs. 13 Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain: Non S** % NS: all Pts **Duration of Pain:** 14.2 vs. 11 yrs **Severity of pain (Grading): NR** **Co-interventions:** pts taking Med (%): 33 vs. 20	**Groups** IG (n = 15)– Acu-traditional Chinese methode, needles 0.25 mm x 0.25 mm x 50 mm. manually stimulated to produce 'de qui' sensation, retained for 20-30 min; 2x / wk for 5 wks Drop outs: 1 at 2, 5 and 12 wks; 4 at 1 yr fu IG2 (n = 15) – Acu-traditional Chinese acu method as IG1, 5x/wk for 2 wks Drop outs: 5 at 1 yr fu	**Outcome instruments:** Pain: VAS (0 – 10) Disability **Results:** NA Baseline: Pain mean (95% CI) average pain: 4.30 (3.06, 5.53) vs. 3.98 (2.87, 5.10) Disability (RMDQ): 6.40 (4.37, 8.43) vs. 7.80 (5.41, 10.19) Immediate post tx: Pain: NR Short term: NR Intermediate: NR Long term: NR **Note:** only baseline values are reported. Outcome results for immediate, short term and long term fu are presented in graphs and not extracted in this report	**Outcome instruments:** QoL/ well being: Data in graph Other: NA Results- mean (95% CI) : Baseline: "QOL: 2.20 (1.72, 2.68) vs. 2.86 (2.07, 3.65) Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** minor bleeding 4 vs. 7; pain: 2 vs. 0 Tiredness or other discomfort: 1 vs. 4 **Summary:** There were no significant differences between the groups in terms of any of the outcomes, (Pain, Disabiltiy, well being) at each follow-up time point.

Table 1.5 Low Back Pain - Acupuncture - Mixed duration- Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Chen, MZ (2005)[53] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 10 ds Final assessments: immediately post tx N screened: 90 N randomized: 90 N completed tx:90 N attended last fu: NR **Inclusion:** L4,L5 spinal stenosis; pain threshold 0.4-1.8 mA **Exclusion:** disc herniation, bone TB, tumor; pain threshold < 0.4 mA	Mean age (SD/range): IG1 = 34.24 (5.78); IG2 = 33.36 (7.58); IG3 = 35.78 (9.65) yrs % of male: 70% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Spinal stenosis **Duration of Pain:** Unknown or mixed duration: IG1 = 5.25 yrs (3.95); IG2 = 5.78yrs (4.87); IG3 = 4.71 yrs (3.96) **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG1 (n = 30) –Acu warming needle + oral nimeisulide; acupoint injection of anisodamine; 15-30 min.d for 10 ds Drop outs: A = 0, B= 0 IG2 (n = 30) – Oral Med: oral nimeisulide tablet; 0.1 bid for 10 ds Drop outs: NR IG3 (n = 30) – acupoint injection: of anisodamine <10 mg/d x 10 ds Drop outs: NR	**Outcomes:** Pain: Pain threshold(A,B) Disability: NR **Results:** Baseline: NR Pain threshold: IG1 = 0.98 (0.27); IG2 = 1.04 (0.27); IG3 = 0.86 (0.22) Immediate post tx: Pain threshold: IG1 = 2.62 (0.59); IG2 = 1.54 (0.39); IG3 = 1.58 (0.22) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results:** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms: NR** **Summary of results (if provided):** warming needle is better than oral medicine and acupoint injection

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Chen, X (2007)[54] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: not clear Final assessments: immediately post tx N screened: not mentioned N randomized: 88 N completed tx: 88 N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard CT exmination showed lumbar intervertebral Disc Protrusion - exclusion: spinal stenosis, myofacial , Mawei nerve pain, tumor…etc.	Mean age (SD/range): NR % of male: IG = 52.3%; CG = 56.8% **Racial composition:** Asian **Work status:** NR **Other socio-demographics:** NR **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease **Duration of Pain:** IG - 5d to 5yr: acute, subacute, chronic; CG - 7d to 4 yr: acute, subacute, chronic **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 44)– Deep Acu of lumbar kiaji points: acupoint: Jiaji, deeply acu 3 inches retention 20min; 10 tx/course, 3 d rest between courses x 2 courses Drop outs: B =0 CG (n = 44) – Conventional Acu of jiaji point: retention 20 min, normal depth; 11 tx/course, 3 ds between courses x 3 courses Drop outs: B =0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain:** Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B, based on Chinese Medical Diagnostic and therapeutic Effective Standard **Results:** Immediate post tx: IG = 95.5%, CG = 77.3% improved Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary (if provided):** Deep acu of lumbar jiaji points has a good curative effect on lumbar intervertebral disc protrusion.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Cu, J (2004)[55] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 20 ds Final assessments: immediately post tx N screened: not mentioned N randomized: 50 N completed tx: 50 N attended last fu: NR **Eligibility criteria:** - Inclusion: Chinese Medical Diagnostic and Therapeutic Standard. - exclusion: Pts with severe nerve function defeat, caudal nerve was pressed, and who is suitable for surgery	Mean age (SD/range): IG = 41.4 vs. CG = 43.6 yrs % of male: IG = 56% vs. CG = 60% Racial composition: Asian Work status: NR Other socio-demographics: Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease Duration of Pain: acute, subacute, chronic, NR Severity of pain (Grading): Co-interventions: NR	**Groups** IG (n = 25) **–** Scalp acu + massage: 0.35 mmX75 mm needle, severe pain, retention 24hrs massage: elbow point massage ,2 palms massage lumbar muscle, 2 twists press muscles on 2 sides of spine, thumb massage buttock muscle, traction, etc; 1 tx/d, 10tx/course, 3 ds between courses x 2 courses Drop outs: B=0 CG (n = 25)– Massage: same as IG; same as IG Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Chinese Medical Diagnostic and therapeutic Standard **Results:** Immediate post tx: IG = 96%, CG = 88% improved (P<0.01) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** IG has an obvious therapeutic effect on prolapse of lumbar intervertebral disc and they exert the therapeutic effect possibly through regulative action on immune functions

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Ding, X (2002)[56] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 28 ds Final assessments: immediately post tx N screened: Don't know N randomized: 68 N completed tx:68 N attended last fu: NR **Eligibility criteria:** - inclusion: 1. Diagnosed as intervertebral disc protrusion 2. Only one side is in pain 3. Who has obvious 1 or 2 sympotoms: can not go to sleep, turn aside, walk, caugh,sneeze, bowel movement, bend waist because of the pain 4. Pain in waist 1 Jiaji and waist 5 jiaji is in the healthy side. and pain rate is ++ above - exclusion: NR	Mean age (SD/range): NR % of male: IG = 32.4%; CG = 35.3% **Racial composition:** NR Asian **Work status:** NR **Other socio-demographics:** NR **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease **Duration of Pain, range:** IG - 7ds-2 yrs: acute, subacute, chronic; CG - 7ds-1.5yrs: acute, subacute, chronic **Severity of pain (Grading):** NR **Co-interventions:** NR	**Groups** IG (n = 34)– injection + acu on healthy side: 0.3mmX 75mm needle, injection on healthy side and acu on affected side, 100mg Vitamin B1 +0.2 mg Vitamin B12 injection in Jiaji.; 1 tx/d for 5 ds, 2 ds rest, 20 tx total Drop outs: 0 CG (n = 34) – injection +acu on affected side: both injection and acu on affected side, 100mg Vitamin B1 +0.2 mg Vitamin B12 injection in Jiaji; 2 tx/d for 5 ds , 2 ds rest, 20 tx total. Drop outs: 0	**Outcomes:** Pain: NR Disability: NR **Results:** Baseline: NA **Pain:** Immediate post tx: NA Pain: - Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being (cure effect) **Results:** Immediate post tx: IG = 82.4%, CG = 14.7% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary (if provided):** contralateral acu has a better effect for protrusion of intervertebral disc accompanied by tenderness on Jiaji points on the healthy side than routine acu on the affected side

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Ding, Y (1998)[57] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: not clear Final assessments: immediately post tx N screened: not mentioned N randomized: 54 N completed tx: 54 N attended last fu: NR **Eligibility criteria:** - inclusion: LBP repeatedly occur, lumbar sacrum pain become worse with fatigue X-ray and examination exclude the other disease the LBP caused by Qi and blood stagnant. - exclusion: NR	Mean age (SD/range): IG = 45 vs. CG = 42 yrs % of male: IG = 80% vs. CG = 63.2% Racial composition: Asian Work status: NR Other socio-demographics: Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Lumbar muscle strain Duration of Pain: IG = <1 yr to >6 yr, CG = NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 35) **–** fly-probing-acupoint manipulation: major acupoint: yaoyangguan, ashi supplement acupoint: weizhong 0.38 mmx75 mm needle, when getting qi, use flying-probing acupoint manipulation retention 40-50 min; 1tx/d, 10tx/course Drop outs: B=0 CG (n = 19)– Routine acu: acupoints as above, when getting qi, retention 20 min; same as IG Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being **Results :** Immediate post tx: IG = 94.3%, CG = 73.7% improved (P<0.01) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** fly-probing-acupoint manipulation as a main acu tx has a stronger effect in promoting the flow of qi and produced a better effect in stransverse oscillatory rotping pain.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Guo, W (2005)[58] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: NR Final assessments: immediately post tx N screened: 197 N randomized: 197 N completed tx: 197 N attended last fu: NR **Inclusion:** Disc herniation; age:20-70 yrs; Diagnosed by CT or MRI; Clinical Positive Signs **Exclusion:** pregnant and breast-feeding women; Serious cardiovascular and cerebrovascular diseases; Serious liver and kidney disease; Serious infecton; Lumbar TB or tumor; Gastrointestinal disease	Mean age (SD/range): IG = 43(11.33) vs. CG = 44 (10.12) yrs % of male: IG = 54%; CG = 51.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain** Disc herniation **Duration of Pain:** Unknown or mixed duration, IG = 2.5 (2.44) yrs; CG = 2.41 (2.33) yrs Severity of pain (Grading): NR Co-interventions: Traction therapy	**Groups** IG (n = 100) – E-acu + acupoint injection: 1st stage :E-acu + acupoint inject at Jiaji; 2nd stage: E-acu; inject using 3ml Triamcinolone Acetonide 40mg + 20g/L Lidocaine Hydrochloride 2ml + Vitamin B12 500ug+ NS 4ml) /5d x 2 *Drop outs:* A = 0;B = 0 CG (n = 97) – SM or Mob + oral Med: NR; Ibuprofen Sustained Release Tablets 0.3g po.bid; Phenprobamate tablets 0.4,po.tid;Tab.Vitamin B1 20mg, tid) x 2m *Drop outs:* A = 0;B = 0	**Outcomes:** Pain: VRS(A,B) Disability: **Results:** Baseline: Immediate post tx: Pain: IG = 1.32 (0.31); CG = 3.11 (0.23) (P<0.01) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Other: Angle for SLR test **Results :** Immediate post tx: IG = 70 (215); CG = 50 (20) Short term:NA Intermediate:NA Long term: NR **Harms:** NR **Summary:** Electro-acupucture plus acupoint inject Med group is better than SM or spinal Mob plus oral Med group

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Huang, GF (2006)[59] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Final assessments: immediately post tx N screened: 68 N randomized: 68 N completed tx:68 N attended last fu: NR **Eligibility criteria:** - inclusion: Disc herniation - exclusion: pregnant and breast-feeding women; Serious disease; mental Pts; Cauda equina compression; have other indications for surgery	Mean age (SD/range): NR % of male: IG = 58.8%, CG = NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: nR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc herniation Duration of Pain: 2d-10yr; NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 36) – Special e-acu: acu at Jiaji,Huangtiao, Yanglinqiang and Wenzhong points; 10-20mA, 30min/d*10d/course x 2 Drop outs: 0 CG (n = 32) – Routine e-acu: acu at Shenyu, Dachangyu,Xubian, Huantiao,Chengfu,Yinmen, Weizhong and Yanglinqian; same as IG Drop outs: 0	**Outcomes:** Pain: VAS **Results-** Immediate post tx: Pain: 5.09 (0.61) vs. 6.58 (0.6) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA Other: overall efficacy **Results:** Immediate post tx: Time of analgesic effects and lasting effect was better in IG vs. CG, P < 0.01 Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results:** electroaupuncture at Jiaji is better than routine acu (time of analgesic effect, and overall efficacy)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Huang, GF (2006)[60] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 24 ds Final assessments: Post-tx N screened: 90 N randomized: 90 N completed tx: 90 N attended last fu: 90 **Inclusion:** Disc herniation; aged 18-65 yrs; Diagnosed by CT or MRI **Exclusion:** Spondylolysis with spondylolisthesis;Seriou disease;Severe osteoporosis;Lumbar tumor and TB	Mean age (SD/range): 41.5 (13.7) yrs % of male: 51.1% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc herniation Duration of Pain: Mixed Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 45) – Acu + Spinal manipulation; acupunture at Ashi, Huantiao, Weizhong and Chenshan; 30 min/ tx, 6 tx/ course, 4 courses Drop outs: A = 0, C = 0 CG (n = 45) – Spinal manipulation: mechanical traction; 30 min/ tx, 6 tx/ course, 4 courses Drop outs: A = 0, C = 0	**Outcome instruments:** Pain: VAS; Overall efficiency Disability: NR **Results:** Immediate post tx: Pain, mean (SD): 1.91 (0.93) vs. 3.58 (1.52), p < 0.01] Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Excellent rate **Results:** Immediate post tx: excellent rate: 86.6% vs. 57.78%, p < 0.01 Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** Combinative group is better

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Hua-Sheng Tang (2008)[61] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 40 ds Final assessments: 6 mo N screened: NR N randomized: 165 N completed tx: 133 N attended last fu: NR **Inclusion:** 20-69 yrs; CLBP and/or traumatic LB injury; LBP complicated with radiant pain towards lower extremities and/or sciatica; disappearance of normal spinal curve and/or Scoliosis associated with tenderness; Straight leg raise positive; CT and/or MRI indicate **Exclusion:** lumber herination complicated with spondylolisthesis and/or myelocele; pregnant and postnatal woman	Mean age (SD/range): IG = 40 vs. CG = 40 yrs % of male: IG = 57.6% vs. CG = 56.2% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** 1-disc/joint disease Duration of Pain: acute; subacute (up to 12 wks); Chronic (> 12 wks); IG = 13 mo. CG = 12 mo. Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG1 (n = 85) – Acupuncture along channel: induce "de qi" sensation using electrical impluse device connected with needles, stimulated at frq of 6-8Hz, 30 min/sess,1 sess/d x 40 ds Drop outs: D = 10 CG (n = 80) – routine acu: Selected 6-8 acupoints among BL23, 24, 25, 26, 40, 54, 60 and GB 30, 34; same as IG Drop outs: D = 22	**Outcome instruments:** Pain: no numeric data Disability: *no numeric data* **Results:** Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: cured and markedly effective rate; and recurrence of pain **Results:** Immediate post tx: cured and markedly effective rate: 88.2% vs. 72.5%; Recurrence of pain, rate of 24% vs. 41.4% Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Jia, Chao (2004)[62] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Final assessments: immediately post tx N screened: 82 N randomized: 82 N completed tx: 82 N attended last fu: NR **Eligibility criteria:** Inclusion: diagnosed as Cervical Spondylosis using ref[1] 1993-chinese, only those who were compliance with the tx, only those who reponsed to the surveys. Cause of pain: 1-Lumbar disc hemiation Exclusion: tumor, fracture, with heart, lung and kidney disease etc.	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** disc/joint disease Duration of Pain: only mentioned people has pain < 6 mos and as well >6mos Severity of pain (Grading): Mcgill: PRI, PRI Co-interventions: NR	**Groups** IG (n = 45)– deeply-acupuncturing jiaji acupoint + acupoint-injection: 65mm, size 28 needle for acu +injection of dangui; + 2ml dangui injection 30 min/tx, 1tx/d, 10 tx/course x 2 + 2ml dangui injection 1 tx/d, 10 tx/course, total of 2 course Drop outs: 0 CG (n = 37) – acupuncturing back-shu acupoint +acupoint – injection: same as IG ; same as IG Drop outs: 0	**Outcome instruments:** Pain: VAS(diff. between baseline and immediate tx)cm; Disability: NR **Results:** Pain, mean changes from baseline: IG = 5.18 (0.32) cm, CG = 3.84 (0.27)cm; Disability: NR Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Chinese Medical Diagnostic and effectiveness standard **Results:** Immediate post tx: improved: 96% vs. 83% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** The clinical effect of deep-acpuncturing jiaji acupoint +acupoint-injection is better than that of acupuncturing back-shu acupoint combined with point-injection

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Li, D (2006)[64] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 2-4 wks Final assessments: 6 mos N screened: NR N randomized: 240 N completed tx: 240 N attended last fu: 240 **Inclusion:** pts with lumbar disc herniation **Exclusion:** NR	**Mean age (SD/range):** NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Lumbar disc herniation Duration of Pain: Mixed, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 80) **–** Traction rotator manipulation of sumbar spine tx: tx performed to the segment of the intervertebral disc herniation; once/wk, 2 wks Drop outs: 0 IG2 (n = 80) **–** Acu silver needle heat conductive tx: conducted to pts waist and buttocks; Same as IG1 Drop outs: 0 CG (n = 80) – Traction + needle heat: Combination of IG1 and IG2; each tx method was done in 2 wks, 4 wks total Drop outs: 0	**Outcomes:** Pain: NRS, improvement of clinical signs as well as curative effect (scores in summary) **Results:** Immediate post tx: Pain: see summary Short term: NR Intermediate: NR Long term: NA	**Outcomes:** QoL/ well being: NR **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NA **Harms:** NR **Summary:** the NRS scores decreased in three gps after 3 mo tx, especially CG (combination), $t = 8.52$, $p < 0.01$; most of the painful symptoms were controlled after 6 mo in CG ($t = 7.08$, $p < 0.01$)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Li, Q (1997)[65] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: varied with pts. Final assessments: immediately post tx N screened: not mentioned N randomized: 156 N completed tx: 156 N attended last fu: NR **Eligibility criteria:** - inclusion: NR - exclusion: NR	Mean age (SD/range): NR % of male: IG, CG = 51.3% Racial composition: Asian Work status: NR Other socio-demographics: Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease Duration of Pain: Acute, subacute, chronic, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 78) **–** Acu+cupping: major acupoints: shenshu, yaoshu, weizhong, renzhong, chize, supplement acupoint: for Pts with cold dampness , add yangguan, shangliao, xialiao; for pts with blood staganant, add geshu, and ganshu for pts with kidney debility, add mingmen, taixi retention 20 min+cupping: cupping on the shenshu, yaoshu and most painful point. retention 15 min; Acu: 1tx/d, 10 tx/course until cured; cupping:1tx/2ds Drop outs: B=0 CG (n = 78)– Acu: same as IG; 2tx/d, 10tx/course until cured Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being **Results:** Immediate post tx: IG = 100%, CG = 97.4% improved Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Acupuncture + cupping are significantly better than acu alone.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Liang, SY (2008)[66] (abstract) Country: China Quality score: NA Initial of reviewer: SG	**Trial Design** RCT Tx duration: possibly 2 wks Final assessments: immediately post tx N screened: 112 N randomized: 112 N completed tx: NR N attended last fu: NR **Inclusion:** pts with myofacitis LBP **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** myofacitis Duration of Pain: cannot tell Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 56) – Tendon muscle picking: picking pain tendon-muscle tubereles on the back; 2 tx courses(possibly 5 or 7 ds each), 14 sessions total Drop outs: NR CG (n = 56) – E-acu: at acupoints: BL 11; BL 13, BL 15, SI 11, and EX-B2; same as IG Drop outs: NR	**Outcome instruments:** Pain: NA Disability: NA **Results: NA** Baseline: NR Pain:NR Disabilty: Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Therapeutic effects (pain, work, and function): IG = 89.3% vs. CG = 78.6%, P < 0.05 **Results:** Baseline: NR Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Luo, S (2007)[67] Country: China Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 108 N completed tx: NR N attended last fu: NR **Inclusion:** varying degrees of LBP radiating to the lower limb. With straightened leg raising test, the raising </= 30 degrees in 37 cases, 31 - 65 in 68 cases, sand 3 cases with positive response in the intensive test. All pts diagnosed with CT and or MRI exam. **Exclusion:** NR	Mean age (SD/range): NR range 23-72 yrs % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR, 100% with radiating pain Duration of Pain: mixed, NR 1 d-17 yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 56) – Scalp Acu + traction: STD scalp-point lines inserted by sterilized needles-pushed to the sub layer of galea aponeurotica. Needles manipulated when sucking sensation felt under the needle by Zhu's reducing method; 5-8 min of needle retention, followed by qi method, needles retained for 30 min + traction Drop outs: NR CG (n = 52) – Traction: horizontal traction in supine position for mild pts and in prone position of severe cases; 30 min/session Drop outs: NR	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: n (%) Clinically cured; marked effective' improved; no change **Results:** Baseline: NR Immediate post tx: IG = 12 (21.4), CG = 7 (13.5); IG = 22 (39.3),CG = 18 (34.6); IG = 18 (32.1), CG = 16 (30.8); IG = 4 (7.1), CG = 11 (21.2) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Mu, JP (2007)[63] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Final assessments: immediately post tx N screened: NR N randomized: 120 N completed tx: 120 N attended last fu: NR **Eligibility criteria:** - inclusion: lumbar herniation; age between 20-65; acute LBP less than 2 wks after lumber herniation diagnosed; not undergoing homonotherapy or taking steriod hormones; signed consent form - exclusion: pregnant and postnatal woman; cardio-cerebrovascular disease; dropped off or cannot be followed up; lumbar tuberculosis and lumbar spinal cord tumor;	Mean age (SD/range): IG1 = 39 (8.7) yrs; IG2 = 37 (4.8) yrs; CG = 42 (6.5) yrs % of male: NR Racial composition:NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** 1-disc/joint disease Duration of Pain: Unknown: IG1 = 1.9 (1.7) yrs; IG2 = 2.1 (1.5) yrs; CG = 2.2 (1.9) yrs Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG1 (n = 40)– E-acu-Jiaji points: Needle 75-90mm deep at EX-B2, connect needles with G805 electric impluse device, stimulate at freq. of 10-20Hz for 30min.; 1 sess/d x 21 sessions Drop outs: 0 IG2 (n = 40) – Laser needle knife grp: cut inter/supra spinal ligments and muscles. SJ-L laser needle-kinfe were remained for 30min; 1 session/wk for 3 wks CG (n = 40) – Jiaji EA + laser needle knife: Combine txs 1 and 2 Drop outs:	**Outcome instruments:** Pain: SF-MPQ Disability: NR **Results:** Baseline: Pain: 41.9 (2.0) vs. 42.4 (1.2) vs. 41.3 (1.8) Disability: NR Immediate post tx: Pain: 9.4 (1.8) vs. 8.5 (2.2) vs. 4.7 (1.3) Disability: NR Short term: Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: **Results:** Immediate post tx: Cure rate: 25% vs. 35.1 vs. 47.4% effective: 47.5% vs. 46 vs. 44.7% ineffective: 27.5% vs. 18.9 vs. 7.9% total efficacy: 72.5% vs. 81.1 vs. 92.1% reoccurrence (6 mos post tx): 63% vs. 74.2 vs. 55.2% Short term: NR Intermediate: NR Long term: NHA **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Peng, Y (2006)[68] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: 20 ds Final assessments: immediately post tx N screened: unknown N randomized: 116 N completed tx: 116 N attended last fu: NR **Inclusion:** diagnosed using Chinese Medical Diagnostic and Therapeutic Standard 30-60 yrs CT-MRI examined and diagnosed and signed consent form **Exclusion**: pts with heart, brain blood vessel, liver, kidney or hemopoietic system disease, mental health, severe infection, pregnant women, lumbar vertebra tubercle, marrow tumor, and spondylolysis, prolapse in the middle with marrow disfunction, relapse after surgery those pts who dropped out and stransverse oscillatory rotped the tx were not included.	Mean age (SD/range): IG = 48 (10.61) vs. CG = 46 (11.3) yrs % of male: IG = 55.2%, CG = 51.7% Racial composition: Asian Work status: NR Other socio-demographics: Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease Duration of Pain: NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 58) – round sharp needle+massage: major acupoints: tuxue (pain point beside lumbar vertebra spinous process), supplement acupoints: with pain in zutaiyangjing, add zhibian, yinmen, chengshan, weizhong, kunlun; with pain in zushaoyangjing, add huantiao, fengshi, xuanzhong, zusanli, yanglingquan, qiulinquan, qiuxu, kunlun; with pain in both, press taiyangjing, zushaoyangjing; with qi stagnant, add yaoyangguan, xuehai; with colddampness, add sanyinjiao, minmen, liver or kidney deficit, add ganshu and shenshu. 0.15mm x87 mm round sharp needle for major points 0.30 mmx40 mm filiform needle retention 30 min massage: rolling manipulation on waist and buttock for 10 min, massage on muscle beside lumbar vertebra, then knock the same spots lightly. Then let the Pt sleep on his/her side, massage Pt's shoulder, then relax for 5 min.; 1tx/d, 10tx/course, rest 2 ds, 2 courses Drop outs: unknown CG (n = 58)– filiform needle + massage: acupoints are all the same as those in the tx group, just use filiform needle; same as IG Drop outs: unknown	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B, Chinese Medical Diagnostic and Therapeutic Standard **Results:** Immediate post tx: IG = 98.3%, CG = 82.8% improved (P<0.01) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** round sharp needle combined with massage has a better therapeutic effect on prolapse of lumbar intervertebral disk.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Qian-mei (2007)[69] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 7 wks Final assessments: imm. post-tx N screened: NR N randomized: 116 N completed tx: 116 N attended last fu: 116 **Eligibility criteria:** - inclusion: diagonosed as lumbar herniation according to "traditional Chinese medicine diagnostic efficacy standards" - exclusion: age >70; undergoing other therapies and taking steriod hormones; Cauda equina syndrome; pregnant and postnatal woman; cardio-cerebrovascular disease	Mean age (SD/range): NR % of male: IG = 51.5% Vs. CG = 56% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease Duration of Pain: acute; subacute (up to 12 wks); Chronic (> 12 wks), NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 66)– Needling acupoints at same nervous segment: insert needles 60mm deep, stimulate manually until soreness and numbness reached, PM such as light nd heat applied on low back; 3 sess/wk x 21 sess. Drop outs: A= 0 CG (n = 50) – Needles were inserted at routinely selected acupoints on low back and buttock; same as IG Drop outs: A= 0	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: cure rate; efficacy rate **Results:** Immediate post tx: Cure rate: 37% vs. 13% significantly effective: 23% vs. 20% ineffective: 1% vs. 7% total efficacy: 90.9% vs. 66% Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Qu, Y (2006)[70] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 1 wk Final assessments: immediately post tx N screened: 120 N randomized: 120 N completed tx: NR N attended last fu: NR **Inclusion:** outPts with dx on syndrome of L3 transverse process (in Criteria on Diagnosis and Theraputic Effects on Syndromes of Chinese Medicine) randomized based on visiting sequence (results separated for acute to subacute and chronic pts) **Exclusion:** NR	Mean age (SD/range): IG - range 25 – 61, CG - 23 - 65 yrs % of male: IG = 58%, CG = 55% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** syndrome of L3 transverse process % NS: % S: Duration of Pain:mixed, IG - (31 chronic, 29 actue - subacute), CG - (33 chronic, 27 acute - subacute) Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 60)– Acu with warming needles: subcutaneous injection with 0.5% lidocaine done on punctured points with pimple formed about 5 mm in diameter, during the moxibustion, if the skin burning on the acu spot was hardly tolerated the aseptic physiological saline was sparyed Drop outs: NR CG (n =) – E-acu: bilateral application with filiform needle (0.30 mm x 50 mm); even needling technique, electric acu apparatus was applied with continuous wave, 50 hz , 2 - 4 V. needles were retained for 30 min; , 1tx/d, 7 tx total Drop outs: NR	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Therapeutic effects: Cured; Improved; No effect; Total n (%) **Results:** Immediate post tx: IG = 49 (81.7), CG = 35 (58.3); IG = 10 (16.7), CG = 22 (36.7); IG = 1 (1.6), CG = 3 (5); IG = 59 (98.4), CG = 57 (95) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Rui-ping She (2008)[71] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Final assessments: immediately post tx N screened: NR N randomized: 179 N completed tx:179 N attended last fu: NR **Inclusion:** show 7/10 following symptoms LBP; sciatica; lower limb numbness; limp intermittently; protective posture; Deformity of spinal cord; straight leg raise test (+); Bragard's test (+); dysuria or lower limb myophagism; CT: dura mater and nerve root disturbed; MRI: intervertebral space narrow **Exclusion:** spondylolisthesis; myofacial pain syndrome; spinal canal stenosis or spinal fracture;	Mean age (SD/range): NR % of male: IG = 55%; CG = 56.8% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** 1 **-** disc/joint disease Duration of Pain: acute; subacute (up to 12 wks); Chronic (> 12 wks); NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: 1. lay on solid bed for 16hrs 2. waist and back support	**Groups** IG (n = 140)– Acu at Qiangji 4 points deeply insert needles until vertebrae reached connected to impulse device and stimulated at tolerated freq.; 40 min/sess, 1 sess/d x 20 ds, 5 ds break after 10 sessions Drop outs: NR CG (n = 139) – Routine acu: needles were inserted 25-40mm deep, manipulate needles connected with electrical impulse device and stimulated at tolerated frq.; same as IG Drop outs: NR	**Outcomes:** Pain: NR Disability: NR **Results-**Baseline: Pain: NR Disability: NR Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: cure rate **Results:** Cure rate: End of 1st course: 42.1% vs. 28.1% End of 2nd course: 82.9% vs. 16.8% Intermediate: Long term: NR **Harms:** NR **Summary:**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Wang, Y (2004)[72] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: NR Final assessments: immediately post tx N screened: not mentioned N randomized: 111 N completed tx: 111 N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed third lumbar vertebra transverse process syndrome - exclusion: NR	Mean age (SD/range): NR % of male: IG = 68.2% vs. CG = 60% **Racial composition:** NR (most likely Asian) **Work status:** NR **Other socio-demographics:** **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: N-S **Duration of Pain:** NR **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 66) **–** Waiguan-through-Neiguan and Lumbus 2-4 , transverse process acu methods: 40-50 mm needle on waiguan-through-Neiguan 75 mm needle on lumbus 2-4 retention 30 min; 1tx/d, 10 tx/course Drop outs: B=0 CG (n = 45)– routine acu: acupoints: shenshu, zhishi, zhibian, weizhong eletronic acu retention 30 min; same as IG Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Well being, B **Results:** Immediate post tx: IG = 95.5%, CG =71.1% improved (P<0.05) Short term: NR Intermediate: NR Long term: NR **Harms:** NR Summary (if provided) : IG = cure rate and total effective rate were 66.7% and 95.5%, CG = 46.7% and 71.1% respectively, showing that the curative effect was better in the IG than in the CG

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Wang, YQ (2005)[73] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Final assessments: NR N screened: 58 N randomized: 58 N completed tx: 58 N attended last fu: NR **Eligibility criteria:** - inclusion: disc herniation - exclusion: Obvious symptoms in Pts with spinal cord compression	Mean age: 45.7 yrs % of male: IG = 76.7% vs. CG = 71.4% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc herniation Duration of Pain: Unknown or mixed duration, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 30)– Acu + massage+ spinal Mob: Ventral acu; 32# needle, 50min/d x 2 courses each 10 ds Drop outs: 0 CG (n = 28) – massage + spinal Mob: NR; 20 min/d x 2 courses, 10 ds each Drop outs: 0	**Outcome instruments:** Pain: VAS(A,B);Overall efficiency (B) Disability: NA **Results:** Immediate post tx: Pain: IG = 0.83 (0.23), CG = 2.85 (0.49); Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Overall efficacy Other: NA **Results:** Immediate post tx: overall efficacy: 64% vs. 85%, p < 0.05 Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** massage plus spinal Mob plus acu group is better than massage plus spinal Mob group

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Wu, Y (2004)[74] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 30 ds Final assessments: immediately post tx N screened: not mentioned N randomized: 114 N completed tx: 114 N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed using Chinese Medical Diagnostic and Therapeutic Standard - exclusion: NR	Mean age (SD/range): NR % of male: IG = 62.9% vs. CG = 57.7% **Racial composition:** Asian **Work status:** NR **Other socio-demographics:** **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease **Duration of Pain:** Acute, subacute, chronic **Severity of pain (Grading):** NR **Current tx/ co-intervention common in all groups:** NR	**Groups** IG (n = 62) **–**Abdominal acu: acupoint: 40-60 mm needle; 1 tx/d, 10tx/course, 3 ds between courses x 3 courses Drop outs: B=0 CG (n = 52)– Body acu:, retention for 30-50 min; same as IG Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, **Results:** Immediate post tx: IG = 98.4%, CG = 86.5% improved (P<0.025) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** abdominal acu has a good therapeutic effect on prolapse of lumbar intervertebral disc with a short therapeutic course

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Xia, F (1997)[75] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 1 mo Final assessments: immediately post tx N screened: not mentioned N randomized: 81 N completed tx: 81 N attended last fu: NR **Eligibility criteria:** - inclusion: Xray or CT diagnosed - exclusion: NR	Mean age (SD/range): NR % of male: NR **Racial composition:** Asian **Work status:** NR **Other socio-demographics:** **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease **Duration of Pain:** Acute, subacute and chronic **Severity of pain (Grading):** NR **Co-interventions:** NR	**Groups** IG (n = 41) **–** Acu+injection+massage: acupoint: jiaji, add huantiao, fengshi, yanglingquan, juegu, ashixue for lumbar or leg pain on zushao yangdan jing; add zhibian, yinmen, weizhong, chengshan, kunlun, aishixue for pain on taiyang pangguangjing. Retention 15 min, every 5 min run needle once injection: B1, B12 4 ml injection into 3-4 acupoints massage waist and leg (affected sides), shake ankles; 1tx/2ds, 10 tx/course, 5 ds rest Drop outs: B=0 CG (n = 40)– Acu: acupoint: jiaji, add huantiao, fengshi, yanglingquan, juegu, ashixue for lumbar or leg pain on zushao yangdan jing; add zhibian, yinmen, weizhong, chengshan, kunlun, aishixue for pain on taiyang pangguangjing. Retention 15 min, every 5 min run needle once; same as IG Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B **Results:** Immediate post tx: IG = 98%, CG = 90% improved (P<0.05) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Xingsheng, C (1998)[76] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 10-30 ds Final assessments: immediately post tx N screened: NR N randomized: 198 N completed tx: NR N attended last fu: NR **Inclusion:** Pts with sciatica aged ≥ 18 yrs **Exclusion:** Pts with fractures or visceral referred pain from infection, neoplasm, or aortic aneurysm	Mean age : 45.6 yrs % of male: 59.1% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** sciatic neuritis; lumbar hyperosteogeny; prolapsed intervertebral disc; soft tissue injury; sacroilitis; coxarthritis; sciatic nerve injury by injection: rheumatoid spondylitis; lumbarization of sacrum; Duration of Pain: Mixed, 3.5 mos (2d-12 yrs) Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 108)– Acu(PTP+DP): Point-To-Point Penetration method + Deep Puncture; manual twirling was used to obtain local sensations of soreness and distenstion; the needle retained for 30 min; 1-2 tx/d, 10 sessions/course, 1-3 courses Drop outs: NR CG (n = 90) – Acu(routine): Routine filiform needling techniques; points chosen according to individual manifestations; manual twirling as IG Drop outs: NR	**Outcome instruments:** Pain: NR Disability: NR **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: Cured: all signs and symptoms disappeared completely and affected limb moved freely **Results:** Short term: NR Intermediate: IG = 74 (68.5%), CG = 31 (34.4%) Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Yao, Z (2007)[77] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 21 ds Final assessments: immediately post tx N screened: Don't know N randomized: 116 N completed tx: 116 N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard, - exclusion: fracture, tumor	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease **Duration of Pain:** less than 2 mons to greater than 6 mons, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 62)– Acu + moxibusion: Acupoint: Huatuo Jiaji xue, 30 min retention, TDP moxibusion , select 4, 5, 6 point in the lower limb of the affected side, 40 mm needles, 40 min retention; 1 tx/d, 6 tx/course, 1 d between courses x 3 courses Drop outs: B=0 CG (n = 54) – E-acu-acupoints: shenshu, dachangshu, guanyuanshu, huantiao, fengshi, weizhong, fenglong, zhusanli, jugu, kunlun, taichong. 30 min retention; same as IG Drop outs: B=0	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: well being, B: pain and symptoms disappear, waist function is back to normal, can return to work Other: **Results:** Immediate post tx: IG = 91.9%, CG = 90.7% improved (P>0.05) Short term: NR Intermediate: NR Long term: NR **Harms:** N

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Ye, D (2002)[78] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 2 mos Final assessments: immediately post tx N screened: not mentioned N randomized: 60 N completed tx: NR N attended last fu: NR **Eligibility criteria:** - inclusion: 1-diagnosed using Chinese Medical Diagnostic and therapeutic Standard - exclusion: NR	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease **Duration of Pain:** acute, subacute and chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 20)– eletric acu+traction+Tuina(massage: acute- pelvis traction for 20 min then electric acu, Retention 15 min(5Hz-10Hz)+20min (0.5Hz-1Hz); 1 tx/d, 10 tx/course x 3, subacute and chronic period-electric acu and traction (same as IG1),+ Tuina 20 min, 1 tx/2 ds, 10 tx/course, 3 courses Drop outs: don't know IG2 (n = 20) – electric acu+traction: tx of electric acu and traction as IG1; same as IG1 Drop outs: don't know CG (n = 20) – electric acu+Tuina(massage: tx of eletric acu and Tuina as IG1; same as IG1 Drop outs: Don't know	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: well being, B, Chinese Medical Diagnostic and therapeutic Standard **Results:** Immediate post tx: improved IG = 95%, IG2 = 90%, CG = 90% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** electric acu + traction mainly applied for the early stage and Tuina combined by electric acu + traction for the middle-later stage

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Ye, L (2004)[79] Country: China Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 3 wks Final assessments: immed. Post-tx N screened: NR N randomized: 98 N completed tx: 98 N attended last fu: 98 **Inclusion:** MRI and CT examination, using Chinese Medical Diagnostic and Therapeutic Standard for lumbar intervertebral disc **Exclusion:** NR	Mean age (SD/range): IG = 38.3(possibly total) % of male: 51%(assuming total) Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Prolapse of lumbar intervertebral disc Duration of Pain: mixed, 369.4, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 49) **–** hypodermic catgut embedding therapy on prolapsed of lumbar intervertebral disc, acupoints: jiaji, huantiao, weizhong, xuanzhong, ashi. 3-5cm beside acupoints, embeded 3-4cm hypodermic catgut; 1 tx/course, embedded for a wk then for next course, 3 courses total Drop outs: B = 0 CG (n = 49) – E-Acu: NR; NR Drop outs: NR	**Outcomes:** Pain: score (put under pain tab, however it is a score for symptoms somatoscopy and activity of daily life), A, B **Results:** Baseline: **Pain:** IG = 9.49 (1.29), CG = 9.47 (1.32) Immediate post tx: Pain: IG = 18.31 (1.83), CG = 15.54 (1.92) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Well-being, B, Other: **Results:** Immediate post tx: % improved: IG = 44, P = 0.897959184; CG = 42, P= 0.857142857 Short term: NR Intermediate: NR Long term: NR **Harms: NR** **Summary:** The hypodermic satgut embedding therapy can increase therapeutic effect on prolapse of lumbar intervertebral disc

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Ye, Z (2004)[80] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 – 60 ds Final assessments: immediately post tx N screened: Don't know N randomized: 56 N completed tx: 56 N attended last fu: NR **Eligibility criteria:** inclusion: Diagnostic as lumbar intervertebral disc protruston using CT examination and based on Shanghai Chinese Medical Diagnostic and Treatment Standard exclusion: NR	Mean age (SD/range): IG = 45 vs. CG = 44 yrs % of male: IG = 76.7%, CG = 76.9% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease **Duration of Pain:** IG - 1 wk to 12 mo : acute to chronic; CG - 5 ds to 11 mo: acute to chronic Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 30)– Needle-knife +Take Chinese medicine + therapy by hand: 50-100kg traction, after 15 min, local anesthesia, use needle-knife; therapy by hand +Chinese Medicine; 6 tx total, 5 ds between 2 tx Drop outs: 0 CG (n = 26) – Eletroacu +Take Chinese medicine+ herapy by hand; 1 tx/d, 10 tx/course, 3-5 d no tx between course, total of 6 course Drop outs: 0	**Outcome instruments:** Pain: NR Disability: NR **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Cure rate **Results:** Immediate post tx: improved; overall: IG = 100%, CG = 88.5 %, P<0.05 Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Needle-knife composite tx is superior to electro-acu composite tx.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zeng, Y (2007)[81] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 133 N completed tx: 133 N attended last fu: NR **Inclusion:** diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard; 20-65 yrs; CT or MRI exam showed lumbar intervertebral Disc Protrusion; Signed consent form **Exclusion:** disease with heart, brain vessel, liver, kidney and blood producing problem, mental health; infection, pregnant women, women in breast feeding, lumbar spinal tubercal, spinal cord tumor, dysfunction with spinal cord, relapse after surgery	Mean age (SD/range): NR % of male: IG = 44.8% vs. CG = 48.5% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease Duration of Pain: acute, subacute, chronic, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 67)–Abdomen acu: acupoint: shuifen, qihai, guanyuan, renzhong+yintang for acute lumbar intervertebral disc protrusion, Qixue (two sides) +siman (two sides) +wailin (two sides) for waist pain, qipang (healthy side)+wailin (healthy side) for sciatic nerve pain+ lower rheumatism point (affected side) retention 30min; 1 tx/d, 10 tx/course Drop outs: B =0 CG (n = 66) –Body acu: acupoint: dachangshu, guanyuanshu, baliao, jiaji, chibian, huantiao, chengshan, yinmen, weizhong, yanglingquan, fengshi, kunlun. Points on affected side retention 30 min; same as IG Drop outs: B =0	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: NA Pain: NA Disability: NA Immediate post tx: NA Pain: NA Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: well being, B, based on Chinese Medical Diagnostic and therapeutic Effective Standard **Results:** Immediate post tx: IG = 95.5%, CG = 86.4% improved Short term: NR Intermediate: NR Long term: NR **Harms: NR** **Summary:** abdomen acu has a good effect on lumbar intervertebral disc protrusion with a short course of tx

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, B (2002)[82] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: not clear Final assessments: immediately post tx N screened: Don't know N randomized: 278 N completed tx: NR N attended last fu: NR **Inclusion:** Diagnosed using X-ray and CT examination and Clinical Disease Diagnostic and therapeutic Effective-Chinese ref 1987 **Exclusion:** Tumor, facture, inflammation in lumbar spine, internal organ failure, tubercle in lumbar spine	Mean age: IG1 = 46, IG2 = 43, CG = 47 yrs % of male: IG1 = 69.8%, IG2 = 60.7%, CG = 66.3% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** disc/joint disease **Duration of Pain:** 3 ds- 10 yrs: acute, sub-acute, chronic **Severity of pain (Grading): NR** **Co-interventions:**NR	**Groups** IG (n = 96)– Acu+ massage: on S acup points; 1 tx/d, 10tx/course, 3-5 d between tx Drop outs: B = 0 IG2 (n = 84) – Acu: same as IG1; 2 tx/d, 10 tx/course, 3-5 ds between tx Drop outs: B = 0 CG (n = 98) – Massage: lay on tummy, rolling, rubbing massage on waist and lower limb, manipulation on huatuojiaji and beishu for 10 min, traction for 1 min, and repeat 3-5 times, stretch and shake waist and left and right turn for 2-3 times, Roll, rub and push from waist to two lower limbs for 5 mins followed by 1 hour rest 3 tx/d, 10 tx/course, 3-5 ds between tx Drop outs: B = 0	**Outcome instruments:** Pain: NR Disability: NR **Results:** NR Immediate post tx: Pain: Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Cure rate Results: Immediate post tx: N (%) improved – IG1 = 96 (100%), IG2 = 73 (86.9%), CG = 90 (91.8%) Short term: NR Intermediate: NR Long term: NR Harms: NR Summary: IG1 is superior to IG2 or CG tx and at present is one of the better methods for treating lumbar intervertebral disc protrusion

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, B (2007)[83] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Final assessments: immediately post tx N screened: NR N randomized: 194 N completed tx:188 N attended last fu: NR **Eligibility criteria:** - inclusion: Pts aged 25-60 yrs with LDH not taking any therapies - exclusion: LDH cases with complications of lumbar spondylolisthesis; complications of general collagenous immune diseases or other infections; those taking glucocorticoids or with severe complications	Mean age (SD/range): IG = 47.6 (5.23) vs. CG = 46.9 (6.12) yrs % of male: IG = 50%, CG = 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR Duration of Pain: Acute-chronic: IG – 1 mo-10yrs; CG – 3wks-20yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 98) – E-Acu: filiform 0.38 mm diameter needles of 40-70 mm length inserted 1.5-2 cun, followed by 2 min reinforcing and reducing manipulations by rotating until electric shock sensation; afterwards, the needles were connected to G6805-II electric stimulator for 20 min with continuous wave 40 HZ frequency and 2mA intensity; 1tx/d, 10d/course for 20 d, 5 d between 2 courses Drop outs: 2 CG (n = 96) – Mobic: NR; 7.5 mg/d orally for 20 d (2 Tx courses each 10 d and 5 d apart) Drop outs: 4	**Outcome instruments:** Pain: Shanghai Diagnose and Treatment Routine of TCM Syndromes issued by Shanghai Municipal Health Bureau; Scoring of pain: not obvious=0, occasional/mild=1, occasional severe or frequent mild=2, frequent severe=3 Disability: **Results:** Baseline: Pain: NR Disability: NA Immediate post tx: Pain: NR Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: N of pts with >50% pain reduction: IG = 82%, CG = 73% **Results:** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** E-Acu was more effective than Western drug in improving LBP, pain in lower limbs, walking, sensory function, SLR and muscle power

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, BM (2008)[84] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Final assessments: immediately post tx N screened: 200 N randomized: 200 N completed tx:196 N attended last fu: NR Inclusion: Disc herniation; 25-60yrs; Eexclusion: Disc herniation with spondylolysis; Pts oral glucocorticoid	Mean age (SD/range): IG = 47.62 (5.23) Vs. CG = 46.96 (6.12) yrs % of male: IG = 53.1%; CG = 51% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc Herniation Duration of Pain: IG - Acute (< 4 wks) ; CG - Chronic (>/= 12 wks) Severity of pain (Grading): NR Co-interventions:No description; IG = 3.06, CG = 56.25	**Groups** IG (n = 100)– E-acu with current intensity of 2 mA at frequency of ; 4HZ; 20min/once a d for 10 ds with 5 ds interval Drop outs: A = 1, B = 1 CG (n = 100) – Oral Med: 30# 1.5 and 3 inch needle; MOBAC tablets 7.5 mg/d x 10 d/course x 2 Drop outs: A = 1, B =1	**Outcomes:** Pain: NR Disability: NR **Results:** Baseline: Pain: NR Disability: IG (n = 96), CG (n = 91); IG (n = 85), CG (n = 80); IG (n = 80, CG (n = 84); IG (n= 82), CG (n = 88); IG (n = 72), CG (n= 74) Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: overall efficacy **Results:** Immediate post tx: overall efficacy (%): 86.53% vs. 75%, p < 0.01 Short term: NR Intermediate: NR Long term: NR **Harms: poor appetite, nausea, abdomen pain, swelling, headache and dizziness in CG but not in** IG – Local hematoma 3.06% in IG **Summary of results:** e-acu is better than oral medicine in improving lumbago, pain or numbness of lower limb, walking ability , raising straight leg and muscle stretngh

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, Honglai (2003)[85] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 45 ds Final assessments: immediately post tx N screened: unknown N randomized: 120 N completed tx: 120 N attended last fu: NR **Inclusion:** diagnosed as Cervical Spondylosis using ref [1] 1993-chinese, Special attention (only those who were compliant with the tx, only those who responded to the surveys) **Exclusion:** acute external injury cause, not compliant	Mean age (SD/range): NR % of male: IG = 53.3%, CG = 55% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Spondylosis Duration of Pain: Chronic, IG = 81.9 mo, IG2 = 92.2 mo, CG = 91.1 mo Severity of pain (Grading): McGill, VAS Co-interventions:NR	**Groups** IG (n = 60)– Electro-acu: tianzhu, jinbailao and dashu (two sides) for major acu points dazhui, fengchi, fengmen, jianjin and waiguan for wind dampness quchi, pishu, fenglong, geshu for tanyuzhu type ganshu, pishu, and zusanli for qi stagnant type ganshu, pishu, zusanli for qi and blood stagnant type yanglao, ganshu, shenshu and taixi for liver and kidney debility. 1.5 Chinese inch, size 30 needle, freq. 120-250/min, retention 30min; 1 tx/d, 15 tx/course, 3 courses, 2 d rest between courses Drop outs: A = NR, B= 0 CG (n = 60) – Traction: 30 min, average traction = 7.5kg; Same as IG Drop outs: A = NR, B= 0	**Outcomes:** Pain: McGill PRI total; difference between baseline and fu on VAS **Results:** Baseline: Pain: IG = 8.57 (2.33), CG = 8.61 (2.42); NR Immediate post tx: Pain: IG = 6.73 (2.12), CG = 7.55 (2.28); IG = 4.87 (1.67), CG = 3.56 (1.26) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Cure, improved, effective, no effect n (%) **Results:** Immediate post tx: IG = 56 (93.3%), CG = 47 (78.3%) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** IG in therapeutic effect and improvement of pain for cervical spondylosis is better than the CG. This study found that both tx have better effect with younger pts compared with older pts

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, Zhong-yi (2002)[86] Country: China Quality score: 1/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 10 wks Final assessments: immediately post tx N screened: Don't know N randomized: 61 N completed tx: 61 N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed as Lumbar Intervertebral Disc Protrusion using X-ray, CT or MRI - exclusion: NR	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease **Duration of Pain:** IG and CG -5d to 18 yrs: acute, subacute and chronic, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 30)– Acu+ massage: acupoints: qihaishu, dachangshu, guanyuanshu, xiaochangshu, huatuojiaji supplement acupoints: zhibian, huantiao, xiajuliao, chengfu, weizhong, yanglingquan, chengshan and kunlun 50mm diameter, 75-100 mm needle retention 20min and cupping on affected sides for 20 min; 2 tx/wk, 10 tx/course x 2 Drop outs: NR CG (n = 31) – Massage: massage on the affected side, pressure the pain point, huantiao, chenfuxue. Then massage weizhong, chenshang, kunlun, taixi, xiexi; same as IG Drop outs: B = 0	**Outcome instruments:** Pain: NR Disability: NR **Results:** Baseline: NA Pain: NA Disability: NA Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B, based on Chinese Medical Diagnostic and therapeutic Effective Standard 1994 **Results:** Immediate post tx: Improved: IG = 96.7%, CG = 90.3% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** The curative effect is better in the IG than in the CG.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhong, B (2006)[87] Country: China Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: NR N completed tx: NR N attended last fu: NR **Eligibility criteria:** - inclusion: Had injuries, caught cold; Waist pain accompanied with sciatic nerve pain; Lumbar bend, limitation on movement, pain around Jitu with radiating pain, skin nerve control too sensitive or obtuse, - exclusion: <15 or >65 yrs	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Lumber vertebra tranverse Duration of Pain: acute, subacute, chronic, N Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = NR)– Abdominal Acu + traction + body acu: abodominal acu: major point: shuifen, qihai, add guanyuan. Wailin, siman for waist pain, add qipang, wailing(affected side), lower ; NR Drop outs: CG (n = NR) – Lumbar traction + body acu: NR; NR Drop outs: NR	**Outcome instruments:** Pain: NA Disability: NA **Results: NA** Baseline: Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Total efficacy rate: **Results:** Immediate post tx: IG = 96.88%; CG = 89.29%, Short term: NR Intermediate: NR Long term: NR **Harms: NR** **Summary:** Abdominal acu + traction and body Acu as acomposite tx has an exact effect on lumbar intervertebral disc protrusion

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhou, Q (1998)[88] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 30 ds Final assessments: immediately post tx N screened: not mentioned N randomized: 58 N completed tx: 58 N attended last fu: NR **Eligibility criteria:** - inclusion: CT diagnosed as lumbar interverbral disc protrusion - exclusion: NR	Mean age (SD/range): IG and CG = 48 yrs % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease Duration of Pain: 4 d to 4 yrs, NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 30) –Acu on Jiaji: lumbar intervertebral disc protrusion to left or right, chose acupoints : huatuo jiaji (affected side), supplement acupoints: chibian, huantiao, yinmen, weizhong, chengshan, kunlun or fengshi, yanglinquan, juegu, qiuxu. Lumbar intervertebral disc protrusion to middle chose acupoints: huatuo jaji (two sides), supplement acupoints as above. retention 20 min, + moxibusion on lumbar acupoints; 1 tx/d, 10tx/course x 3 courses Drop outs: B=0 CG (n = 28)– acu on pangguangjingxue: acupoints : pangguang (affected side, or two sides), e.g qihaishu, dachangshu, guanyuanshu, xiaochangshu. supplement acupoint as above; same as IG Drop outs: B=0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B **Results:** Immediate post tx: IG = 90%, CG = 75% improved (P<0.05) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhou, Q (1998)[89] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: NR Final assessments: immediately post tx N screened: not mentioned N randomized: 192 N completed tx: 192 N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed using Chinese Medical Diagnostic and Therapeutic Standard and 1988 Clinical Trial Diagnostic Standard 20-65 yr; Signed consent form - exclusion: pregnant, breast feeding women, Pts with heart or brain blood vessel, liver, kidney primary disease diagnosed as prolapse of lumbar intervertebral dic but no nerve root pain	Mean age: 45 yrs % of male: 51 Racial composition: Asian Work status: NR Other socio-demographics: Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease Duration of Pain: NR, IG = 1.9 (1.7) yrs; CG1 = 2 (1.6)NS; CG2 = 1.9 (1.6)NS Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 96) **–** Huaisanzhen: acupoints: huaisanzhen, 0.35 mmx 75 mm needle, retention 30 min ; NR Drop outs: B=0 CG1 (n = 48) – Drug: injection of Bilinfen 0.9g+physiological saline 2 ml; NR Drop outs: B =0 CG2 (n = 48)– Acu: acupoint: shenshu, qihaishu, jiaji, ciliao, zhibian, huantiao, ashixue, weizhong, yanglinquan, xuanzhong retention 30 min; NR Drop outs: B=0	**Outcomes:** Pain: pain, VAS, 1 hour later, 12 hours later, 24 hours later, 48 hours later Disability: NA **Results:** Baseline: **Pain:** IG = 10, CG1 = 10, CG2 = 10 Immediate post tx: Pain: IG = 3.7 (1.5), CG1 = 5.5 (2), CG2 = 5.2 (1.2) Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Well being, Chinese Medical Diagnostic and Therapeutic Standard **Results:** Immediate post tx: IG = 83.3%, CG1 = 6.3%, CG2 = 8.3% improved Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary**: timing analgesic effect was shorter, the effect lasting time was longer, and the analgsic effect and the comprehensive therapeutic effect were better in the IG vs. CG1, &2 (P<0.01)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhou, YL (2006)[90] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 10 ds Final assessments: immediately post tx N screened: 380 N randomized: 310 N completed tx: 310 N attended last fu: NR **Eligibility criteria:** - inclusion: Disc herniation; VAS ≥ 3; Sign a consent form; 20-65 yrs - exclusion: NR	Mean age (SD/range): IG1 = 45.72 (11.2); IG2 = 44.44 (10.36); CG = 46.08 (10.76) yrs % of male: IG1 = 51.9%; IG2 = 46.1% CG = 44.4% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc herniation; Degenerative disc disease **Duration of Pain:** Unknown or mixed duration, IG1 2.62 (2.55) yrs; IG2 = 2.58 (2.7) yrs; CG = 2.60 (2.57) yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 162) –Acu-ankle-three-needle: points Gentong NO.1, 2 and 3 were selected; needle:size 75mm, 30min *Drop outs: 0* IG2 (n = 76) – Routine Acu: acu at Shenshu, Qihaishu,Jiaji and Qilao; needle:size 75mm, 30min Drop outs: 0 CG(n = 72) – Med inject: routine buttock intramuscular injection of aspirm-DL-lysine plus saline; aspirm-DL-lysine 0.9g plus saline 2ml Drop outs: 0	**Outcomes:** Pain: VAS only at baseline; time of inducing analgesia Disability: NR **Results:** Immediate post tx: Pain: VAS- NR time of inducing alagesia, minutes: 6 vs. 27 vs. 18 minutes Effect lasting for 24.5 vs. 8.9 vs. 6.4 hours Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Other: straight-leg raising test **Results:** Immediate post tx: IG1 = 61.7 (13.4); vs. 52.1 (18.9); vs. 53.6 (15.2) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Analgesic effect within 48 hrs, Straight leg raising test: ankle-three-needle group is better than the other two groups but there are not different between routine acu group and medicine injection group.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhou, Z (2004)[91] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 24 ds Final assessments: immediately post tx N screened: not mentioned N randomized: 160 N completed tx: 160 N attended last fu: NR **Eligibility criteria:** - inclusion: 1-LBP or sciatic nerve pain, pain may become worse when coughing, sneezing or bow movement 2-pain on lumbar vertebra or sciatic nerve, test of rasing straight leg 3-CT or MRI exmination diagnostic lumbar intervertebral disc protrusion - exclusion: spinal stenosis, tumor	Mean age (SD/range): NR % of male: IG = 66.7% vs. CG = 60% **Racial composition:** Asian **Work status:** NR **Other socio-demographics:** **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Disc/joint disease **Duration of Pain:** acute, subacute, chronic **Severity of pain (Grading):** NR **Co-interventions:** TDP illuminate abdomen (around shenque) + 250 ml Danshen injection	**Groups** IG (n = 42) **–** Abdominal acu + Danshen injection+ light illuminate: (for short acute, use shallow acu; long acute, use deep acu); 30 min retention 250 ml Danshen injection; 1 tx/d, 6tx/course x 4 courses, 1 d rest between courses, injection: 1 tx/d for 20 ds Drop outs: B =0 CG (n = 40)– Lumbar shallow acu +Danshen injection+ TDP illuminate: use shallow lumbar acu, acupoint in lumbar and leg . TDP illuminate lumbar area (L4-5 as centre), 30 min retention 250 Danshen injection Drop outs: B =0	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B, Chinese Medical Diagnostic and therapeutic Standard **Results:** Immediate post tx: IG = 97.6%, CG = 47.5% improved (P<0.01) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** there was a very sign. difference in the effective rate between the IG and the CG

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhu, Q (2003)[92] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 30 ds Final assessments: Immed. Post-tx N screened: not mentioned N randomized: 60 N completed tx: 60 N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed using Chinese Medical Diagnostic and Therapeutic Standard - exclusion: spinal stenosis, lumbar buttlock myofacial pain syndrom, caudal nerve tumor, epidural tumor, pradiculitis, deformity of sacrum vertebra	Mean age (SD/range): IG = 34.01 (0.18) vs. CG = 32.96 (0.22) yrs % of male: IG = 80.6% vs. CG = 79.3% **Racial composition: Asian** **Work status: NR** **Other socio-demographics:** **Co morbidities: NR** **Prior episode of pain if acute: NR** Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease Duration of Pain: Acute, subacute, chronic, IG = 4.8 mos; CG = 5.21 mos Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 31) **–** acu + moxibusion + autonomic traction of knee-chest: acupoint: jiajixue, add chibian, huantiao, fengshi, weizhong, yanglinquan, xuanzhong, taichongxue. Acupuncture retention 15 min +moxibusion autonomic traction for 15 min; 1 tx/d, 1 d rest/wk, 30 tx total Drop outs: B=0 CG (n = 29)– Acu + moxibusion : same as IG; same as IG Drop outs: B=0	**Outcomes:** Pain: Pain, VAS, A, B Disability: NA **Results:** Baseline: NA **Pain:** IG = 4.42 (1.03); CG = 4.415 (0.1) Immediate post tx: NA Pain: IG = 1.57 (0.012); CG = 2.89 (0.026) Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B **Results:** Immediate post tx: IG = 93.5%, CG = 75.9% improved (P<0.05) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 1.6 Low Back Pain - Acupuncture - Mixed - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
He (1997)[93] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: 20 ds Final assessments: immediately post tx N screened: 100 N randomized: 100 N completed tx: NR N attended last fu: NR **Inclusion:** LBP, fixed in location, limited ROM, worse in cold and raining weather. **Exclusion:** Kidney diseases or bone diseases confirmed by urine test and x-ray test.	Mean age (SD/range): NR, range 22-79 yrs % of male: IG = 42%, CG = 46% Racial composition: Chinese Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S **Duration of Pain:** Acute to chronic, 5ds-6 mos **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG (n = 50)– Manual Acu + moxi + Chinese herbal medicine: De qi sensation was obtained. Moxibustion was used 2-3 times on the handle of the needles and needles were retained for 30 mins. Herbal formula was given daily; total of 20 tx- once/d up to 10 tx, two 5 d tx sessions Drop outs: NR CG (n = 50) – Chinese herbal Med: no description; same as IG Drop outs: NR	Outcome instruments: Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	Outcome instruments: QoL/ well being: Results: Immediate post tx: % Cured- tx effect: IG = 82%, CG = 64%; %marked effective: IG = 10%, CG = 12%; % improved: IG = 6%, CG = 8%; No change: IG = 2%, CG = 16% Short term: NR Intermediate: NR Long term: NR **Harms: NR** **Summary:** IG is better that CG alone for treating LBP with cold and dampness based on TCM diagnosis

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Sakai, T (2001)[94] Country: Japan Quality score: 8/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 2 wks Final assessments: immediately post tx N screened: 71 N randomized: 68 N completed tx: 63 N attended last fu: NR **Inclusion** (1) LBP without sciatica, (2) at least 2-wk history of LBP, and (3) over twenty yrs old. **Exclusion:** neurological findings, pain/numbness in lower extremity; malignancy, infection/ inflammatory disease; fracture; lumbago due to urological , gynecological , digestive or cardio-vascular problem; pts who cannot stransverse oscillatory rot other conflicting/ongoing tx; problem of general condition; dementia; pregnancy	Mean age (SD/range): IG = 37.3 (12.5) vs CG = 36.2 (12) yrs % of male: IG = 64.5%; CG = 45.5% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: Lumbago (22), lumbar spondylosis (15), discopathy (9), acute LBP (3), spondylolysis (3), spondylolisthesis (1), sacroiliitis (1) and un-classified (10). Duration of Pain: mixed, IG = 52.8 (6.11); CG = 93.9 Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 32) **–** E-Acu: Needling points chosen by palpation of quadratus lumborum and/or erector spinae, 2 points were used bilateraly, in total 4 points for each tx., 2 disposable needles used: 0.20 mm and 0.24 mm diam., 50 mm and 60 mm in length, needles inserted into muscles; 2 tx/wk for 2 wks, total 4 tx sessions Drop outs: 1 CG (n = 36) – TENS: stimulating points chosen by palpation of quadratus lumborum and/or erector spinae, 2 points were used bilateraly, in total 4 points for each tx; at freq. 1Hz for 15 min adjusted to make contraction w/o pain; same as IG; Drop outs:4	**Outcomes:** Pain: Pain relief scale (VAS-10 cm) before run in period; response rate of pain releif scale, n %; after run in period Disability: JOA score after 1 wk run in **Results:** Immediate post tx: Pain: IG = 5.3 (3), CG = 5.9 (3.4); NR % pts with no pain: IG = 13, CG = 10; n of pts with >50% pain reduction: IG 41.9, CG = 30.3 Disability: IG = 14.3 (2.2), CG = 14.4 (2.7) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NA **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** There was no difference between groups in any parameter.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Thomas, KJ (2007)[95] Country: UK Quality score: 9/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 24 mos Final assessments: immediately post tx N screened: 298 N randomized: 239 N completed tx: 239 N attended last fu: NR **Eligibility criteria:** - inclusion: Patients aged 18-65 yrs with N-S LBP of 4-52 wk duration - exclusion: Possible spinal pathology, carcinoma, motor weakness, disc prolapse, past spinal surgery, bleeding disorders, or current Acu Tx	Mean age (SD/range): IG = 42 (10.8) vs. CG = 44 (10.4) yrs % of male: IG = 37.7% , CG = 42.5% **Racial composition:** IG (n = 100)-white; CG (n = 97.5) - white **Work status:** Full-time: IG = 51.6; CG = 56.3 **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Cause of Pain: N-S **Duration of Pain:** Chronic, IG = 17.1 (13.5);CG = 16.7 (14.6) Severity of pain (Grading): (both grps): Bothersome BP in past wk (extreme): 56% Co-interventions: Moxa (17.7%), massage (42.2%), acupressure (12.8%), cupping (4.5%), Chinese herbs (4.5%), diet (11.3%), yoga EX (3.3%), relaxation (3.0%)	**Groups** IG (n = 159) – Acu: 177 acupoints bilaterally and unilaterally, needles 25-40 mm long and 0.20-0.30mm in diameter; max 10tx/pt Drop outs: C = 13, D= 12, E = 36 CG (n = 80) – Usual Tx: Mix of PT, Med, and back EXs; NR Drop outs: D =21, E = 21	**Outcomes:** Pain: SF-36 Bodily Pain score; PPI of McGill questionnaire Disability: Oswestry Low Back Pain Disability – reported as % **Results:** Immediate post tx: Pain: IG = 60.9 (23), CG = 55.4 (25.4); IG = 2.43, CG = 2.77 ODI adjusted mean: 20.4 vs. 23.3 Short term: NR Intermediate: NR Long term, (12 montsh) Pain (PPI, adjusted mean): 2.44 vs. 2.51 ODI, adjusted mean: 20.1 vs. 20.6	**Outcomes:** QoL/ well being: SF-36 **Results:** Immediate post tx: NR Short term: IG = 20.4, CG = 23.3 Intermediate: NR Long term: NR **Harms:** collected for acu grp only: one pts visited accident and emergency with symptoms of painc attack following tx; no SAE during the trial

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Tsukayama, H (2002)[96] Country: Japan Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 2 wks Final assessments: imm. Post-tx N screened: 21 N randomized: 19 N completed tx: 19 N attended last fu: 19 **Inclusion:** LBP without sciatica, at least 2 wks history of pain and > 20 yrs of age **Exclusion:** radiculopathy of neuropathy, fracture, tumour, infection or internal disease, other general health problemsadn conflicting or ongoing txs.	Mean age (SD/range): IG = 47 (10) vs. CG = 43 (13) yrs % of male: IG = 11%, CG = 20% Racial composition: Assuming 100% Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, IG = 7.9 (5.4), CG = 8.5 (9.05) yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 9)– E-Acu:, insertion depth 20mm. e-stimulation was applied to the inserted needles freq of 1 Hz/15 min- then adjusted to max tolerable level, muscle contraction was observed. press tack needles were inserted after EA at 4/8 chosen points in each session and left in situ for several ds; 2tx/wk for 2 wks Drop outs: A = 1, B = 0 CG (n = 10) – TENS:. EA was applied in the same manner as IG. After each session a poulitice containing methy salicylic acid, menthol and antihistamine was prescribed to be applied at home in between treatmetns to the low back region; same as IG Drop outs: A = 0 B=0	**Outcome instruments:** Pain: VAS (100mm)- average during the intervention period Disability: JOA **Results:** Baseline: Pain: NR Disability: IG = 16.3 (2.3), CG = 15.6 (3.7) Immediate post tx: Pain: IG = 56 (10), CG = 78 (10) Disability: IG = 18.6 (0.6), CG = 15.8 (1.2) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** One case of each: IG- (n = 5) transient aggravation, discomfort due to ress tack needles, pain on needle insertion, small subcutaneous bleeding; CG – (n = 3) transient aggravation , transient fatigue, itching with electrode

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, Y (2007)[97] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 10 ds Final assessments: immediately post tx N screened: 120 N randomized: 120 N completed tx:120 N attended last fu: NR **Eligibility criteria:** - inclusion: Low back pain - exclusion: Osteoporotic; tumor; Spondylolysis with spondylolisthesis;Suppurative inflammation	Mean age (SD/range): IG1 = 37.73(5.62); IG2 = 39.57 (7.35); IG3 = 40.53 (8.27) yrs % of male: IG1 = 55; IG2 = 47.5; IG3 = 60 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S **Duration of Pain:** Unknown or mixed duration: IG1 = 2.32 yrs (0.54); IG2 = 2.78yrs (0.53); IG3 = 2.92 yrs (0.26) **Severity of pain (Grading):** NR **Co-interventions:**NR	**Groups** IG1 (n = 40) – E-acu: G6805 E-acu Therapy Instrument; 4-6Hz, 15min/d for 10 ds Drop outs: B= 0 IG2 (n = 40) – Acupoint injection of Danggui:NR; 0.5-1ml/d for 10 ds Drop outs: NR IG3 (n = 40) – acupoint injection of O_3: German instrument; 30ug/ml x 3-5 ml/d for 10 ds Drop outs: NR	**Outcomes:** Pain: *NR* Disability: NA **Results:** Baseline: NA Pain: NR Immediate post tx: Pain: NR Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Other: NA **Results:** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms: NR** **Summary of results (if provided):** acupoint injection of O3 is the best than other txs

Table 1.7 Low Back Pain - Acupuncture - Unknown - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Lee, J (2007)[98] Country: Korea Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Final assessments: immediately post tx N screened: 33 N randomized: 31 N completed tx: 23 N attended last fu: NR **Eligibility criteria:** - inclusion: Female Pts 20-50 yrs old with LBP and accompanied sciatic neuralgia - exclusion: other S causes such as fracture, tumor or infection of lumbar, cauda equina syndrome, spondylolisthesis, spondylosis grade II-IV, osteoporosis, scoliosis, health examination, CLBP due to heavy labour.	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** 100% with radiating pain Duration of Pain: Unknown, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 16)– Kuesu-point acu: Acu on B25, B26, & B60 with Kuesu point (3-cun from the sacrum center, paralleled to the 4th sacrum foramen) Raising, thrusting, twirling or rot techniques were used to gain "de-Qi". Needles inserted 4-5cun 90° relative to skin surface; 4-5 tx/wk for 3wks, needle inserted for 11 min. Drop outs: A = 2 B = 6 CG (n = 15) – Non Kuesu-point acu: Acu on same points as IG without Kuesu point. On B25, B26; same as IG Drop outs: NR	**Outcome instruments:** Pain: Pain rating scale (0 -100) Disability: NA **Results:** Immediate post tx: Pain: 5.30 vs. 2.40 Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results- mean:** Immediate post tx Estimation Index of Backache (0 – 100): 0.45 vs. 0.26 Difference between before and after tx (after- before): 38.8 vs. 19.0 Pain elimination ratio (%): 73.3% vs. 40.0% on ROM test; 53.3% vs. 20.0% on motor test, and 66.7% vs. 30.0% on walking on heel test. Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Li, Y (2006)[99] Country: China Quality score: /13 Initial of reviewer: FY	**Trial Design-**RCT Tx duration: 1 month Fu duration (last assessment): immediately post tx N screened: NR N randomized: 77 N completed tx: 77 N attended last fu: 77 (attrition NR) **Inclusion:** adult without any major complications and diagnosis of prolapsed lumbar inter vertebral disc **Exclusion:** NR	Mean age (SD/range):NR years % of male: NR Racial composition: assumed all Asian Work status: NR Other socio-demographics: No data reported Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** LBP **Cause of Pain:** Specific: prolapsed disc Duration of Pain, mean (SD/range): NR Severity of pain (Grading): NR Current treatment/ co-intervention common in all groups: NR	**Groups** IG (n = 40)– Acupuncture, by therapist at Shenshu (BL23), Dachangshu (BL 25), Baliao (BL 31, 32, 33, 34), Zhibian (BL 54) combined with polarized light – treatment duration: 1 month CG (n = 37) – Western medication: Dikelake (75 mg) once daily—total treatment duration = 1 month	**Outcomes (describe instrument used):** Curative rate (markedly cured) Pain (VAS) **Results-** Immediate post tx: Pain-mean: Baseline: 6.05 (1.18) vs. 5.95 (1.22) Post tx: 2.28 (0.95) vs. 3.49 (1.45)—p < 0.05 % of pts with markedly cured status: 95% vs. 75% Short term: NA Intermediate: NA Long term: NA	**Outcomes (describe instrument used):** No other relevant outcomes reported

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Wang, Z (2009) [100] Country: China Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 2 course NR Final assessments: immediately post tx N screened: NR N randomized: 139 N completed tx: NR N attended last fu: NR **Inclusion:** pts with senile radical xciatica **Exclusion:** NR	Mean age (SD/range): IG = 68 (3.5) vs. CG = 67 (3.7) yrs % of male: IG = 58.8%, CG = 59% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Sciatica 100% with radiating pain Duration of Pain: NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 70)– E-Acu: acu points such as BL 24, BL 25, BL 26; 2 courses (possible 5-7 ds in each course) Drop outs: NR CG (n = 69) – TENS: skin electrode sticking at the PPT point of the nerve trunk connected with pulse current Drop outs: NR	**Outcome instruments:** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: AN Pain: Disability: Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: cure rate (QoL) at the end of each course **Results:** Immediate post tx: % improved: IG = 80%, CG = 44.9% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** end of 1st course the cured rate was 41.1% vs. 29%

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Wu, Y (2004)[101] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 20 ds Final assessments: immediately post tx. N screened: Not mentioned N randomized: 300 N completed tx: NR N attended last fu: NR **Eligibility criteria:** - inclusion: diagnosed as lumbar intervertebral disc protrusion, 25-60 yrs, stransverse oscillatory rot using other tx or medicine, signed consent form - exclusion: pts with spondylolysis, infection, all body collagen immune disease using glucocorticoid, pts whose symptoms became worse during the study.	Mean age (SD/range): NR % of male: NR **Racial composition:** Asian **Work status:** NR **Other socio-demographics:** **Co morbidities:** NR **Prior episode of pain if acute:** NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain**: Disc/joint disease **Duration of Pain:** NR **Severity of pain (Grading):** NR **Co-interventions:** NR	**Groups** IG1 (n = 100) **–** E-acu: at Shiqizhui, yaoyangguan, huantiao, yanglingquan (affected side) + geshuxue + hegu + yinlingquan (two sides) for pts with cold dampness and hot dampness; + sanyinjiao for liver and kidney deficit. retention 20 min; 1 tx/d, 10 tx/course, 5 ds between courses x 2 courses, after 1st course add lumbar traction (5min, 1tx/d, 10tx) Drop outs: unknown IG2 (n = 100) – Acu: same as IG1; same as IG1 Drop outs: unknown CG (n = 100)– Medicine: fenbid 75 mg/time; 1 tx/d,10tx/ course, 5 ds between courses x 2 courses Drop outs: unknown	**Outcomes:** Pain: NA Disability: NA **Results:** Baseline: NA **Pain: NA** Immediate post tx: NA Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: well being, B, using both Chinese and Western diagnostic and therapeutic standard for Lumbar intervertebral disc protrusion **Results:** Immediate post tx: IG1 = 88%, IG2 = 72% , CG = 76% improved Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 1.8 Low Back Pain - Acupuncture - Unknown - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Edelist, G (1976)[102] Country: Canada Quality score: 2/13 Initial of reviewer: SG	**Trial Design** **RCT** **Tx duration:** 2 ds **Final assessments:** immediatedy post tx **N screened:** NR **N randomized:** 30 **N completed tx:** NR **N attended last fu:** NR **Inclusion:** Pts with disc disease- not responding to conventional therapy including bed rest, analgesics, heat, and PT **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc disease **Duration of Pain:** NR **Severity of pain (Grading):** NR **Co-interventions:** NR	**Groups** IG (n = 15)– Acu: needles inserted bilaterally(Ta-ch'ang-yu: 3.6 cm lateral to the midline at a level between the 4th and 5th lumbarvertebrae- and the distal margin of the gastrocnemius muscle); needles were manip. until Te Chi was elicited-needles then attached to ES G68.5 and set to stimulate at a freq of 3-10 Hz with an intensity tolerable to pts. Needles were stimulated for 30 sec then removed; 3 tx over 2 ds Drop outs: NR CG (n = 15) – Sham acu: needles as IG inserted at level of L4-5 bilaterally, 15cm lateral to midline, needle in each leg 10cm below politeal fossa, 6cm lateral to midline, stimulated as IG; same as IG Drop outs: NR	**Outcome instruments:** Pain: Patients with no pain measured by VAS Disability: NR **Results:** Immediate post tx: n (%) of pts with no pain: IG = 7 (46.7%), CG = 6 (40%) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR Harms: NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Garvey, TA (1989)[103] Country: U.S Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 1 tx, NR Final assessments: 3 mo N screened: NR N randomized: 63 N completed tx: 63 N attended last fu: 63 **Inclusion:** pts treated for strain LBP (defined as non-radiating pain with normal neurologic examination, absence of tension signs and normal lumbosacral roentgenograms) with nonsteriodal anti-inflammatory agents, hot showers 2xd, and avoidance of activity that might aggrevate the pain for 4 wks (initial run in period) **Exclusion:** NR	Mean age (SD/range): total 38 yrs % of male: 65.1% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Mechanical strain **Duration of Pain:** NR **Severity of pain (Grading):** NR **Co-interventions:**hot shower twice a d and restricted physical activity-causioned against starting any EX program, same in all groups	**Groups** IG1 (n = 13)– TP lidocaine injection; one time tx Drop outs: 3 IG2 (n = 14) – TP: 0.75 ml of 1% lidocaine and 0.75 ml of Aristospan (20 mg/ml), using a 21-gauge needle after and isopropyl alcohol wipe; one time tx Drop outs: 3 IG3 (n = 20) – Dry needling injection: single dry needle stick (i.e. acu) with a 21 gauge needle after and isopropyl alcohol wipe; one time tx Drop outs: 2 CG (n = 16) – Ethylchloride spray, followed by 20 seconds of acupressure using the plastic needle guard; one time tx Drop outs: 4	**Outcome instruments:** **Pain:** Pain improvement-improved at C (ITT); Pain improvement-improved at C (completers only) **Results:** **Immediate post tx:** NR **Short term:** **Pain:** IG1 = 31%, IG2 = 26%, IG3 = 55%, CG = 50%; IG1 = 40%, IG2 = 45%, IG3 = 61%, CG = 66% **Intermediate: NR** **Long term: NR**	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Inoue, M (2001)[104] Country: Japan Quality score: 10/13 Initial of reviewer: SG	**Trial Design** **RCT** Tx duration: single tx Final assessments: immediately post tx N screened: 21 N randomized: 16 N completed tx: 16 N attended last fu: NR **Inclusion:** Pts with lumbago who attended the university acu clinic as outPt and gave consent to attend to the trial. **Exclusion:** other S causes, systemic problems; pts who can't stransverse oscillatory rot conflicting /ongoing tx; problem of general condition; (8) dementia; pregnancy	Mean age (SD/range): IG = 55.1 (18.8) vs. CG = 56.3 (18.2) yrs % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Lumbago Duration of Pain: NR Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 10)– Acu: one needling point chosen from lumbar area: most painful locus detected. Needles inserted and sparrow-picking technique performed for 20 sec. pts treated once time immediately before regular acu tx; single tx Drop outs: 0 CG (n = 6) – Sham Acu: One needling point was chosen from lumber area: most painful locus was detected, as same as RA group, mimicked needle insertion: tapped head of needle guide tube, and then gesture of needling was performed for 20 sec. Pts were treated one time immediately before regular acu tx; single tx Drop outs: 0	**Outcome instruments:** Pain: VAS of(100 mm) pain at the most restricted action **Results:** Baseline: Pain: IG = 72.2 (19), CG = 68.2 (12.8) Immediate post tx: Pain: IG = 37.3 (24.4), CG = 64.1 (13.5) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** There was difference between the IG and CG

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Kawase, Y (2006)[105] Country: Quality score: 10/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 64 N completed tx: 64 N attended last fu: NR **Inclusion:** NR **Exclusion:** Those who do not have good overall physical status Those who were found inappropriate for acu therapy (based on hand examination (e.g., those with pathological reflex, pain while resting, pain when needling)	Mean age (SD/range): IG1 = 47.2 (17.6), IG2 = 57.8 (13), IG3 = 54.5 (16.3), CG = 51.7 (18.1) yrs % of male: IG1 = 42%, IG2 = 77%, IG3 = 60%, CG = 47% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: NR, IG1 = 51 (65), IG2 = 48 (49.8), IG3 = 47.4 (74.1), CG = 49.3 (69.9)-(not sure if values measured in d, wks, mo, or yrs)-SG Severity of pain (Grading): NR Co-interventions: Point therapy (BL40)	**Groups** IG1 (n = 12)– Body Acu pole tx + low freq. acu: CV12, LR14, ST25, CV6, BL10, GP20, BL11, GB21, BL13, BL 14, BL 20, BL23, BL25, point therapy: BL40, Low freq. acu: BL23(-) to BL40(+), 5Hz, 2V, 5 min, depth 5-7 mm; 1 tx Drop outs: 0 IG2 (n = 13) – Body acu pole tx: sham acu:BL20, BL23, BL25; NR Drop outs: 0 IG3 (n = 20) – Low freq. acu: 30mm No18. or Np 20 disposal stainless steel needle; NR Drop outs: 0 CG (n = 19) – Sham Acu: NR – possibly same as IG2-SG; NR Drop outs: 0	**Outcome instruments:** Pain: Therapeutic effectiveness (VAS) Disability: Activities of daily living (numeric data not shown) **Results:** Immediate post tx: Pain: 51.0 (65.0) vs. 48.0 (49.8) vs. 47.4 (74.1) vs. 49.3 (69.9) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NA **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Significant improvement ($p<0.05$) in pain (in terms of VAS scores) and ADL (in terms of JOA scores) was found for all groups except for CG

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Kurosu, Y (1979 &1980)[106] Country: Japan Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: 3 mos N screened: 20 N randomized: 20 N completed tx: 20 N attended last fu: 20 **Inclusion:** Pts with LBP or the LB and sacral region. **Exclusion:** NR	Mean age (SD/range): majority range 40 - 50 yrs % of male: IG 1 & 2a = 50%, IG 1 & 2b = 55% Racial composition: Asian Work status: NR Other socio-demographics:NR Co morbidities:NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Non-S Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG 1a (n = 10) Acu: needles retained for 10 min in 6-8 points in LB region: BL23, 24 25, 26, 27, 31, 52, and 3 extra points,needles (50 mm x 0.25 mm) inserted at depth of 2-4 cm depended on const. of pts; 1b (n = 10) – same as 1a + needle retention in abdominal points CVF4, 12 and bilateral ST25, depth of insertion 1-1.5 cm for 10 min.; NR Drop outs: 0 CG 2a (n = 10) Garlic moxibusion(acu?): same points as IG, detail NR, put garlic on surface of body and burn moxa on that; 2b (n = 10) –simple needle insertion: needle inserted and removed at same points as IG +needle retention as IG 1b ; NR Drop outs: 0	**Outcome instruments:** Pain: Pain recovery score by questionnaire: 2nd visit before 2nd tx; 4th visit before 4th tx **Results:** Immediate post tx: NR Short term: IG 1a = 0.58 (0.64), 1b = 1.18 (0.747), CG 2a = 0.42 (0.66), 2b = 0.22 (0.253) ; IG 1a = 0.865 (0.799), 1b = 0.625 (0.648), CG 2b = 0.22 (0.253) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** In tx of LBP, eedle retention technique was much superior to simple needle insertion technique.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Mencke (1988)[107] Country: Germany Quality score: 9/13 Initial of reviewer: SG Exclude: Shoulder and Back	**Trial Design** **RCT** **Tx duration:** 3 wks **Final assessments:** 8 wks **N screened:** 75 **N randomized:** 75 **N completed tx:** 75 **N attended last fu:** NR **Inclusion:** Pts have previously been treated unsuccessfully (GP, orthopedic, physiotherapist), no involvement in other therapies **Exclusion:** NR (anyone not meeting inclusion criteria)	Mean age (SD/range): Both grps together: 49.4, Range 29-79 % of male: 49.3% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: No Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S + disc herniation **Duration of Pain:** unknown **Severity of pain (Grading):** VAS (0-10) but NR **Co-interventions:** none	**Groups** IG (n = 40)– Typical AP: Needles were placed within the affected segment near AP and TPs; 6 tx sessions over 3 wks, 6-12 needles/session, AP needles 0.2-3cm depth Drop outs: none CG (n = 35) – Atypical AP: Needles were placed within the affected segment but far away from AP and TPs; Session 1: 5 mins, session 2: 10 mins, session 3: 15 mins, session 4 +>: 20 mins Drop outs: none	**Outcomes:** Pain: VAS Pain scale **Results:** Immediate post tx: Pain: 41.0 vs. 83.0 Disability: 0.0043, vs. 0.0461 (abduction), IG = 0.0044, CG = 0.001(anteversion), IG = 0.0177, CG = 0.0757(retroversion), IG = 0.0567, CG = 0.4609 (outer rot), IG = 0.0001, CG = 0.2324 (inner rot),IG = 8.0, CG = -0.3 (anteversion of head) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NR Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** highly signif. differences in improvement between typically & atypically treated Pts

Table 1.9 Low Back Pain - Manipulation – Acute/Sub-acute - Specific Pain – No Studies

Table 1.10 Low Back Pain – Manipulation – Acute/Sub-acute - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Alaksiev, A (1996)[108] Country: Bulgaria Quality score: 3/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 20 ds Final assessments: immediately post tx N screened: 64 N randomized: 65 N completed tx: NR N attended last fu: NR **Inclusion: NR** **Exclusion:** NR	Mean age (SD/range): NR % of male: balanced Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Acute, Sub-acute, NR Severity of pain (Grading): NR Co-interventions:NR	IG1 (n = 22) – High velocity, low amplitude technique: NR; 2-4 sessions, 20 ds Drop outs: NR IG2 (n = 21) – Post-isometric relaxation; 12 sessions Drop outs: NR CG (n = 21): shame manipulation; 2-4 tx	**Outcomes:** Disability: NA **Results:** Baseline: Disability: NR Immediate post tx: Disability: Short term: NR Intermediate: NR Long term: NR No numeric data given	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hadler NM (1987)[109] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: NR Final assessments: immediately post tx N screened: 57 N randomized: 54 N completed tx: NR N attended last fu: NR **Inclusion:** Pts aged 18-40 yrs with acute LBP (≤ 1 mo), no other episode of back pain in previous 6 mo, not work-related pain, no previous surgery **Exclusion:** NR	Mean age (SD/range):NR(trial intended for a younger adults) % of male: 48% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** NS Duration of Pain: Acute ≤ 2 wks: n = 13 Severity of pain (Grading): NR Co-interventions:NR	IG (n = 28) – Mobilization: Pt was positioned first on the right and then on the left side; the operator grasped both knees with one arm while pressing down on the on the pts' lower spine with the opposite hand; then the subjects legs were gently flexed on the hips twice; NR Drop outs: NR CG (n = 26) – Manipulation: Pt was positioned on right, then on the left side; then pt positioned in a spinal rot position, shoulders and the face up to the ceiling and pelvis rotated down toward the table; a long lever HV thrust was applied to the lower spine while stabilizing the thorax; NR Drop outs: NR	**Outcomes:** **Pain:** NR Disability: RMDQ **Results:** Immediate post tx: Disability: IG = 9.1 (5.3), CG = 3.9 (4.3) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Manipulation was more effective than Mob at reducing disability score in the first wk of tx (time and tx interaction significant $p < 0.04$) for those with duration of pain for 2-4 wks (longer pain duration at entry)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hoiriis K (2004)[110] Country: Mariette, GA Quality score: 8/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 2 wks Final assessments: 3 mos N screened: 535 N randomized: 156 N completed tx: 110 N attended last fu: 110 **Inclusion:** 21 - 59 yrs old with uncomplicated LBP of 2 - 6 wks duration **Exclusion:** Previous spinal surgery, spinal fractures, spinal stenosis, and known or suspected disk herniation; previous LBP within 18 mos; neuropathy; spondylitis; vascular disease; malignant disease; cervical complaint; pregnancy; and personal injury litigation.	Mean age (SD/range): IG1 = 42.2 (9.7), IG2 = 40.5 (10.1), CG = 43.1 (9.8) yrs % of male: 56.7% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: IG1 = 0.36 (0.6), IG2 = 0.46 (0.64), CG = 0.58 (0.67) Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Sub-acute, IG1 = 3.7 (1.3), IG2 = 3.6 (1.5), CG = 3.8 (1.4) wks Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 50)– Chiro adjustments and medical placebo: upper cervical and lumbar, sacral, or pelvic adjustments performed manually with HVLA thrust; 7 visits of chiro, 2 wks Drop outs: NR IG2 (n = 53)– muscle relaxants and sham adjustments: designed to mimic chiro adjustments; 2 capsules, 3 times daily from A, B, C, D bottles, 2 wks Drop outs: NR CG (n = 53) – medical placebo and sham adjustments: same as IG1 and IG2; Drop outs: NR	**Outcomes:** Pain: VAS (10 cm) Disability: Oswestry **Results-** Immediate post tx: Pain: IG1 = 2.44 (2.22), IG2 = 2.73 (2.15), CG = 3.18 (2.4) Disability: IG1 = 17.02 (13.75), IG2 = 16.99 (12.18), CG = 19.35 (13.7) Short term: VAS: IG1 = 1.71 (1.88), IG2 = 2.24 (2.23), CG = 2.21 (2.02) ODQ: IG1 = 11.94 (11.93), IG2 = 16.04 (16.12), CG = 16.32 (12.95) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hsieh, C (2002)[111] Country: California, US Quality score: 4/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3 wks Final assessments: 6 mos N screened: 206 N randomized: 200 N completed tx: 184 N attended last fu: 178 **Inclusion:** 18 yrs or older, LBP duration of more than 3 wks-6 mo for current episode or a pain-free period of at least 2 mo in preceding 8 mo for recurrent **Exclusion:** pregnancy; serious medical problems, definable neurologic abnormalities in the lower extremities; spine disorders with bony lesions, with radiographs were taken as clinically indicated; sign. mental disorders; obesity; leg pain with positive nerve root tension; history of lumbar surgery	Mean age: 48 yrs % of male: 65.4% Racial composition: White: 71.7% Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Sub-acute, CG = 10.7 (6.6), IG1 = 11.8 (6.8), IG2 = 11.8 (7.2), IG3 = 11.5 (7.2) wks Severity of pain (Grading): NR Current tx/ co-intervention: 10% reported use of otc pain Meds. 6 pts reported 8 visits to health care practitioners. Among these visits, 2 were related to LBP.	**Groups** CG (n = 48)– Back school program: videos; instructions and supervised home programs 1 x/wk for 3 wks Drop outs: mB = 6 IG1 (n = 51) – Myofascial therapy: sprays and stretches after isometric contraction at 50-70% MVC; 3 x/wk for 3 wks Drop outs: 2 IG2 (n = 49) – SM manipulation: HVLA maneuver in the lumbar / sacroiliac Drop outs: B = 3,D = 5 IG3 (n = 52) – SM + myofascial therapy Duation as other grps Drop outs: B = 4	**Outcomes:** Pain: VAS Disability: Roland Morris activity sclae **Results-** Immediate post tx: Pain: CG = 2.13 (1.28), IG1 = 2.78 (1.82), IG2 = 2.58 (1.93), IG3 = 2.04 (1.35) Disability: CG = 4.26 (3.52), IG1 = 5.8 (5.12), IG2 = 4.42 (4.92), IG3 = 3.73 (3.76) Short term: NR Intermediate: Pain: CG = 2.29 (1.98), IG1 = 2.99 (2.28), IG2 = 2.4 (2.41), IG3 = 2.24 (2.01) RMAS: CG = 3.48 (3.86), IG1 = 5.06 (4.78), IG2 = 3.29 (4.73), IG3 = 3.56 (3.46) Long term: NR	**Outcome instruments:** QoL/ well being: NR Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** 23 pts reported adverse effects from tx-mostly transient exacerbations of symptoms, n = 2 claimed that IG2 aggravated symptoms, n = 1 constant tinnitus in IG1

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Morton, J (1999)[112] Country: US Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4 wks Final assessments: 3 mos N screened: NR N randomized: 29 N completed tx: 29 N attended last fu: 29 **Inclusion:** 18-70 yrs with acute mechanical LBP of approx. 4 wks or less. Pain located between T12 and the gluteal fold (might radiate to one lower limb) **Exclusion:** Contraindications for manipulations neoplastic disease, bone disease, inflammatory arthritis, advanced diabetes mellitus, vascular abnormalities, visceral arterial disease, congenital generalized hypermobility, severe nerve root pain, claimants.	Mean age (SD): IG = 42.9 (9.1) vs. CG = 46.4 (9.0) yrs % of male: IG = 27%, CG = 43% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain: Non-S** Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 15)– Manipulation + Exercise: HV thrust to joint to briefly force beyond its restricted ROM or sudden HV short-amp motion delivered at pathological limit of accessory ROM to gap the joint, manipulation L1-L5/L5-S1 traction gap, EXs designed to re-educate multifidus musculature in its stabilizing role; 8 tx, 4 wks Drop outs: NR CG (n = 14) – Exercise: Same as IG, training in hands-knee position, gradually to standing position with lumbar spine in neutral and enhanced by use of pelvic stabilizer; same as IG Drop outs: NR	**Outcome instruments:** Pain: VAS (0 – 100) Disability: Roland-Morris Disability **Results-**Baseline: Pain: IG = 49.73 (23.62), CG = 46.57 (25.1) Disability: IG = 10.6 (5.23), CG = 10.07 (6.4) Immediate post tx: Pain: IG = 2.4 (3), CG = 25.43 (17.34) Disability: IG = 1.93 (2.52), CG = 6 (5.22) Short term: AVAS-IG = 0 (0), CG = 13.57 (9.4) RMD: IG = 0.33 (0.82), CG = 3.64 (2.8) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results: NA** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Pts who receive manipulation with EXs for acute LBP of mechanical origin will improve more and faster than pts who receive an EX program alone.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Pope, M (1994)[113] Country: US Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3 wks Final assessments: 3 wks N screened: NR N randomized: 150 N completed tx: 148 N attended last fu: 148 **Inclusion:** ages 18-55 yrs; general good health; LBP between 3 wks-6 mo; free from LBP for minimum 3 wks **Exclusion:** pregnancy; sciatica; neurologic deficits, loss of sensation, strength and reflex; no prior vertebral fracture, tumor, infection or spondyloarthropathy; no prior back surgery; Davenport weight index greater than 33; no prior MT for this episode of LBP	Mean age (SD/range): 32 yrs % of male: 62% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NS Duration of Pain: Mix Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 60)– Manipulation: dynamic short level, HVLA thrust on lumbar spine/ sacroiliac joint; 3 x/wk for 3 wks Drop outs: B = 17 CG (n = 30) – Soft-tissue massage: Effleurage conducted with Pt in prone position; 15 min/tx, 3 x/wk for 3 wks Drop outs: B = 10 IG2 (n = 30) -TMS: max 91 mA, 4 electrodes on back in area, for 8 hrs/d; 1 hr at a time; 1x/wk for 3 wks Drop outs: B = 10 IG3 (n = 30) – Lumbo sacral corset r max. 10 min at a time, 3 x/d; 1x/wk for 3 wks Drop outs: B = 6	**Outcomes:** Pain: 10 cm VAS Disability: **Results-** Immediate post tx (after 4 wks): Pain change from baseline: IG = -24.1 (27), CG = -17.2 (25.1), IG2 = -9.6 (30), IG3 = -15.9 (27) VAS at 4 wks, mean: IG = 8.61; CG = 7.23; IG2 = 6.86; IG3 = 5.28 Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: ROM-modified Schober's test: Flexion; ExtensionImmediate post tx: -mean change: IG = 0.38 (1.25), CG = -0.08 (1.2), IG2 = -0.02 (0.82), IG3 = 0.33 (0.93); IG = -0.29 (0.59), CG = -0.32 (0.63), IG2 = 0.63 (0.89), IG3 = -0.27 (0.72) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Postacchini (1988)[114] Country: USA Quality score: 3/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: One session Final assessments: 3 mos N screened: 1880 N randomized: 95 N completed tx: 69 N attended last fu: NR **Inclusion:** LBP; presence of palpatory cues indicating that manipulation might be successful; absence of psychosocial problems that might affect tx outcome, absence of contraindications for vertebral manipulation; absence of previous experience with manipulative therapy. **Exclusion:** Pregnancy, previous experience with manipulation, disability income, pending litigation, previous back surgery, obesity, drug or alcohol abuse, and pain not treatable by manipulation of the lumbosacral area.	Mean age (SD/range): IG = 30.1 (8.4) vs. CG = 32.1 (9.8) yrs % of male: 59% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Acute/Sub-acute, IG = 30 (27.7) ds, CG = 19.6 (20.4) ds Severity of pain (Grading): NR Co-interventions:NR	IG (n = 56) – Rotational manipulation: Rotational manipulation of the lumbosacral spine; 1 tx Drop outs: NR CG (n = 39) – Soft-tissue massage; 1 tx Drop outs: NR	**Outcomes:** Pain: % pts reporting pain (severity level) Disability: **Results-**Baseline: Pain: NR Disability: NR Immediate post tx: Pain: Pts reporting improvement in amount of pain 84% in IG vs. 68% in CG Disability:NR Short term: no pain data could be used. Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Other: Straight leg raising (°) Immediate post tx: Improvement: 3.3 vs. – 0.5 Short term: Improvement 7.8 vs. 8.8 Intermediate: NR Long term: NR **Harms:** NR **Summary:** at discharge there was no significant difference between groups- tx was effective for 88% vs. 86% of pts

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Postacchini (1988)[115] Country: Italy Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: Final assessments: 6 mos N screened: 459 N randomized: 398 N completed tx: 375 N attended last fu: NR **Inclusion:** Pts presenting at two LB clinics, 17-58 yrs **Exclusion:** BP related to neo-plastic or infectious diseases of the spine, pregnancy, nursing women, pts with serious general diseases, psychiatric disturbances, medico-legal litigation	Mean age (SD/range): NR % of male: 50.5% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Mixed, NR Severity of pain (Grading): NR Co-interventions:NR	IG1 (n = 87) – Manipulation: standard technique; 7 tx for 1st wk, then 2 tx for up to 6 wks IG2 (n = 81) – Drug therapy: Diclophenac "full dose"; 10-20 ds IG3 (n = 78) – Physiotherapy: massage, electrotherapy, infrared, etc.; 7 tx/wk for up to 3 wks CG1 (n = 29) – Bed rest: NR; 15-24 hrs for up to 8 ds CG2 (n = 50) – Back school: NR; 4 sessions in 1 wk CG3 (n = 73) – Placebo gel: NR; 2 tx/ds for up to 2 wks Drop outs: Total lost to follow-up = 23	**Outcomes:** Mean improvement, **Results:** Immediate post tx: Not presented at this table. Short term: Acute: 9.7 vs. 10.7 vs. 8.4 vs. 7.5 vs. 7.3 Chronic: 2.6 vs. 2.2 vs. 4.2 vs. 4.6 vs.1.2 Acute with chronic history: 6.8 vs. 8.7 vs. 9.9 vs. 10.4 vs. 5.4 Acute with radiating pain: 9.2 vs. 8.7 vs. 6.0 vs. 5.7 vs. 5.1 Chronic with radiating pain: 6.2 vs. 7.5 vs. 6.4 vs. 2.8 vs. 2.1 Intermediate: (data reported but not presented in this table) Long term: NR	**Outcomes:** QoL/ well being: NR Results:NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** in pts with acute improvement initially observed in SM grp (not at 6 mos fu, with no diff between tx grps); in pts with chronic pain best result was achieved with PT at short term and BSP at 6 mos fu.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Rasmussen, G (1979)[116] Country: Denmark Quality score: 2/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 2 wks Final assessments: immediately post tx, and 1 yr N screened: NR N randomized: 24 N completed tx: 24 N attended last fu: NR **Inclusion:** Male outPts, 20-50 yrs of age with LBP, without signs of root pressure; duration less than 3 wks; no tx except analgesics prior to the trial **Exclusion:** contraindications to manipulation	Mean age (SD/range): 34.9 (7.3) yrs (total) % of male: 100% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 12) – Short wave: NR; 3 times/wk for 2 wks Drop outs: B = 2 (total) CG (n = 12) – Manipulation: Rotational manipulation in the pain free direction; as IG	**Outcome instruments:** Pain: Restoration (n of pts with >50% pain reduction) Disability: **Results:** Immediate post tx: Pain: IG = 3, CG = 11 Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: Schober's test Immediate post tx: pts with improvement: 12 vs. 6 pts with no improvement: 0 vs. 6 Short term: NR Intermediate: NR Long term: all restored pts were free of sympomes for at least one yr **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Sanders GE (1990)[117] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: one tx Final assessments: immediately post tx N screened: NR N randomized: 18 N completed tx: NR N attended last fu: NR **Inclusion:** Pts with acute LBP (< 2 wks) naïve to chiropractic manipulation and had not taken any pain Med for 48 hrs prior to the study enrollment **Exclusion:** NR	Mean age (SD/range): NR % of male: 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NS Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 6)– SM: A single HVLA adjustive SM at the L4/L5-S1 spinal region; one tx Drop outs: NR CG (n = 6) – Sham: light physical contact at the L4/L5-S1 spinal region; one tx Drop outs: NR CG2 (n = 6) – No tx; NA; NA Drop outs: NR	**Outcome instruments:** Pain: VAS **Results:** Baseline: Pain: IG = 2.67 (0.52), CG = 2.33 (0.52), CG2 = 2.17 (0.41) Immediate post tx: Pain: data presented in graphs- not used in this report. Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: plasma endorphin levels Results: Baseline: NA Immediate post tx: NA Short term: NA Intermediate: NR Long term: NR **Harms:** NR **Summary:** there was a significant reduction of pain in manipulation grp but not in the other grps

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Shah, M (1989)[118] Country: United Kingdom Quality score: Not applicable (abstract only) Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 16 N completed tx: NR N attended last fu: NR **Inclusion:** pts with acute back pain **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 10)– Manipulation: NR; 7 ds (assumed) Drop outs: NR CG (n = 6) – Naprosyn (oral Med): NR; 7 ds (assumed) Drop outs: NR	**Outcomes:** Pain: pain rating scale at d 0 – 7- no numeric data is reported Disability: disability questionnaire at d 0, wk 1, and wk 4 – no numeric data reported **Results:** Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR General imporvement **Results:** Immediate post tx: at d 7, 50% vs. 83% improved (data for wek 4 was incomplete) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
UK BEAM trial; Russell I (2004)[119] Country: United Kingdom Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4-8 wks Final assessments: 9 mos N screened: 3535 N randomized: 1334 N completed tx: NR N attended last fu: NR **Inclusion:** Pts aged 18-65 yrs with LBP (RMDQ ≥ 4) who had experienced the pain daily for past mo **Exclusion:** Serious spinal disorder (malignancy, OP, AS, cauda equina, infection, or compression), previous spinal surgery, severe mental disorder, CVD, hypertension (systolic blood pressure > 180 mm Hg and diastolic > 105 mm Hg), anti-coagulant Tx, steroids, RMDQ ≤ 3, English literacy	Mean age (SD/range): 43.1 (11.3) yrs (total) % of male: 43.2% total Racial composition: 95.8% White Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Acute Severity of pain (Grading): NR Co-interventions:NR	IG1 (n= 338) – GP: Based on UK National Acute BP Guidelines, Drop outs: n = 349 (total) CG1(n= 310) – Exercise; 8 sessions for 4-8 wks IG2 (n = 180) – Private manipulation: techniques used by chiropractitioner IG3 (n = 173) – manipulation - NHS-: as IG2 in NHS premises CG2 (n = 172) – Private-M + Exercise: as above CG3 (n = 161) NHS-M + Exercise: as IG2 and CG	**Outcome instruments:** Pain & Disability: reported as adjusted means-values not shown **Results:** CG1 (1.4, 95% CI: 0.6, 2.1) and IG2 (1.6, 95% CI: 0.8, 2.3) improved disability compared to GP immediately after the tx; IG2 improved disability at wk 9 post-tx (1.0, 95% CI: 0.2, 1.8) vs. IG1; for CG2, this improvement immediately after the tx was 1.9 (95% CI: 1.2, 2.6) and 1.3 (95% CI: 0.5, 2.1) at 9 mo after the tx; no difference between IG2 vs. IG3	**Outcomes:** QoL/ well being: **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** No SAE occurred. Other AE was NR.

Table 1.11 Low Back Pain – Manipulation – Chronic - Specific Pain---no trials

Table 1.12 Low Back Pain – Manipulation - Chronic - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Biedermann F (1980)[120] Country: Korea Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: NR Fu duration: 3 mos N screened: 1649 N randomized: NR N completed tx: NR N attended last fu: 59 **Inclusion:** Sudden onset usually associated with trauma, recent onset usually of 2 or 3 wks, abnormally low SLR tests **Exclusion:** Pregnancy, disorders of the spinal cord or cauda equina, advanced occlusive vertebral artery disease, spinal disease including congenital defects, marked spinal instability, herniated nucleus pulposus, osteoporosis, ankylosing spondylitis	Mean age (SD/range): IG = 31.4 (9.19) vs. CG = 29.7 (5.58) yrs % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = NR)**–** Rotational manipulation: pt's thoracic and lumbar spine extended and rotated in intent to stretch paravertebral structured in lumbosacral area Drop outs: NR CG (n = NR) – Soft-tissue massage: Pt and manipulator assumed same relative positions, but rotal movement of the vertebrae was minimized while the lumbosacral paravertebral areas were massaged. Drop outs: NR	**Outcomes:** Pain: Duration or relief (mean in ds) **Results:** Immediate post tx: Pain: NR Short term: IG = 8.01 (2.02), CG = 2.94 (0.52) Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Spinal flexibility: (numeric data NR) **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR Note: patitent who responded to SM tend to be older at start of LBP compre to those who were not.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Cote P (1994)[121] Country: Canada Quality score: 4/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: one session Final assessments: post-tx N screened: NR N randomized: 30 N completed tx: 30 N attended last fu: 30 **Inclusion:** Pts with mechanic CLBP > 2 mo **Exclusion:** seronegative spondyloarthropathy or rheumatoid arthritis, lumbar radiculopathy, hip pathology, abdominal/pelvic organ pathology, pregnancy, current use of muscle relaxants or anti-inflammatory drugs	Mean age (SD/range): 31 (7.15) yrs total % of male: IG = 37.5%, CG = 71.4% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Mechanical Duration of Pain: Chronic, 74 (83.3) mo (total) Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 16) – Mobilization: side-lying position, rot force was created at the lumbo-sacral junction or sacroiliac joints; joint taken to its limit of passive motion and HVLA thrust applied through the joint producing an audible sound; one session Drop outs: 0 CG (n = 14) – Manipulation: a long lever HV thrust applied to the lower spine while stabilizing the thorax in side lying and prone position ; one session Drop outs: 0	**Outcomes (instrument used):** Pain: PPT: L5 tender point; SI ligament tender point; gluteus tender point **Results:** Immediate post tx: PPT IG = 5.6 (2.1), CG = 5.0 (2.9) SI IG = 5.6 (2.1), CG = 5.5 (3.1) Gluteus pain IG = 5.6 (2.2), CG = 5.2 (2.7) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** The two groups did not differ in mean PPT scores for the three myofascial points (L5 tender point, SI ligament tender point, and gluteus tender point); ANOVA indicated no SS time*tx term interaction (P > 0.267)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Giles, LG (2003)[25,26] Country: Australia Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 9 wks Final assessments: 1 yr N screened: 533 N randomized: 115 N completed tx: 69 N attended last fu: 62 I**nclusion**: pts at least 17 yrs old with uncomplicated mechanical spinal pain for minimum of 13 wks, for long term fu (> 1 yr), those who received randomly allocated tx during 9 wk tx period **Exclusion**: pts with nerve root involvement, spinal anomalies (other than sacralization or lumbarization), pathology other than mild to moderate osteoarthrosis, spondylolisthesis of L5 or S1 exceeding Grade 1, previous spinal surgery,	Mean age (SD/range): IG1 = 23.8 (4.8), IG2 = 25 (8.1), CG = 29.5 (2.07) % of male: IG1 = 55.9%, IG2 = 51.4%, CG = 57.5% Racial composition: NR Work status: NR Other socio-demographics: 25.7% Pensioner /Unemployed Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: chronic (> 13 wks) Severity of pain (Grading): NR Co-interventions: NR	**Groups** IG (n = 36)– Acu: TP & distal analgesia producing sypatholytic acu points- insertion depth 20-50 mm, 2 tx/wk up to 9 wks Drop outs: B = 14, E = 6/20 IG2 (n = 36) – Spinal manipulation: HVLA thrust; 20 min/session, 2 tx/wk up to 9 wks Drop outs: B = 11, E= 4/23 CG (n = 43) – new Med: Celecoxib/Celebrex (200 - 400 mg/d), Rofecoxib/Vioxx (12.5 - 25 mg/d), paracetamol/acetaminophen (500 mg tablets 2-6/d up to 4 g/d) Drop outs: B = 21, E = 12/19	**Outcome instruments:** Pain: VAS (1 - 100)- ITT Disability: Oswestry Back **Results:** Immediate post tx: Pain: IG1 = 4 (3.7), IG2 = 3 (5.2), CG = 5 (3.7) Disability: IG1 = 26 (20.74), IG2 = 14 (24.4), CG = 32 (23.7) Short term: NR Intermediate: Long term: Disability IG1 = 13 (22.9), IG2 = 16 (17.8), CG = 24 (25.2)	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** N=22, 13 in IG1, 4in IG2, 5 in CG, n=1 committed suicide after end of tx; most frequent AEs were hematoma and bleeding

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Giles, LGF (1999)[122] Country: Australia Quality score: 1/13 Initial of reviewer: SG	**Trial Design-RCT** **Tx duration:** 3-4 wks **Final assessments: immediately post tx** **N screened:** 875 **N randomized:** 69 **N completed tx:** not clear **N attended last fu:** NR **Inclusion:** pts suffering from spinal pain for at least 13 wks; age of at least 18 yrs **Exclusion:** Nerve root involvements; spinal anomalities; pathology other than mild to moderate osteoarthrosis; previous spinal surgery and leg length inequality of >9mm with postural scoliosis	Mean age (SD/range): IG1 = 46.5 (9.6), IG2 = 42.5 (9.6), CG = 35 (14.1) yrs % of male: IG1 = 35%, IG2 = 53%, CG = 19% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S **Duration of Pain:** Chronic(13 wks), IG1 = 7.5 (10.4), IG2 = 6 (5.9), CG = 5 (9.6) yrs **Severity of pain (Grading):** NR **Co-interventions:** NR	**Groups** IG1 (n = 18)– Acu: treating clinician decided which form of acu taken-HWATO Chinese disposible acu guide tube needles 50mm long with a gauge of 0.25 mm for 20; 6 tx over 3-4 wks Drop outs: 26 IG2 (n = 32) – Manipulation: Spinal manipulation was performed to be safe and appropriate by the chiropractor for the spinal level of involvement only. A HVLA SM was performed; as IG1 Drop outs: 13 CG (n = 19) – Medication: tenoxican (20mg/d) and ranitidine (50mg x 2/ d); 15-20min/ tx over 3-4 wks Drop outs: 10	**Outcome instruments:** Pain: Pain (VAS) at time A, B (change from baseline) Disability: Owstery Disiablity Index at A, B(change from baseline) **Results:** Immediate post tx: Pain, mean change: -1.0 vs. -5.0 vs. -1.0 Disability, mean change: -7.0 vs. -16.5 vs. -0.4 Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Immediate post tx: Short term: NR Intermediate: NR Long term: NR Harms: NR **Summary:** SM more effective than acu or Med; overall 33 pts (43%) had to change to another intervention after study period because of inefficacy or side effects.% of necessary crossing over differed significantly (p = 0.002) with respect to 3 interventions, manipulation 22.2%, acu 60%, Med 62%

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Haas, M (2004)[123] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT- 4x2 factorial design – dose response of SM Tx duration: 3 wks Final assessments: immediately post tx N screened: 201 N randomized: 72 N completed tx: 72 N attended last fu: 67 **Inclusion:** Current episode of CLBP (> 3 mos) Must be 18 yrs and older and have English literacy **Exclusion:** prior chiro care in 3 mo before baseline; contraindications to SM; involvement in litigation for a health problem/non-compliance	Mean age (range): IG1 = 44 - 54 yrs, % of male: IG1 = 56%; IG2 = 50%, IG3 = 33%, IG4 = 44% Racial composition: majority (> 75%) White non-Hispanic Work status: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Non-S Duration of Pain: Chronic Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1/2 (n= 18): Spinal manipulation alone (SM) + PM (PM) 1 visits/ wk- 3 wks Dropouts: IG3/4 (n= 18) SM; or SM + PM 2 visits/wk- 3 wks Dropouts: IG5/6: (n= 18) SM; or SM + PM 3 visits/wk- 3 wks Dropouts: IG7/8: (n= 18) SM; or SM + PM 4 visits/wk- 3 wks Dropouts:	**Outcomes:** Pain: Von Korff Pain Scale (0-100) **Results-** Immediate post tx: Pain: IG1/2: 37 (29)/ 40 (31) IG3/4: 2 31 (21)/ 37 (22) IG5/6: 21 (12)/ 25 (22) IG7/8: 22 (24)/ 19 (16) Short term: Pain: IG1/2: 46 (27)/ 38 (23) IG3/4: 46 (26)/ 37 (20) IG5/6: 18 (20)/ 29 (18) IG7/8: 50 (25)/ 19 (14)	**Outcomes:** QoL/ well being: NR Disability: Von Korff Disability Scale (0-100) Immediate post tx: IG1/2: 27 (29)/ 31 (32) IG3/4: 25 (21)/ 21 (20) IG5/6: 5/6:13 (11)/ 21 (22) IG7/8: 10 (14)/10 (11) Short term: IG1/2: 30 (21)/ 26 (21) IG3/4: 37 (31)/ 22 (24) IG5/6: 8 (17)/ 21 (14) IG7/8: 39 (30)/ 13 (14) Intermediate: NR Long term: NR **Harms:** No AE was reported by pts

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Herzog (1991)[124] Country: Canada Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 4 wks Final assessments: 4 wks N screened: 120 N randomized: 29 N completed tx: 29 N attended last fu: NR **Inclusion:** Chronic sacroiliac joint problem, 18-50 yrs, ambulatory **Exclusion:** Extreme obesity	Mean age (SD/range): 33.5 yrs % of male: 67.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Mixed, NR Severity of pain (Grading): NR Co-interventions:NR	IG (n = 16) – Spinal manipulation: Manipulation (sacroiliac); 10 sessions over 4 wks, or until complete recovery Drop outs: B = 8 CG (n = 13) – Back school: stretching and postural EXs; Same as IG Drop outs: NR	**Outcomes:** Pain: VAS (0-10) Disability: Oswestry **Results:** Baseline: Pain: NR Disability: NR Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** No raw data reported. CG was a better tx modality than the IG according to the clinical measures of rehabilitation. Precisely opposite results were found for the biomechanical measures.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Lalanne, K (2009)[125] Country: Quebec Quality score: 1/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: one session Fu duration: imm. Post-tx N screened: 27 N randomized: 27 N completed tx: 27 N attended last fu: 27 **Inclusion:** 18-60 yrs; constant or recurrent LBP for more than 6 mo **Exclusion:** spondylolisthesis; axial skeletal inflammation or osteoarthritis; collagenosis; osteoporosis; spinal surgery; neuromuscular disease; lower limb musculoskeletal injuries; malignant tumor; hypertension; infection; or any other non-mechanical condition; radiculopathy; progressive neurological deficit; myelopathy; herniated lumbar disc; and severe pain >7 on VAS.	Mean age (SD): IG = 36.1 (12.3) vs. CG = 43.5 (10.5) yrs % of male: IG = 61.5%, CG = 42.8% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NS Duration of Pain: Chronic, <1 yr >10 yrs Severity of pain (Grading): Pts with severe pain (VAS > 7) were excluded Co-interventions:EX + education and counseling sessions about pain and stress management- + EMG biofeedback to relax the back during trunk flx task	**Groups** IG (n = 13)– Lumbar spine manipulation: spinous pull method - applied to middle lumbar segments; 1 manipulation Drop outs: 0 CG (n = 14) – Control: (no manipulation-side lying posture) same position as IG lying on left side for 10 sec Drop outs: 0	**Outcome instruments:** Pain: VAS (1-100) **Results:** Baseline: Pain: IG = 26.9 (21.8), CG = 23.3 (21.8) Immediate post tx: Pain: IG = 24.9 (22.3), CG = 30.1 (26.9) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Mean angles of flextion relaxation phenomenon/EMG activity (data not shown) Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Mohseni-Bandpei, M (2006)[126] Country: UK Quality score: 2/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: not clear, 3-6 wks? Final assessments: immediately post tx N screened: 233 N randomized: 120 N completed tx: 107 N attended last fu: NR **Inclusion:** Patients with CLBP, 18-55 yrs with pain in LB between L1 and L5 and the sacroiliac joints; had LBP > 3 mo, signs and symptoms interpreted to be referred from the lumbar spine and not other organs, good self-reported general health **Exclusion:** History of prior tx including manipulation, chiro, osteopathy, ultrasound; receiving disability benefit as a result of LBP; underlying disease	**Mean age** (SD/range): IG = 34.8 (10.6) vs. CG = 37.2 (10.2) yrs **% of male:** IG = 39%, CG = 43% Racial composition: NR Work status: NR Other socio-demographics: Smokers: 50%; Meds: 50%; Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic, IG = 35.9 (48.3); CG = 50.8 (62.9) Severity of pain (Grading): NR Co-interventions:1 pt dropped out during tx due to co-intervention	**Groups** IG (n = 60)– SM + Exercise, HV thrust applied on lumbar spine and sacro-iliac joint after end of range; 1st session 40 min, rest 20 min Drop outs: A = 5, B = 8 CG (n = 60) – Ultrasound + Exercise: Frequency of 1MHz used; 6 sessions, 1-2 times/wk	**Outcome instruments:** Pain: VAS (0-100) Disability: Oswestry Disability Index (%) Data shown are mean within group differences from baseline: **Results:** Immediate post tx: Pain: 41.6 vs. 25.1, p = 0.012 Disability: 17.9 vs. 10.1 Short term: NR Intermediate: Pain: 37.9 vs. 22.8 Disability: 16.7 vs. 11.5 Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** mean within group differences from baseline: Immediate post tx: lumbar flx (mm): 16.0 vs. 6 Lumbar extenstion (mm): 9.0 vs. 5.0 Short term: NR Intermediate: NR Long term: NR **Harms:** one Pt droped out due to TP, no indication of group allocation

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Postacchini (1988)[115] Country: Italy Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: Varied, see intervention detail Final assessments: 1 yr N screened: 459 N randomized: 398 N completed tx: 375 N attended last fu: NR **Inclusion:** Pts presenting at two LB clinics, 17-58 yrs **Exclusion:** BP related to neo-plastic or infectious diseases of the spine, pregnancy, nursing women, pts with serious general diseases, psychiatric disturbances, medico-legal litigation	Mean age (SD/range): NR % of male: 50.5% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Mixed, NR Severity of pain (Grading): NR Co-interventions:NR	IG1 (n = 87) – Manipulation: standard technique; 7 tx for 1st wk, then 2 tx for up to 6 wks IG2 (n = 81) – Drug therapy: Diclophenac "full dose"; 10-20 ds IG3 (n = 78) – Physiotherapy: massage, electrotherapy, infrared, etc.; 7 tx/wk for up to 3 wks CG1 (n = 29) – Bed rest: NR; 15-24 hrs for up to 8 ds CG2 (n = 50) – Back school: NR; 4 sessions in 1 wk CG3 (n = 73) – Placebo gel: NR; 2 tx/ds for up to 2 wks Drop outs: Total lost to follow-up = 23	**Outcomes:** Data reported in graphs for subgroups (data not shown) **Results:** Immediate post tx: Disability: IG = 9.1 (5.3), CG = 3.9 (4.3) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** no significant differences in outcomes of pain and disability at long term fu between groups.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Rasmussen J (2008)[127] Country: Denmark Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Final assessments: 2 wks, 4 wks, and 1 yr N screened: 97 N randomized: 72 N completed tx: 72 N attended last fu: NR **Inclusion:** 18-60 yrs; LBP more than 3 mo **Exclusion:** ongoing insurance claim; unsettled social pension claim; LBP caused by major accident; pain ext below knee; excessive distribution of pain according to a pain drawing; neurological diseases including known disc herniation; significant medical diseases including cancer; inflammation	Mean age (SD/range): IG = 38 vs. CG = 42 yrs % of male: IG = 51%, CG = 43% Racial composition: NR Work status: 7% Unemployed Other socio-demographics: 58% Married; 35% Smokers Co morbidities: Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR, % with radiating pain: IG = 54, CG = 78 Duration of Pain: Chronic, [median (quartiles) IG = 17 (6-47) mo; CG = 8 (4-41) mo Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 35)– Extension EX + manipulation: 2 simple ext EXs; high velocity, low amplitude thrust at the level of reduced movement, called dysfunction; 3-5 times/EX, repeated 4-6 times, at least once/hr Drop outs: Total for both groups: D=16 CG (n = 37) – Extension EX: 2 simple ext EXs; same as IG	**Outcomes:** Pain: VAS (0-10) **Results:** Baseline: Pain: IG = 5 (0.76), CG = 5 (0.76) Immediate post tx: Pain: --- Short term: at 4 wks VAS: IG = 3 (0.76), CG = 3 (0.76) Intermediate: NR Long term: at 1 yr VAS: IG = 2 (0.51), CG = 2 (0.51)	**Outcome instruments:** QoL/ well being: NR Degree of reduced mobility of most affected segments **Results:** Immediate post tx: Strong: 1 (3%) vs. 6 (17%) Medium: 10 (29%) vs. 6 (17%) Light: 24 (69%) vs. 23 (66%) Short term: NR Intermediate: NR Long term: NR **Harms:** 4 pts in IG repoted worsening of pain after 4 wks vs. 3 in CG Similar in 3 mos and 1 yr. No pts was hospitalized during fu perioe due to LBP or disc herniation

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Triano JJ (1995)[128] Country: US Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 4 wks Final assessments: 3 mos N screened: 1267 N randomized: 209 N completed tx: NR N attended last fu: NR **Inclusion:** Pts aged ≥ 18 yrs with mechanic CLBP (pain > 12 mo between L1 and L5 including sacroiliac joints) experiencing palpatory tenderness **Exclusion:** Neuropathy, systemic disease affecting musculoskeletal system, severe osteoporosis, fracture, spinal pathology, receiving other tx for back pain	Mean age (SD/range): 41.6 (14.7) yrs (total) % of male: 54% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Mechanical Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	IG1 (n = NR) – SM (HVLA): applied to lumbar and pelvic site(s) pts in laterally posture on table, free leg flexed at knee and pelvis to cause relative flx of lumbar spine; daily 2 wks Drop outs: C = 7 IG2 (n = NR) – HVLF mimic: one side only to avoid accumulation effect; pt placed on a table center with legs bent bilaterally; as IG1 Drop outs: C = 14 CG (n = NR) – BEP: no physical contact or EXs,included attractive color graphics coupled with common anatomic and biomechanical information on spine function and hygiene; as IG1 Drop outs: C = 18	**Outcomes:** Pain: VAS Disability: Oswestry **Results-** Immediate post tx: Pain: IG1 = 13.9 (15.3), IG2 = 19.8 (18.3), CG = 19.6 (17.6) Disability: IG1 = 9.5 (6.3), IG2 = 15.5 (10.8), CG = 12.3 (8.4) Immediately post tx with withdrawals: VAS: IG = 13.3 (15.9), IG2 = 21.7 (24.4), CG = 15.1 (19.4) Oswestry: IG1 = 10.6 (11.7), IG2 = 14 (11.7), CG = 11.4 (10.3)	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Waagen, G (1986)[129] Country: Iowa, US Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 2 wks Fu duration: 2 wks N screened: NR N randomized: 29 N completed tx: 29 N attended last fu: 17 **Inclusion:** chief complaint of LBP; no experience with chiro **Exclusion:** pregnancy, malingering, workmen's compensation for back problem, not ambulatory, obesity, radiographic evidence of osseous fractures, osteoporosis or spondylolisthesis, BP result of visceral disorder, positive indication of disk herniation, severe concurrent infectious or other systemic disease process, neurologic deficits indicated by leg pain or numbness or weakness	Mean age (SD/range): IG = 25.2 vs. CG = 24.3 yrs % of male: IG = 54.5%, CG = 38.9% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Non-specified Duration of Pain: Chronic, IG = 2.5 yrs, CG = 2.8 yrs Severity of pain (Grading): pre-trial pain level: IG = 3.7, CG = 4.6 Co-interventions:NR	**Groups** IG (n = 11)– Adjustment: spinal adjustive therapy only, full-spine adjustments administered to each pt to Sally correct all chiropractic lesions found by clinician; 2-3 tx/wk for 2 wks Drop outs: B = 2 CG (n = 18) – Sham adjustment: using minimal force for generalized manipulation; simulated by applying gentle pressure over both posterior superior iliac spines such that lumbar section fell; tx concludes with para-spinal soft tissue massage; same as IG Drop outs: B = 8	**Outcomes:** Pain: 10 cm VAS decrease after tx and at 2 wks post tx Disability: NR **Results-** Immediate post tx: Pain-mean change: IG = 1.3, CG = 0.7 Short term: Pain-mean change: IG = 2.3, CG = 0.6	**Outcome instruments:** QoL/ well being: Global index change from baseline: IG = 1.71, CG = -2.08 Other: Leg raising test: D-mean change: IG = 6 (8.65), CG = -13.5 (10.3) IG = 6 (6.2), CG = -15 (5.8); **Short term: NR** **Harms:** NR

Table 1.13 Low Back Pain – Manipulation – Mixed - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Mathews W (1988)[130] Country: United Kingdom Quality score: 2/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 2-3 wks Final assessments: post-tx N screened: 895 N randomized: 282 N completed tx: NR N attended last fu: NR **Inclusion:** 18-60 yrs of age; presenting episode of pain of less than 3 mo **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Specifically defined syndromes of LBP alone (lumbago) and LBP with pain in the leg (sciatica) Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 158) – Rotational Manipulation: 2 trials, pain on forward flx but ext was pain free, direct vertical pressure was applied first. Leg of more painful side was lifted and used to rotate the pelvis over, and away from that side, body weight was utilized to apply over-pressure using the length of the leg as a lever, short or long, applying the force through the pt's buttock; unclear Drop outs: NR CG (n = 134) – Control: 2 trials, Infrared lamp over the most painful area of the LB; 15 min/tx, 3 tx/wk for 2-3 wks Drop outs: NR	**Outcomes:** Pain: VAS (n "recovered") Disability: Oswestry Disability Index (data shown in graphs. Numeric values could not be extracted and are not shown in this table) **Results:** Immediate post tx: Pain: IG = 116, CG = 73; P = 0.05 Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** back school therapy was a better tx modality than the SM according to the clinical measures of rehabilitation.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Zhang, W (2008)[131] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 30 ds Final assessments: post-tx N screened: NR N randomized: 11128 N completed tx: 11088 N attended last fu: 11088 **Inclusion:** diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard, diagnosed using CT or MRT, sign on consent form **Exclusion:** pregnant, breast feeding, Lumbar intervertebral disc hemiation plus Mawei nerve synthesize, lumbar tumor or tubercal, headache or heart pain etc. high blood pressure, heart disease, the other serious disease related to organ or system, and people with mental health issues	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease Duration of Pain: Acute, Sub-acute, chronic; IG = 2 ds-30 yrs, CG = 1 d-26 yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 5760)– Manipulative reduction + lumbar traction + various physiotherapies: 25-30 kg traction, 20-30 min/tx, microwave trt-12-15 w, 20 min/tx, middle frequency trt, Chinese medicine fumigate ; 1 tx/d, 10 tx/course, 3 courses Drop outs: B = 23 CG (n = 5368) – lumbar traction +various physiotherapies: 25-30kg traction, 20-30 min/tx, microwave trt: 12-15 w, 20 min/tx middle frequency trt Chinese medicine fumigate; same as IG Drop outs: B = 17	**Outcomes:** Pain: VAS **Results:** Baseline: Pain: IG = 7.82 (2.25), CG = 8.1 (1.81) Immediate post tx: Pain-mean change: IG = 2.13 (1.46), CG = 4.65 (2.14) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: well being, instrument NR (% improved) **Results:** Immediate post tx: IG = 98.6%, CG = 96.4% Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Zhang, W (2008)[131] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 30 ds Final assessments: post-tx N screened: NR N randomized: 11128 N completed tx: 11088 N attended last fu: 11088 **Inclusion:** diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard, diagnosed using CT or MRT, sign on consent form **Exclusion:** pregnant, breast feeding, Lumbar intervertebral disc hemiation plus Mawei nerve synthesize, lumbar tumor or tubercal, headache or heart pain etc. high blood pressure, heart disease, the other serious disease related to organ or system, and people with mental health issues	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease Duration of Pain: Acute, Sub-acute, chronic; IG = 2 ds-30 yrs, CG = 1 d-26 yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 5760)– Manipulative reduction + lumbar traction + various physiotherapies: 25-30 kg traction, 20-30 min/tx, microwave trt-12-15 w, 20 min/tx, middle frequency trt, Chinese medicine fumigate ; 1 tx/d, 10 tx/course, 3 courses Drop outs: B = 23 CG (n = 5368) – lumbar traction +various physiotherapies: 25-30kg traction, 20-30 min/tx, microwave trt: 12-15 w, 20 min/tx middle frequency trt Chinese medicine fumigate; same as IG Drop outs: B = 17	**Outcomes:** Pain: VAS **Results:** Baseline: Pain: IG = 7.82 (2.25), CG = 8.1 (1.81) Immediate post tx: Pain-mean change: IG = 2.13 (1.46), CG = 4.65 (2.14) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: well being, instrument NR (% improved) **Results:** Immediate post tx: IG = 98.6%, CG = 96.4% Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 1.14 Low Back Pain - Manipulation - Mixed - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Childs JD (2004)[132] Country: US Quality score: 8/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4 wks Final assessments: 6 mos N screened: 543 N randomized: 131 N completed tx: 131 N attended last fu: NR **Inclusion:** LBP pts aged 18-60 yrs with ODQ score ≥ 30% **Exclusion:** serious spinal condition (tumor, compression fracture, or infection), nerve root compression, positive straight leg increase < 45 degrees of diminished reflexes, sensation, or lower extremity strength, pregnant, previous surgery to the lumbar spine or buttock	Mean age: 34 yrs % of male: IG = 57%, CG = 59% Racial composition: NR Work status: NR Other socio-demographics: Smokers: IG = 17.1%, CG = 29.5% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Symptoms distal to the knee: IG = 25.7%, CG = 21.3% Duration of Pain: Acute and Sub-acute, IG = 22 ds; CG = 30 ds Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 70) – SM + Exercise: During 1st two PT sessions, pts received high-velocity thrust SM and range-of-motion EX only; the first, PTst performed manipulation by using the technique reported by Flynn et al.; 4 wks Drop outs: D = 18 CG (n = 61) – Exercise: low-stress aerobic and lumbar spine strengthening program which targeted the trunk musculature identified as important stabilizer of the spine in the literature; 4 wks Drop outs: D = 21	**Outcome instruments:** **Pain:** Disability: ODQ **Results:** Baseline: Disability: IG = 41.4 (10.1); CG = 40.9 (10.8) Immediate post tx: Disability: NR Short term: 1 vs. 2 10.1-P = 0.001 Intermediate: NR Long term: NR Data for short term fu collected for IG, n = 52 CG, n - = 40	**Outcome instruments:** QoL/ well being: NR % pts with Med use in the last wk- Short term (6 mos fu): 36.5% vs. 60.0% Missed time at work in last 6 wks due to BP: 9.6% vs. 25% Seeking tx for BP: 11.5% vs. 42.5% Intermediate: NR Long term: NR **Harms:** drop out not due to AE **Summary:** ODQ scores of SM was greater if performed by practitioners with < 3 yrs of experience compared to that for those with ≥3 yrs of experience

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Cherkin D (2008)[133] Country: Ottawa, Canada Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 1 mo Final assessments: 3 mos N screened: 3800 N randomized: 321 N completed tx: 307 N attended last fu: 298 I**nclusion**: 20-64 yrs old who saw their primary care physician for LBP and who still had pain seven ds later E**xclusion:** NR	Mean age: 40 yrs % of male: 52.6% total Racial composition: NR Work status: 88% Employed Other socio-demographics: 15.6% Smokers Co morbidities: NR Prior episode of pain if acute: 56% with .2 episodes Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Unknown, 6 wks Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 133)– Physical therapy: relies on pt-generated forces and emphasizes self-care; up to 9 visits over 1 mo Drop outs: A = 4,B = 0 IG2 (n = 122)– Chiro manipulation: a short-lever, high-velocity thrust directed Sally at a "manipulable lesion"; same as IG1 Drop outs: A = 3,B=0 CG (n = 66) – Educational booklet: discussed causes of back pain, prognosis, appropriate use if imaging studies and specialists, and activities for promoting recovery and preventing recurrences; initial consultation only Drop outs: A = 1,B=5	**Outcomes:** **Pain: symptom bothersomeness (VAS)** Disability: RDQ **Results:** Immediate post tx: Pain: 2.3 (2.61), vs. 1.9 (1.94), CG = 3.1 (2.96) Disability: IG1 = 4.1 (4.64), IG2 = 3.7 (4.43), CG = 4.9 (4.35) Short term: Pain: IG1 = 2.7 (2.76), IG2 = 2 (2.22), CG = 3.2 (3.2) RDQ: IG1 = 4.1 (4.97), IG2 = 3.1 (4.16), CG = 4.3 (4.86) Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results:** Immediate post tx: Short term: Intermediate: NR Long term: NR **Harms:** No important AE effects of tx wre reported in any of the groups

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hoehler F (1981)[134] Country: US Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: NR Final assessments: 3 wks post discharge N screened: 1880 N randomized: 95 N completed tx: NR N attended last fu: NR **Inclusion:** presence of palpatory cues indicating that manipulation might be successful **Exclusion:** Manipulation contraindicated or alternative tx strongly indicated; pregnancy; previous experience with manipulation; disability income; pending litigation; previous back surgery; obesity; drug or alcohol abuse; pain not treatable by manipulation of lumbosacral area.	Mean age (SD/range): IG = 30.1 (8.4) vs. CG = 32.1 (9.8) yrs % of male: 59% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: 50% Acute, 23% Chronic Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 56)– Manipulation: rotal manipulations of the lumbosacral spine; # of tx varied Drop outs: NR CG (n = 39) – Soft-tissue massage: soft-tissue massage of the lumbosacral areas, with the rotal thrust omitted; same as IG Drop outs: NR	**Outcome instruments:** Pain: Improvement in pain (see summary) Disability: NA **Results:** Immediate post tx: Pain: --- Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results** Immediate post tx: Pts reporting tx as effective: 88% vs. 86% Improvement in SLR (to pain): 7.8 (7.4) vs. 8.6 (8.4) Short term (3 wks post discharge): Pts reporting improvement in amount of pain from baseline – IG = 88%, CG = 68% Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Bronfort, G (1989)[135] Country: Denmark Quality score: 2/13 Initial of reviewer: SG	**Trial Design-** RCT Tx duration: 1 mo Final assessments: immediately post tx N screened: 21 N randomized: 19 N completed tx: 19 N attended last fu: NR **Inclusion:** Native to chiropractic and between 18-70 yrs of age. Primarily suffering from LBP of various durations with or without radiating pain to one or both lower extremities **Exclusion:** LBP due to destructive, metabolic and inflammatory disease, organic referred pain syndromes, vascular and circulatory diseases of the lower extremities, psychological disturbances, nerve root or spinal cord compression syndromes warranting surgical intervention, essentially weakened health.	Mean age (SD/range): IG = 36 (4) vs. CG = 39 (3.9) yrs **% of male:** IG = 20%, CG = 78% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: IG = 60, CG = 22 (with more than 3 episodes, N-S if acute) Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 10)– Chiropractic: S manipulative procedures carried out with LAHV aimed at selected dysfunctional articulations involving all sections of spine and pelvis as detected by motion palpation, instructions given on how to minimize risk of future LBP episodes; 1 mo Drop outs: A = 2 CG (n = 9) – Medical: Mostly analgesic Med prescription, local analgesic-anaesthestic injections, bedrest and or PTincluding ultrasound, diathermy & ergonomic advice; 1 mo Drop outs: NR	**Outcome instruments:** Pain: % of pts improved Disability: NR **Results:** Ptient's assessment of improvement- % with no pain: Immediate post tx: 20% vs. 22% Short term: 20% vs. 11% Intermediate: 50% vs. 11% Long term: NR	**Outcome instruments:** QoL/ well being: NR Patient's assessment of pain according to gender- % with no pain at 6 mos: male 40% vs. female 20% Intermediate fu: Use of analgesics during 6 mos (%): 10% vs. 33% Unable to work at 6 monhts: 10% vs. 11% **Harms:** worse pain compared to baeline after tx 10% vs. 11%; short term & intermediate fu 0 in both groups; tx for LBP.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Rupert R (1985)[136] Country: Egypt Quality score: 2/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: unspecified Final assessments: immediately post tx N screened: 145 N randomized: 145 N completed tx: NR N attended last fu: NR **Inclusion:** 18-68 coming to three hospitals for low-back pain and/or restriction in lumbar ROM. **Exclusion:** Pts familiar with manipulation; spinal cord involvement, osseous pathology, tumors, bleeding disorders, acute inflammatory joint diseases, acute or progressive neurological defecit, chronic systemic disease, pain referred from visceral pathology, and advanced pregnancy	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Mixed, NR Severity of pain (Grading): NR Co-interventions:NR	IG (n = 49) – Chiropractic adjustment: Specific short-lever manipulation using spinous processes or mamillary bodies as lever arms; 3 tx/wk, duration of trial unspecified Drop outs: NR CG1 (n = 46) – Sham manipulation: touching and palpitating the pt on the adjusting table in the same tx setting as IG. CG1 received a non-therapeutic massage to a site unrelated to the area of pain; 3tx/wk Drop outs: NR CG2 (n = 50) – Drugs and bed rest; 3 tx/wk Drop outs: NR	**Outcomes:** Pain: VAS - % LBP improvement (data shown in graphs-not extracted) **Results:** Immediate post tx: Pain: IG = 47%, CG1 = 19%, CG2 = -40% Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Trial only reports preliminary data, does not specify the duration of the trial and # of txs- pts uncder 40 yrs of age noted more immediate pain relief than those over 40.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hoiriis, K (1999)[137] Country: NR Quality score: 0/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: up to 6 mos Final assessments: imm.post tx N screened: 800 N randomized: 26 N completed tx: NR N attended last fu: NR **Inclusion:** LBP of greater than 2 mo **Exclusion:** presence of serious disease, cervical complaint, or postsurgical low back syndrome	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Sub-acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n =)– Cervical Adjustments: NR; pts adjusted up to 6 mo Drop outs: NR IG2 (n =) – Full Spine adjustments: NR; same as IG1 Drop outs: NR CG (n =) – Combination of both techniques; same as IG1 Drop outs: NR	**Outcomes:-**report of significant improvement from initial values Pain: VAS-Only results for all groups together are given (Baseline=4.04, follow-up=1.57) Disability: Oswestry Disability Q-Only results for all groups together are given **Results:** Immediate post tx: Pain: ---- Disability: --- Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Herzog (1991)[124] Country: Canada Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 4 wks Final assessments: immediately post tx N screened: 120 N randomized: 29 N completed tx: 29 N attended last fu: NR **Inclusion:** Chronic sacroiliac joint problem, 18-50 yrs, ambulatory **Exclusion:** Extreme obesity	Mean age (SD/range): 33.5 yrs % of male: 67.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Mixed, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 16) – Spinal manipulation: Manipulation (sacroiliac); 10 sessions over 4 wks, or until complete recovery Drop outs: B = 8 CG (n = 13) – Back school: stretching and postural EXs; Same as IG Drop outs: NR	**Outcomes:** Pain: VAS (0-10) Disability: Oswestry **Results:** Baseline: Pain: NR Disability: NR Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** No raw data reported. CG was a better tx modality than the IG according to the clinical measures of rehabilitation. Precisely opposite results were found for the biomechanical measures.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hondras, M (2009) [138] Country: USA Quality score: 11/13 Initial of reviewer: ST	**Trial Design:** RCT Tx duration: max 12 visits Final assessments: 18 wks post tx N screened: 1849 N randomized: 240 N completed tx: 225 N attended last fu: NR **Inclusion:** Age at least 55 yrs, presented with nonspecific LBP of at least 4 weeks duration and met the diagnostic classification of 1, 2, or 3 according to the Quebec Task Force on Spinal Disorders. **Exclusion:** LBP with: radiculopathy/neurological signs; comorbidities or general poor health that could complicate the prognosis; major clinical depression; bone/joint pathology that contraindicated SM; current/pending litigation; pacemaker; receiving disability for any condition; received SM within the past month; unwilling to postpone the use of MT for LBP except for those provided in the study; unable to comprehend English.	Age: Mean (yrs) IG1 = 63.8 (7.6) IG2 = 62.3 (6.1) CG = 63.0 (6.0) % male: IG1 = 55.2%; IG2 = 55.8%; CG = 59.2% Racial composition: White: IG1 = 95.8%, IG2 = 95.8%, CG = 98%; Hispanic: IG1 = 2.1%; , IG2 = 2.1%; , CG = 6.1% Work status: Full-time: IG1 = 34.4%, IG2 = 40%, CG = 34.7%; Comorbidities: NR Prior episode of pain if acute: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR Duration of Pain: Mean (SD): IG1= 11.9 y (13.4), IG#2 = 15.1 y (16.7), CG = 9.6 y (11.1) Severity of pain - Avg low back pain during past week 0-100mm: IG#1 = 42.1 (23.6), IG#2 = 42.5 (25.2), CG = 42.4 (24.5) Conterventions: NR	**Groups** IG1 (n = 96) – High-velocity low amplitude SM; max 12 visits, not to exceed 3x/wk for 1st 2 wks, 2x/wk for wks 3 & 4, 1x/wk for wks 5 & 6. 30 min home exercise instruction. Drop outs: 2 IG2 (n = 95) – Low-velocity variable amplitude SM; max 12 visits, not to exceed 3x/wk for 1st 2 wks, 2x/wk for wks 3 & 4, 1x/wk for wks 5 & 6. 30 min home exercise instruction. Drop outs: 4 CG (n = 49)- Minimal conservative medical care; 3x over 6 wks Additional visits as necessary. 30 min home exercise instruction. Drop outs: 9	**Outcome instruments:** Pain: VAS (0-100mm) No Pain - Worst Pain Disability: RMD (0-24); FABQ physical subscale (0-24); SF-36 physical function subscale (0-100) **Results:** Baseline: Pain: QTF 1 – IG1 = 66.7%, IG2 = 60%, CG = 61.2%; Disability: RMD – IG1 = 6.5 (4.1), IG2 = 6.6 (4.6), CG = 5.7 (4.0); Immediate post tx - Mean chg from baseline (range): Pain: No significant results Disability: RMD - IG1 = 2.7 (2.0, 3.3), IG2 = 2.9 (2.2, 3.6), CG = 1.6 (0.5, 2.8); Short term: NR Intermediate: NR	**Outcome instruments:** QoL/ well being: NA **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** No serious adverse events. **Summary** Biomechanically distinct forms of SM did not lead to different outcomes in older LBP patients and both SM procedures were associated with small yet clinically important changes in functional status by the end of treatment for this relatively health older population.

Table 1.15 Low Back Pain - Manipulation - Unknown - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Dai, DC (2006)[139] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 5 wks Final assessments: post-tx N screened: 99 N randomized: 99 N completed tx: 99 N attended last fu: 99 **Inclusion:** Lumbar stability of degenerative spondylolishesis **Exclusion:** History of lumbar surgery, Severe lumbar trauma, Bone TB and tumor, Pts with central nervous symptoms,Serious cardiovascular and cerebrovascular disease,Psychiatric pts	Mean age (SD/range): IG = 58.86 (7.24) vs. CG = 57.37 (7.43) yrs % of male: IG = 22%, CG = 24.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Spondylolysis with spondylo-listhesis Duration of Pain: Cannot tell Severity of pain (Grading): Co-interventions:Soft-tissue manipulation	**Groups** IG (n = 50)– Spinal fine adjusting manipulation: NR; 20 min/ tx, 2 tx/ wk for 5 wks Drop outs: 0 CG (n = 49) – Flexing hip and knee manipulation: NR; same as IG Drop outs: 0	**Outcomes:** Pain: Local STD of integrated score of symptoms and function Disability: x-ray changes of lumbar spine **Results-**Baseline: Pain: IG=7.62 (2.22), CG =7.92 (2.06) Disability: --- Immediate post tx: Pain: IG = 3.38 (1.14), CG = 3.97 (1.76) Disability: ---- Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Excellent rate of tx: Immediate post tx: 60% vs. 36.7% Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** lumbar lordosis, lumbosacral angle in IG appeared significant changes after spine fine adjusting compared to baseline.

Table 1.16 Low Back Pain – Manipulation - Unknown - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Shearar K (2004)[140] Abstract Country: South Africa Quality score: 1/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 2 wks Final assessments: imm.post tx N screened: 60 N randomized: 60 N completed tx: 60 N attended last fu: 60 **Inclusion:** 18 - 59 ; diagnosed with sacroiliac joint syndrome **Exclusion:** NR	Mean age (SD/range): NR % of male: approx. 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Sacroiliac joint syndrome Duration of Pain: Unknown, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 30)– HVLA chiropractic adjustments: National-Diversified Technique; 4 tx over 2 wks Drop outs: NR CG (n = 30) – Mechanical force, manually assisted chiropractic adjustments: using an Activator Adjusting Instrument; same as IG Drop outs: NR	**Outcome instruments:** Pain: NRS-101- mean values only Disability: Revised ODQ **Results:** Baseline: Pain: IG = 49.1, CG = 48.9 Disability: IG = 37.4, CG = 36.6 Immediate post tx: Pain: IG = 23.4, CG = 22.5 Disability: IG = 18.5, CG = 15.1 Short term: Intermediate: Long term:	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 1.17 Low Back Pain – Mobilization – Acute/Sub-acute-non Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hadler NM (1987)[109] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: NR Final assessments: immediately post tx N screened: 57 N randomized: 54 N completed tx: NR N attended last fu: NR **Inclusion:** Pts aged 18-40 yrs with acute LBP (≤ 1 mo), no other episode of back pain in previous 6 mo, not work-related pain, no previous surgery **Exclusion:** NR	Mean age (SD/range): NR % of male: 48% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** Non-S Duration of Pain: Acute ≤ 2 wks: n = 13 Severity of pain (Grading): NR Co-interventions:NR	IG (n = 28) – Mobilization: Pt was positioned first on the right and then on the left side; the operator grasped both knees with one arm while pressing down on the on the pts' lower spine with the opposite hand; then the subjects legs were gently flexed on the hips twice; NR Drop outs: NR CG (n = 26) – Manipulation: HV thrust was applied to the lower spine while stabilizing the thorax; NR Drop outs: NR	**Outcomes:** Disability: RMDQ **Results:** Baseline: Disability: NR Immediate post tx: Disability: IG = 9.1 (5.3), CG = 3.9 (4.3) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** SM was more effective than Mob at reducing disability score in the first wk of tx (time and tx interaction significant $p < 0.04$) for those with duration of pain of 2-4 wks

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hanrahan, S (2005)[141] Country: U.S. Quality score: 2/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: NR Final assessments: immediately post tx N screened: 19 N randomized: 19 N completed tx: 19 N attended last fu: NR **Inclusion:** All male collegiate athletes with acute LBP for less than 48 hrs. Mechanical LBP, not radicular. Prior tx of lumbar spine not excluded **Exclusion:** Any conditions (e.g. Neurologic deficit or suspected disk herniation) for which joint Mob techniques were contraindicated. Any radicular, disk, or fracture involvement	Mean age (SD/range): 20.3 yrs % of male: 100 Racial composition: NR Work status: NR Other socio-demographics: Height: 185.4 cm avg; Weight: 92 kg avg Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Acute Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 9)– Experimental: standard tx of cryotherapy and stretching, grade 1 and 2 joint Mobs administered at the lumbar spine; 30 sec each, 6 repetitions Drop outs: A=0, B=0 CG (n = 10) – Control: standard tx protocol of cryotherapy and stretching, placed in prone position of comfort during joint Mobs; NR Drop outs: NR	**Outcome instruments:** Pain: MPQ: no numeric data provided Disability: NA **Results:** Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Muscle force: data not shown **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Overall pain decreased for all over time. MPQ (P = 0.001). Pain decreased for the sensory pain subscale (P = 0.000) and difference was noted between groups and tests (P = 0.048).

Table 1.18 Low Back Pain – Mobilization – Acute/Sub-acute Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Wreje U (1992)[142] Country: Sweden Quality score: 4/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3 wks Final assessments: immediately post tx N screened: 46 N randomized: 39 N completed tx: 32 N attended last fu: NR **Inclusion:** LBP due to pelvic joint dysfunction (positive test results on the following: asymmetry of the pelvis, movement, and provoked pain) **Exclusion:** Pregnancy, pain duration > 3 mo, malignancy, neurological disease, lumbar spine pathology	Mean age (SD/range): IG = 31.9 vs. CG = 31.4 yrs % of male: 0 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** Pelvic joint dysfunction Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:None	**Groups** IG (n = 18) – SM: MET and segmental Mob by Kubis, based on pts clinical picture, techniques were combined with stretching of the paracoccygeal ligaments per rectum by putting little pressure on coccyx in dorsal direction; 3 wks Drop outs: n =7(total) CG (n = 21) – Sham-SM: manual transverse frictions on the gluteus medius muscles for three minutes; as IG Drop outs:	**Outcome instruments:** Pain: VAS [no numerical data] Disability: NA **Results:** Immediate post tx: Pain: --- Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** The use of analgesics was higher in the CG compared to IG ($p < 0.05$) over 3 wks; there was no between group difference in pain

Table 1.19 Low Back Pain – Mobilization – Chronic-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Timm (1994)[143] Country: US Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: 8 wks Final assessments: Post-tx N screened: NR N randomized: 250 N completed tx: 250 N attended last fu: 250 **Inclusion:** lumbar-related pain and associated symptomatology for at least 6 mo prior to the period of study following a single-level lumbar laminectomy of the L5 segment performed at least 1 yr before the start of the experiment; intermittent or constant pain in one of the lower extremities but not below the level of the knee **Exclusion:** NR	Mean age:41 – 45 yrs % of male: 72.8 Racial composition: NR Work status: 100% employed in automotive industry Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: 50	**Cause of Pain:** Post laminectomy Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 50) – Joint manipulation: Large amplitude, low velocity Maitland; 3 tx/wk for 8 wks Drop outs: None CG1 (n = 50) – Physiotherapy: hot packs, ultrasound, TENS; Same as IG Drop outs: None CG2 (n = 50) – Low-tech McKenzie EXs: NR; As IG Drop outs: None CG3 (n = 50) – High-tech Cybex EXs: NR; Same as IG Drop outs: None CG4 (n = 50) – No Tx Drop outs: None	**Outcomes:** Disability: Oswestry; **Results-** Immediate post tx: Disability: IG = 5.57 (2.38), CG1 = 2.55 (1.03), CG2 = 5.69 (3.1), CG3 = 4.84 (2.67), CG4 = 2.19 (1.54); Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Other: modified Schober (ROM) (cm) **Results- mean (SD):** Immediate post tx: IG = 6.46 (2.17), CG1 = 6.31 (1.52), CG2 = 8.81 (2.36), CG3 = 9.07 (2.61), CG4 = 6.24 (1.47) Short term: NR Intermediate: NR Long term: NR **Harms:** NR Note: atuthors concluded that the low tech EX produced longer pain relief and was also most cost-effective.

Table 1.20 Low Back Pain – Mobilization – Chronic-Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Ritvanen T (2007)[144] Country: Finland Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 2 mos Final assessments: 3 mos N screened: 150 N randomized: 61 N completed tx: 61 N attended last fu: 54 **Inclusion:** Pts with CLBP aged 20-60 yrs who had restricted functioning **Exclusion:** severe neurologic, metabolic, or CVD , back surgery, mental disease, major structural abnormality, pregnancy	Mean age (SD/range): IG = 40.7 (4.75) vs. CG = 41.5 (5.95) yrs % of male: IG = 54.5%; CG = 57.1% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic, IG = 7 yrs (7); CG = 11 yrs (8) Severity of pain (Grading): NR Co-interventions:Painkillers	**Groups** IG (n = 33) – TBS: based on manual whole body tx; tx starts from toes and feet up to the hands and head mobilizing tissues and malocclusions; 5 tx with 2 wk intervals over 2 mo Drop outs: C = 2 CG (n = 28) – PT: Included massage, therapeutic stretching, trunk stabilization EX, EX therapy; same as IG Drop outs: C = 5	**Outcomes:** Pain: VAS Disability: ODQ **Results:** Baseline: Pain: IG = 40 (4), CG = 41 (4) Disability: IG = 18 (2), CG = 21 (2) Immediate post tx: Pain: NR Disability: NR Short term: VAS: IG = 23 (5), CG = 28 (4) ODQ: IG = 12 (2), CG = 17 (2) Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Finger to floor distance (cm); lateral bending (right and left)- cm. **Results:** Immediate post tx: finger to floor distance: 5.4 (2.2) vs. 6.3 (1.9) Right lateral bending: 17.1 (0.6) vs. 17.1 (0.7) Left lateral bending: 17.4 (0.7) vs. 16.5 (0.8) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Cote P (1994)[121] Country: Canada Quality score: 4/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: one session Final assessments: post-tx N screened: NR N randomized: 30 N completed tx: 30 N attended last fu: 30 **Inclusion:** Pts with mechanic CLBP > 2 mo **Exclusion:** seronegative spondyloarthropathy or rheumatoid arthritis, lumbar radiculopathy, hip pathology, abdominal/pelvic organ pathology, pregnancy, current use of muscle relaxants or anti-inflammatory drugs	Mean age (SD/range): 31 (7.15) yrs total % of male: IG = 37.5%, CG = 71.4% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Mechanical Duration of Pain: Chronic, 74 (83.3) mo (total) Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 16) – Mobilization: side-lying position, a counter-rot force was created at the lumbo-sacral junction or sacroiliac joints; joint taken to its limit of passive motion and HVLA thrust applied through the joint producing an audible sound; one session Drop outs: 0 CG (n = 14) – Manipulation: a long lever HV thrust applied to the lower spine while stabilizing the thorax in side lying and supine position Drop outs: 0	**Outcomes (instrument used):** Pain: PPT: L5 tender point; Sacroiliac (SI) ligament tender point; gluteus tender point (gluteal) **Results:** Immediate post tx: Pain: L5: IG = 5.6(2.1), CG = 5.1 (3.0); SI: IG = 5.6 (2.1), CG = 5.5 (3.1) Gluteal : IG = 5.6 (2.2), CG = 5.2 (2.7) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** The two groups did not differ in mean PPT scores for the three myofascial points (L5 tender point, SI ligament tender point, and gluteus tender point); ANOVA indicated no SS time*tx term interaction (P > 0.267)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Mackawan S (2007)[145] Country: Thailand Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: one session Final assessments: post-tx N screened: NR N randomized: 67 N completed tx: 67 N attended last fu: 67 **Inclusion:** 20-60 yrs; persistent CLBP (> 12 wks); no evidence of underlying diseases or anatomical abnormalities **Exclusion:** menstruation; pregnancy; body temp 38.5°C on d of exam.; a history of acute trauma, back surgery, spinal fracture, joint subluxation or instability, inflammatory joint disease muscle disease, malignancy or infection; evidence of neurologic deficits, multiple sclerosis, hemi/para paresis or myelopathy, skin diseases, or infectious diseases	Mean age (SD/range): IG = 38.97 (7.85) vs. CG = 38.57 (7.66) yrs % of male: IG = 34%, CG = 44% Racial composition: NR Work status: Government service = 49%; Private officer = 32.5%; Student= 6%; Business owner = 11.5% Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 35)– Traditional Thai massage(TTM): Deep massage with prolonged pressure (5-10s/point) on the muscles along with passive stretching. Gentle stretching of the joints and muscles relieves tension, enhances flexibility, and induces a deep state of tranquility; one 10 min session Drop outs: NR CG (n = 32) – Joint Mob: passive movement of a spinal segment with and occasionally beyond its active ROM.; as IG Drop outs: NR	**Outcomes:** Pain: VAS (10 cm); **Results:** Baseline: Pain: IG = 4.22 (1.98), CG = 4.35 (1.71) Immediate post tx: Pain: IG = 2.45 (1.75), CG = 3.39 (1.66) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: NA Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Lopez de, C (2007)[146] Country: Spain Quality score: 8/13 Initial of reviewer: SG	**Trial Design-RCT-** Tx duration: NR Final assessments: immediately post tx N screened: NR N randomized: 100 N completed tx: NR N attended last fu: NR **Inclusion:** N-S CLBP, aged 18-65 yrs; **Exclusion:** ongoing insurance claim; unsettled social pension claim; LBP caused by major accident; pain ext below knee; excessive distribution of pain according to a pain drawing; neurological diseases including known disc herniation; significant medical diseases including cancer; inflammation; language problems; suspected non-compliance or planned other tx in the first 4 wks	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 100) – Mobilization: NR Drop outs: NR CG (n =NR)– No tx: NR Drop outs: NR	**Outcomes:** Pain: VAS Disability: Roland Morris **Results:** Baseline: Pain: IG 48.7 vs. CG 49.23 Immediate post tx: Pain: IG 33.40 vs. CG 49.77 Disability: IG 7.89 vs. CG 10.64 Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Other: ROM Immediate post tx: Flexion IG 6.28 vs. CG 5.20 Extension IG 1.80 vs. CG 1.40 Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** IG shoes a significant improtment in pain, lateral beniding, mobility and disability degree.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hemmila (1997)[147] Country: Finland Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: 6 wks Final assessments: 6 wks and 6 mos N screened: 147 N randomized: 114 N completed tx: 113 N attended last fu: 113 **Inclusion:** Back pain between the shoulders and the buttocks **Exclusion:** retirement, pregnancy, malignancy, rheumatic diseases, severe osteoarthritis, cauda equina syndrome, back operation, or vertebral fracture in the past 6 mos or any condition that would prevent or contraindicate any of the therapies.	Mean age (SD/range): IG = 42 (12); CG1 = 42 (8.9); CG2 = 41 (9.9) yrs % of male: IG = 55.9, CG1 = 55.5, CG2 = 60 Racial composition: Work status: NR Other socio-demographics: 28.3% Smokers Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Mixed, IG = 7 (8.9) yrs; CG1 = 8.5 (10.5) yrs; CG2 = 6.8 (7.2) yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 34) – Bone-setting: NR; 1-2 tx/wk for 6 wks Drop outs: 1 (unclear from which grp or at what point) CG1 (n = 45) – Physiotherapy, mainly manual (no thrusts), thermal, electrotherapy: NR; Same as IG Drop outs: See IG CG2 (n = 35) – Home EXs with individual instruction by PT: NR; Same as IG Drop outs: See IG	**Outcomes:** Pain: 100 mm VAS (Disability: NR **Results-** Immediate post tx: Pain: no significant differences between IG and CG Disability: NR Short term: NR Intermediate: Pain: no numerical mean values reported. Sign difference between IG and CG in favore of IG in VAS Long term: NR	**Outcomes:** QoL/ well being: NR **Other:** physical measures, mean change from baseline (mm): at 6 wks **Modified Schober**; 0.1 vs. 0.8 vs. 2.4 **Side Bending:** 11.0 vs. 5.4 vs. -2.1 **Lumbar Extension:** 3.7 vs. 3.6 vs. 3.1 **Straight leg raising:** 2.4 vs. 1.6 vs. 1.8 Short term: NR Intermediate (6 mos): **Modified Schober:** 4.0 vs. 2.3 vs. -1.0 **Side Bending**: 9.3 vs. 3.6 vs. -2.7 **Lumbar Extension:** 5.4 vs. 6.8 vs. 4.3 **Straight leg raising:** 2.4 vs. 1.6 vs. 1.8 Long term: NR **Harms:** NR

Table 1.21 Low Back Pain – Manipulation + Mobilization – Acute/Sub-acute- -Specific Pain - No Trials

Table 1.22 Low Back Pain – Manipulation + Mobilization – Acute/Sub-acute-Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hancock MJ (2007)[148] Country: Australia Quality score: 9/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4 wks Final assessments: 3 mos N screened: 320 N randomized: 240 N completed tx: 240 N attended last fu: 235 **Inclusion:** Pts with acute LBP (< 6 wks) in the area between the 12th rib and the buttock crease causing moderate pain and disability **Exclusion:** present episode of pain not preceded by pain-free period of ≥ 1 mo in which care was not provided, serious spinal pathology, nerve root compromise, NSAIDs use or SM, spinal surgery in the preceding 6 mo, contraindication to NSAIDs and SM	Mean age (yrs) (SD/range): IG1 = 39.5 (15.8), IG2 = 41.1 (15.4) % of male: IG1 = 58%, IG2 = 54% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain: N-S** Duration of Pain: Acute, NR Severity of pain (Grading): NR Co-interventions:paracetamol 1 g 4 times/d + advise	**Groups** IG1 (n = 60)– Diclofenac: NSAID; 50 mg twice/d, 4 wks Drop outs: n = 3 IG2 (n = 60) – SM: The algorithm-based approach, Mob or HV thrust aiming to produce motion at the joints of the lumbar spine thoracic spine, sacroiliac joint, pelvis and hip; 2-3 times/wk, 4 wks Drop outs: n = 2 IG3 (n = 60) – Diclofenac + SM + SMo; 4 wks Drop outs: n = 0 CG (n = 60) – Placebo manipulative therapy + placebo diclofenac: NR Drop outs: n = 0	**Outcomes:** Pain: NRS (0 – 10); also d to recovery (primary outcome of study) Disability: RMDQ **Results-** Immediate post tx: Pain: - 2.0 (-0.7 – 0.3) vs. -0.1 (-0.6 – 0.4) Disability: -1.0 (-2.0 – 0.1) vs. -0.7 (-1.8 – 0.4) Short term: V Pain: - 0.2 (-0.7 – 0.3) vs. 0.0 (-0.5 – 0.4) RMDQ : -0.5 (-1.7 – 0.7) v.s -0.1 (-1.3 – 1.1) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: global precieved effects: **Results:** Immediate post tx at 4 wks 0.2 (95% CI: -0.1 – 0.6) vs. 0.0 (-0.3 – 0.3) Short term: 0.3 (-0.1 – 0.6) vs. 0.1 (-0.3 – 0.4) Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hurley DA (2004)[149] Country: Ireland Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 8 wks Final assessments: discharge, 6 mos and 12 mos N screened: 569 N randomized: 240 N completed tx: 240 N attended last fu: 158 **Inclusion:** Pts aged 18-65 yrs with acute LBP (duration: 4-12 wks) with or without pain irradiation to the buttock or legs **Exclusion:** Previous spinal surgery, motor vehicle accidet, systemic disease, concurrent medical or musculoskeletal conditions, contraindication to manual therapy, psychiatric illness, lack of fluence in English RMDQ < 4 points, pregnancy	Mean age (SD/range): IG = 39.6 (11.6), IG2 = 40.2 (12.1), CG = 40.5 (11.3) yrs % of male: IG = 54%, IG2 = 50%,CG = 52% Racial composition: NR Work status: Employed: IG = 19%, IG2 = 23%, CG = 20% Other socio-demographics: Non-smokers: IG = 49%, IG2 = 42%, CG = 39% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR	**Cause of Pain:** Work-related Duration of Pain: Acute, IG = 7.5 (3.1) wks, IG2 = 7.6 (3) wks, CG = 8.3 (2.8) wks Severity of pain (Grading): NR Co-interventions:NR Prior surgery related to current complaint: NR	**Groups** IG (n = 80)– MT: Mobilization/manipulation techniques that passively move an intervertebral joint within or beyond its existing ROM described my Maitland; 8 wks Drop outs: D = 26 CG1 (n = 80) – IFT: Omega Inter 4150 portable IFT unit (freq: 3.85 kHz, beat freq: 140 Hz, 130 microsec), spinal nerve root electrode placement method via two Reply 658 carbon silicone self-adhesive electrodes 50 x100 mm; as IG Drop outs: D = 23 CG2 (n = 80) – MT + IFT: Both protocols explained above provided with MT first and then IFT second; as IG Drop outs: D = 27	**Outcomes:** Pain: VAS, mean change from baseline Disability: RMDQ-mean chage from baseline **Results-** Immediate post tx: Pain: -19.8 vs. -21.4 vs. -24.7 Disability: -4.5 vs. -3.6 vs. -4.7 Short term: NR Intermediate: Pain: -17.0 vs. -24.6 vs. -20.0 Disability: -4.7 vs. -3.9 vs. -4.6 Long term: Pain: -18.2 vs. -26.5 vs. -25.7 Disabiltiy: -4.7 vs. -4.9 vs. -6.5	**QoL:** EQ-5D Weighted Health Index, mean change from baseline **Other:** short term SF-36 physical functiuoning, mean change from baseline Immediate post tx: EQ-5D: 0.16 vs. 0.16 vs. 0.15 SF-36: 15.2 vs. 10.6 vs. 14.3 Short term: NR Intermediate: EQ-5D: 0.17 vs. 0.16 vs. 0.16 SF-36: 12.6 vs. 10.1 vs. 14.4 Long term: NR EQ-5D: 0.15 vs. 0.20 vs. 0.25 SF-36: 9.4 vs. 11.7 vs. 21.4 **Harms:** No AEs were reported. One Pts died due to causes unrelated to LBP or PT

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Farrell, JP (1982) [150] Country: Australia Quality score: 4/13 Initial of reviewer: ST	**Trial Design:** RCT Tx duration: 3x/wk for up to 3 weeks. Final assessments: 3 weeks from date of initial treatment N screened: 56 N randomized: 48 N completed tx: 48 N attended last fu: NR **Inclusion:** Either sex aged 20-65 with pain on lumbar movements or straight leg raising, pain centrally or pravertebrally between T12 and gluteal folds, symptoms of 3 wks durations, experienced a pain-free period of 6 mnths prior. **Exclusion:**Had other treatment for the current episode of LBP, pregnant, signs of caudaequinal pressure, alterered sensation, reflexes or weakess in lower extremities, previous surgery in the lumbar region, history of fracture in the lower thoracic lumbar region, evidence of systemic disease or carcinoma.	Mean age: IG = 43.4; CG = 41.83 % of male: IG = 67%; CG1 = 58% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR Duration of Pain: Acute Severity of pain (Grading): Numerical Rating Scale: (0 – 10) IG = 4.95 (estimated based on graph) CG1 = 5.25 (estimated based on graph) Co-interventions: NR	**Groups** IG (n = 24)– passive mobilisation and manipulation – techniques descrbeid by Stoddart and Maitland. Drop outs: NR CG (n = 24) – Received 15 minutes of microwave diathermy in a combfortable side-reclining position ; 10 repittioan of isometric abdominal excrcies which the subject also carried out independently another 3-4 times a day; ergonomic instructions which include advice on activities such as lifting, sitting, standoing, carrying objects and rest postures. Drop outs: NR	**Outcome instruments:** Pain: Mean subjective pain rating (0-10) Disability: NR **Results:** Baseline: Pain: (estimated based on graph) IG = 4.95 CG = 5.25 Disability: NR Immediate post tx: Pain: (estimated based on graph) IG = 3.80 CG = 4.40 Disability: NR Short term: (estimated based on graph) (after 3rd tx) IG = 2.95 CG = 2.75 (3 wks after initial tx) IG = 0.30 CG = 0.30 Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary** Pts with acute LBP treated by passive mobilisation and manipulation had a shorter mean duration of symptoms compared with those who were treated by microwave diathermy, isometric abdominal exercises and ergonomic instructions.

Table 1.23 Low Back Pain – Manipulation + Mobilization – Chronic-Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Aure (2003)[151] Country: Norway Quality score: 8/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 8 wks Fu duration: 6 mos N screened: 60 N randomized: 49 N completed tx: 49 N attended last fu: 49 **Inclusion:** Men and women age 20-60 yrs sick-listed between 8 wks and 6 mos due to LBP with or without leg pain. **Exclusion:** Unemployment or early retirement because of LBP; prolapsed with neurologic signs and symptoms requiring surgery; pregnancy; spondylolisthesis; spondylolysis;degenerative olisthesis; fractures; suspicion ofmalignancy; osteoporosis; previous back surgery; known rheumatic, neurologic, or mental disease	Mean age (SD/range): IG = 38.9 (12.85) vs. CG = 41.1 (10.76) yrs % of male: IG = 52%, CG = 54% Racial composition: NR Work status: all pts sick-listed for 8 wks-6 mo Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, IG = 16 (17.23), CG = 10 (10.77) yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 27) – Spinal manipulation, S Mob, and stretching techniques described by Evjenth, Hamberg, and Kaltenborn were allowed; 16 tx, 45 min/ each, 2 tx/wk for 8 wks, max. 6 home EXs during tx period Drop outs: B=2 CG (n = 22) – Exercise therapy: 45 min of training, EX programs designed based on pt exam-ination, group training and massage not allowed; same as IG Drop outs: B=1	**Outcomes:** Pain: VAS 100 mm Disability: Oswestry Disability Index (ODI) **Results-** Immediate post tx: Pain: IG=22 (18.56) CG = 37 (25.12) Disability: IG = 18 (13.26), CG = 30 (10.77) Short term: VAS: IG=22(19.88), CG = 39 (22.53) ODI: IG=18(11.93) CG = 30 (14.36) Intermediate: VAS: IG=21 (14.58) CG = 35 (35.89) ODI: IG = 17 (13.25), CG = 26 (14.36) Long term: NR	**Outcome instruments:** QoL/ well being: General health (data not shown) Other pts **sick listed** At entery: 100% on partial or full time sick leave Immediate post tx: 9 (33%) vs. 16 (73%) Short term (4 wks) 8 (30%) vs. 12 (57%) Intermediate (6 mos): 3 (1150 vs. 13 (62%) Long term (12 mos): 5 (19%) vs. 13 (59%) **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Ferreira ML (2007)[152] Country: Australia Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 8 wks Final assessments: 6 mos N screened: NR N randomized: 240 N completed tx: 240 N attended last fu: 211 **Inclusion:** Pts with N-S CLBP (≥ 3 mo) aged 18-80 yrs; pts with OA, disc protrusion, or herniation without neurological compromise were also included **Exclusion:** Serious low back pathology, contraindications to EX or SM therapy, neurological signs, spinal pathology, or back surgery	Mean age (SD/range): IG1 = 54 (14.4), IG2 = 51.9 (15.3), CG = 54.8 (15.3) yrs % of male: 31% total sample Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic, IG1 = 60 mo, IG2 = 36 mo, CG = 60 mo Severity of pain (Grading): NR Co-interventions:None	**Groups** IG1 (n = 80) – SM: Joint Mob or manipulation techniques applied to spine or pelvis, doses and techniques prescribed based on pts' exam results; 12 sessions, 8 wks Drop outs: D = 7 IG2 (n = 80)– MC-EX: improving function of trunk muscles (transversus abdominis, multifidus, the diaphragm, and pelvic floor muscles; cognitive-behavioural therapy encouraging skill acquisition; same as IG1 Drop outs: D = 15 CG (n = 80) – GEN-EX: 'Back to Fitness' program; 12 1 hr sessions, 8 wks Drop outs: D = 7	**Outcomes:** Pain: VAS Disability: RMDQ **Results-** Immediate post tx: Pain: 4.1 (2.6) vs. , 4 (2.5) vs. 4.8 (2.4) Disability: 7.9 (6) vs. 7.9 (5.7) vs. 9.7 (6.3) Short term: NR Intermediate: VAS: 4.3 (2.6), vs. 4.3 (2.6) vs. 4.8 (2.6) RMDQ: 7.7 (6.2) vs.8.4 (6.4) vs. 10.1 (7) Long term: VAS: 4.9 (2.7) vs. 4.9 (2.9),vs. 5.2 (2.8) RMDQ: 9.2 (6.6) vs. 8.8 (6.5) vs. 9.6 (6.9)	**Outcome instruments:** QoL: Global precieved effect **Results:** Immediate post tx: 2.3 (2.2) vs. 2.8 (1.8) vs. 1.0 (2.8) Short term: NR Intermediate: 1.7 (2.6) vs. 1.9 (2.4) vs. 1.4 (2.4) Long term: 1.2 (2.9) vs. 1.8 (2.5) vs. 1.0 (2.8) **Harms:** No AEs were reported. **Summary:** There were no apparent differences between groups in either primary or secondary variables at 6 or 12 mos.

Table 1.24 Low Back Pain – Manipulation + Mobilization – Mixed- Specific Pain-No trials
Table 1.25 Low Back Pain – Manipulation + Mobilization – Mixed-Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Chiradejnant A, (2003)[153,154] Country: Australia Quality score: 5/13 Initial of reviewer: FY	**Trial Design-**RCT Tx duration: 1 session Fu duration (last assessment): immediately post tx N screened: N randomized: 140 N completed tx: 140 N attended last fu: 140 **Inclusion:** Pts with LBP and resting pain > 2 on a 0-10 scale; candidate for mobilization by PT **Exclusion:** red flag conditions such as malignancy or inflammatory or infectious diseases affecting the spine	Mean age (SD/range): 47.4 (16.4) vs. 45.4 (16.5) % of male: NR Racial composition: NR Other socio-demographics: work loss (days) 4.7 (8.9) vs. 3.9 (7.7) Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** LBP- NS Some with leg numbness (15.7% vs. 22.9%) Duration of Pain, mean Mixed, 184.1 (539.9) vs. 89.3 (279.7) days Severity of pain (Grading): NR Current treatment/ co-intervention common in all groups: NR	**Groups** IG1 (n = 70) – PT selected correct mobilization technique By qualified PTs Single session Drop outs: 0 IG2 (n = 70) – randomly selected mobilization technique Drop outs: 0	**Outcomes:** Pain: VAS Disability: NR Well being: global perceived effect (11 point scale) **Results:** Immediate post tx: Change from baseline: **Pain:** Current pain intensity 1.3 (1.4) vs. 1.2 (1.7) On most painful movement 1.7 (1.7) vs. 1.4 (1.50 % reduction of pain intensity 29.7 (32.7) vs. 23.9 (37.9) Global perceived effect: 1.4 (1.8) vs. 1.2 (1.9)	**Outcomes:** Range of movements (ROM) Change from baseline: Finger to floor (cm): 2.0 (2.6) vs. 0.5 (5.6) Flexion: -3.5 (3.8) vs. -1.9 (6.5) Extension (degrees) -2.2 (2.9) vs. -2.6 (2.8) Right lateral flexion: -2.0 (2.5) vs. -1.9 (2.7) On most painful movement: -3.2 (3.2) vs. -2.1 (6.3) **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Goodsell, M (2003)[155] Country: Australia Quality score: 3/13 Initial of reviewer: FY	**Trial Design-**RCT- cross over Tx duration: 1 session Fu duration (last assessment): immediately post tx N screened: NR N randomized: 26 N completed tx: 26 N attended last fu: 26 **Inclusion:** Pts with LBP in last 48 hours, back pain elicited or increased by active lumbar flexion or extension movements, pain elicited on application of force to the spinous process of 1 or more lumbar vertebrae **Exclusion:** known contraindication to manual therapy such as malignancy, inflammatory or infectious disease affecting the spine, or pregnancy	Mean age (SD/range): NR % of male: 58 vs. 36% Racial composition: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** LBP- NS Some with leg numbness (15.7% vs. 22.9%) Duration of Pain, mean Mixed, 184.1 (539.9) vs. 89.3 (279.7) days Severity of pain (Grading): NR Current treatment/ co-intervention common in all groups: NR	**Groups** IG (n = 12) – Lumbar postero-anterior mobilization applied to the most symptomatic spinal level 3 x 1 minute reps-magnitude adjusted at PTs discretion Drop outs: 0 CG (n = 14) – Control prone lying for 3 minutes Drop outs: 0	**Outcomes:** Pain: VAS **Results:** Immediate post tx: Change from baseline: **Pain:** In flexion -6.1 vs. -2.0 In extension (mm) -7.4 vs. -3.0 Worse pain (mm) -13.4 vs. -3.5 Overall (%) -24.5 vs. -11.1	**Outcomes:** Range of movements (ROM) Change from baseline: Finger to floor (cm): 1.9 vs. 1.8 Flexion (degrees) 0.9 vs. 1.4 Extension 0.9 vs. 1.4 **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Himmilä, HM (2002)[156] Country: UK Quality score: /13 Initial of reviewer: FY	**Trial Design-**RCT Tx duration: 1 session Fu duration (last assessment): same day-immediately post tx N screened: NR N randomized: 26 N completed tx: 26 N attended last fu: 26 **Inclusion:** ambulatory pts with back pain longer than 7 weeks **Exclusion:** Patients with back pain less than 7 weeks-	Mean age (SD/range): all pts: 38.3 (11.7) range 18-61 % of male: 58% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	LBP- NS. Duration of Pain, mean (SD/range): All pts 26.8 (47.9) range 0.1 – 240 months Severity of pain (Grading): NR Current treatment/ co-intervention common in all groups: no therapies were allowed for 1 month prior to the study	IG (n = NR)– spinal mobilization applied centrally or unilaterally; between 1 and 3 levels, using 2-3 set of 4-6 reps. (MWM technique) By senior PTs with mean 9 years post graduate experience and accredited MVM course- one session only Drop outs: 0 CG1 (n = NR)– Placebo mobilization with only postural placement of subjects similar to the intervention group (instruction was to relax) One session only Drop outs: 0	**Outcomes (describe instrument used):** Pain by VAS Disability by RMDQ **Results:** Baseline: VAS at worst 7.0 (2.0) ; During flexion 5.2 (1.9) Disability:11.4 (4.7) Immediate post tx: Pain: post placebo: 4.3 (2.2) Post MWM 4.2 (2.5)	**Outcomes (describe instrument used):** Spinal ROM Immediate post tx: post placebo total flexion: 69.7 (21.5); total extension 21.2 (11.1) Post MWM total flexion 76.7 (22.4); total extension 24 (11.0) Short term: NA Intermediate: NA Long term: NA **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hurwitz EL (2006)[157] Country: US Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 6 wks Fu duration: 18 monhts N screened: 2355 N randomized: 681 N completed tx: 681 N attended last fu: 610 **Inclusion:** age 18 or older Health maintenance organization membership, sought care in one of the study sites between 1995-1998 with LBP, had no Tx received for the past mo, **Exclusion:** Pain due to fracture, tumor, infection, spondyloarthropathy, or other non-mechanical cause, blood disorder or received anticoagulants or corticosteroids, no ability to speak English	Mean age range: 49 – 53 yrs % of male: 48.1 (avg for all grps) Racial composition: majority (> 60%) White Work status: NR Other socio-demographics: Married: majority with high school or college education & married; > 50% employed - < 2% on leave Co morbidities: NR	**Cause of Pain:** Traumatic back injury-avg 27.1 Radiating pain: leg pain below knee-avg 34.2 Duration of Pain: Acute, 26.1 Sub-acute, 15.7 Chronic, 11.6 Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 169)– SM or Mob + advise & EX Drop outs: 12 monhts = 16 IG2 (n = 172) – SM or Mob + PM (heat/cold, ultrasound, EMS) Drop outs: 12 monhts = 16 CG1 (n = 170) – medical care: advise + analgesics, muscle relaxants, anti-inflammatory Drop outs: 12 monhts = 17 CG2 (n = 170) – medical care + PM Drop outs: 12 monhts = 22	**Outcome instruments:** Pain: VAS Disability: RMDQ **Results-** Immediate post tx: Most severe pain: IG1 = 1.83, IG2 = 1.95 Average pain: IG1 = 1.04, IG2 = 1.35 Disability-mean: IG1 = 3.18, IG2 = 3.16 Short term: NR Intermediate: NR Long term: Pain-mean: IG1 = 2.51, IG2 = 2.51; IG1 = 1.73, IG2 = 1.82 Disability-mean: IG1 = 4.41, IG2 = 3.68	**Outcome instruments:** QoL/ well being: NR **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NA **Harms:** NR **Summary:** mean changes in pain intensity and disability IG 1&2 were similar at each fu (adjusted mean differences at 6 mos for most severe pain, 0.27, 95% CI: -0.32– 0.86; average pain, 0.22, -0.25– 0.69; and disability, 0.75, -0.29 –1.79). PT yielded somewhat better 6-mo disability outcomes than did medical care alone (1.26, 0.20–2.32).

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Koes, B (1992)[158] Country: Netherlands Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 6 and 12 wks Final assessments: 12 wks N screened: NR N randomized: 136 N completed tx: NR N attended last fu: NR **Inclusion:** pain or self-reported limited ROM in the back or neck for at least 6 wks **Exclusion:** suspicion of underlying pathology (e.g., malignity, osteoporosis, herniated disc), tx with PT or manual therapy for back or neck complaints during past 2 yrs, pregnancy, language problem or inability to reproduce complaints by active or passive movements during physical examination.	Mean age (SD/range): 42.75 yrs total % of male: IG1 = 46% IG2 = 52%, CG1 = 62%, CG2 = 48% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Sub-acute, Chronic; 26-92 wks Severity of pain (Grading): NR Co-interventions:NR	IG1 (n = 36)– SM + Mob of the spine according to Dutch Society for manual therapy ; max. 3 mo Drop outs: B = 3,D = 10 IG2 (n = 31)– Physiotherapy: EX, massage, heat, electrotherapy, ultrasound, short-wave diathermy Drop outs: B = 5,D = 17 CG1 (n = 39)– General practitioner: continued tx with GP, prescription, advice on posture, EX, sports and bed rest; as IG1 Drop outs: B = 7 CG2 (n = 30) – Placebo: physical exam detuned diathermy (10 min) and ultrasound (10 min); 2 tx/wk for 6 wks; Drop outs: B = 8	**Outcome instruments:** Pain: NR Disability: NR **Results:** Immediate post tx: Pain: Disability: ---- Short term: Intermediate: Long term:	**Outcome instruments:** QoL/ well being: NR Other: Immediate post tx at 3 mos: Improvement in physical functioning: 4.0 (2.3) vs. 3.2 (2.0) vs. 3.4 (2.3) vs. 3.4 (2.2) Spinal flx at T1(degrees)- change in ROM: -2.0 (15) vs. 6 (13) vs. 0 (10) vs. 0 (18) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Macdonald, R (1989)[159] Country: London Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: until cured Final assessments: immediately post tx N screened: 100 N randomized: 95 N completed tx: 90 N attended last fu: NR **Inclusion:** Pts 16-70 yrs with pain partly or wholly; the inferior angles of the scapulas to the buttock folds **Exclusion:** inflammatory joint disease, skeletal metastases or infection, spondylolisthesis, neurologic deficit in structures innervated by lumbar or sacral roots that could not be ascribed to a previous resolved episode or other pathology, osteomalacia/ osteoporosis, visceral pathology that could refer LBP, pregnancy, sought physical tx outside the practice for their present episode, transient pts	Mean age (SD/range): NR % of male: IG = 43%, CG = 39% Racial composition: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: 1-12 mos prior IG - (26), CG – (21); 1-6 yrs prior IG - (28), CG – (23) Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain: N-S** Duration of Pain: Acute Severity of pain (Grading): Pain Analog (0-75)(A) Co-interventions:NR Work status: Men having physically active work (36%) Women having physically active work (16%)	**Groups** IG (n = 49) – Osteopathic manipulation therapy (OMT): advice on posture, EX,. Osteopathic tx given: direct pressure and stretching to involved musculature, LVHA oscillatory movements to hypomobile joints, HVT to hypomobile vertebral motion segments; 2 tx/wk until pts deemed themselves recovered or further tx believed unlikely to produce benefit Drop outs: B = 5 CG (n = 46) – Control: Advice on posture, EX, pts seen in clinic as necessary Drop outs: NR	**Outcomes:** Pain: PDI (0-10);Pain analog (PA) (0-75) Disability: Activity Loss (ALA) **Results:** Baseline: Pain: PDI: IG = 6.4 (3), CG = 6.1 (2.5) PA: IG = 18.9 (10), CG = 20.3 (9.2) Disability: IG = 34.9 (23.1), CG = 22.8 (14.9) Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** n = 20, Excess Lumbar Lordosis; n = 21, Pins and needles

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Powers, C (2008)[160] Country: US Quality score: 3/13 Initial of reviewer: FY	**Trial Design-**RCT Tx duration: 1 session Fu duration (last assessment): same day-immediately post tx N screened: NR N randomized: 30 N completed tx: 30 N attended last fu: 30 **Inclusion:** adults 18 to 45 years of age with diagnosis of nonspecific LBP < 3 months with localized LBP at or above the waist level, decreased lumbar extension assessed by qualitatively while standing **Exclusion:** Patients older than 45 years to control for confounding of osteoarthritis; spinal malignancy, cardiovascular disease, evidence of cord compression, aortic aneurysm, hiatal hernia, uncontrolled hypertension, abdominal hernia, prior LBP surgery	Mean age (SD/range): 30.2 (7.9) vs. 32.3 (9.6) % of male: 35% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: pts with prior surgery were excluded	LBP- NS. Duration of Pain, mean (SD/range): Severity of pain (Grading): NR Current treatment/ co-intervention common in all groups: NR	IG (n = 15)– spinal mobilization (Maitland method) one session only Drop outs: 0 CG1 (n = 15)– press up exercise as far as possible without reproducing lumbar pain with standing extension (according to the McKenzie and May technique) One session only Drop outs: 0	**Outcomes (describe instrument used):** Pain by VAS Disability: NR **Results:** Baseline: 4.1 (1.7) vs. 4.0 (2.1) Immediate post tx: 2.4 (1.8) vs. 2.8(1.5) Average change from baseline 1.7 (2.1) vs. 1.2 (1.4)	**Outcomes (describe instrument used):** Lumbar extension (degrees): Baseline: 20.2 (5.2) vs. 22.2 (3.9) Immediately post-tx: 23.8 (6.5) v.s 24.9 (6.0) Average change form baseline: 3.6 (5.0) vs. 2.7 (5.1) Short term: NA Intermediate: NA Long term: NA **Harms:** NR

Table 1.26 Low Back Pain – Manipulation + Mobilization – Unknown -Specific Pain -No trials
Table 1.27 Low Back Pain – Manipulation + Mobilization – Unknown -Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Meade TW (1991)[161] Country: UK Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 3-12 mo Final assessments: 1 yr N screened: 781 N randomized: 741 N completed tx: 741 N attended last fu: 541 **Inclusion:** LBP mechanical origin, no contraindication to SM, no Tx within the past mo **Exclusion:** Nerve root damage, major structural abnormalities visible on radiography, osteopenia, or infection	Mean age (SD/range): IG = 38.9 (11.2) vs. CG = 38.3 (10.8) yrs % of male: IG = 49%, CG = 53% Racial composition: Work status: Self-employed: IG = 11%, CG = 13% Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Mechanical Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 384)– Chiro: Tx at the discretion of chiropractors who used chiro manipulation on most pts; max. 10 sessions for 3-12 mo, tx completed in 30 wks Drop outs: E = 137 IG2 (n = 357) – HM: Maitland Mob/manipulation; tx completed in 12 wks Drop outs: E = 150	**Outcome instruments:** **Pain:** Oswestry Disability Questionnaire; ODQ(pain intensity) **Results:** Immediate post tx: NR Short term: Disability-mean change: IG1 = 1.03, IG2 = 0.67 Intermediate: Disability-mean change: NR; IG1 = 0.94, IG2 = 0.73 Long term (1 yr) Pts with no pain: 59% vs. 64% Disability-mean change: NR; IG1 = 0.98, IG2 = 0.63	**Outcomes:** QoL/ well being: NR Mean changes in SLR (degrees) in 6 wks: Right leg: 5.0 vs. 7.1 Left leg: 0.62 vs. 0.85 Using drugs, %: 35% vs. 33% **Harms:** NR (pts with further requally severe pain at 1 yr: 25% vs. 24%) **Summary:** at 2 yrs post-R, for those with ODQ > 40%, > improvement in ODQ scores between IG1 vs. IG2 (between-group difference: 13.3, 95% CI: 0.24, 26.01) compared to those with ODQ ≤ 40% at baseline (between-group difference: 3.19, 95% CI: -1.52, 7.90)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Sims-Williams H (1979)[162] Country: UK Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4 wks Final assessments: 3 mos & 1 yr (postal questionnaire) N screened: NR N randomized: 94 N completed tx: 94 N attended last fu: 80 **Inclusion:** pts with N-S LBP **Exclusion:** contraindications to tx	Mean age (SD/range): IG = 43 (11.8) vs. CG = 42.3 (12.7) yrs % of male: IG = 64.5%, CG = 52.1% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S, n (%) radiating pain: IG = 15 (31.2%), CG = 4 (8.7%) Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 48) – SMM: based on a method described by Maitland; daily for 1st wk, then 3 times/wk for 3 wks, 4 wks total Drop outs: D = 14 (both arms) CG (n = 46) – Placebo: microwave at the lowest setting directed to the lumbar spine for 15 min with the pt prone; same as IG Drop outs: see above	**Outcome instruments:** Pts with no pain (completely better) Disability: subjective assessment of physical activity **Results-** Immediate: Pts with no pain: 4/48 vs. 1/48 Much better in pain: 13 vs. 14 Combined 17 vs. 15 Back to normal activity (no. of pts): 19 vs. 20 Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Flexion; Extension Immediate post tx: Disability: IG = 24 (10.3), CG = 22.75 (9.62); IG = 42.96 (9.09); CG = 44.43 (11.38) Short term: IG = 26.83 (9.41), CG = 22.46 (9.43); IG = 43.13 (9.93), CG = 44 (11.85) Intermediate: NR Long term: NR **Harms:** NR

Table 1.28 Low Back Pain – Flexion Distraction Technique – Acute/Subacute- No studies
Table 1.29 Low Back Pain – Flexion Distraction Technique – Chronic- Specific- No studie
Table 1.30 Low Back Pain – Flexion Distraction Technique – Chronic -Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Cambron JA (2006)[163] Country: US Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4 wks Fu duration:1 yr N screened: 2176 N randomized: 235 N completed tx: 235 N attended last fu: 174 **Inclusion:** aged > 18 yrs with CLBP > 3 mo from L1 to S1 joint inclusive, willing to undergo narcotic/NSAIDs muscle relaxant's use **Exclusion:** CNS disease, contraindication to MT, severe osteoporosis, lumbar fracture, systemic disease affecting muscoskeletal system, psychiatric disease, alcohol/drug abuse, morbidly obese, pregnant, currently receiving Tx for LBP	**Mean age :** 42 yrs **% of male:** IG = 66%; CG = 59% Racial composition: Majority White (82%) Work status: NR Other socio-demographics: Married:59.5% Co morbidities: Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 123) – Chiro (flx + distraction): (FD) was done on a table with a pt lying in prone position the clinician placed one hand over the lumbar region at the spinal level of interest and used the other hand to flex or rotate the lower extremity section of the table; 2-4 times/wk, 4 wks Drop outs: E = 27 CG (n = 112) – Exercise: Strength, flexibility, and CV EXs; same as IG Drop outs: E = 34	**Outcome instruments:** Pain: VAS Disability: RMDQ **Results-** Immediate post tx: Pain: 14.6 (1.7) vs. 19.7 (2) Disability: 3.6 (0.4) vs. 3.8 (0.4) Short term: Pain: 19.3 (2.1), vs. 22.1 (2.2) RMDQ: 2.7 (0.4) vs. 2.9 (0.4) Intermediate: Pain: 19.2 (2) vs.3.8 (2.4); RMDQ: 2.6 (0.4) vs. 3.4 (0.5) Long term: Pain: 20.6 (1.9) vs. 21.6 (2) RMDQ: 2.9 (0.4) vs. 3.2 (0.4)	**Outcomes:** QoL/ well being: NR Other: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NA **Harms:** No AE occoured within either tx grps **Summary:** Pts in IG experienced greater improvements in pain compared to CG; no differences were seen in disability between the two groups

Table 1.31 Low Back Pain – Flexion Distraction Technique – Mixed - Specific- No studies
Table 1.32 Low Back Pain – Flexion Distraction Technique – Mixed - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hawk, C (2005)[164] Country: Midwestern US Quality score: 8/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 3 wks Fu duration: imm.post-tx N screened: 230 N randomized: 111 N completed tx: 106 N attended last fu: 106 **Inclusion:** 18 yrs and over, with sub-acute (onset 4-12 wks prior to contact) or CLBP (onset more than 12 wks prior) **Exclusion:** Pregnancy, radiation of pain distal to the knee with evidence of neurologic involvement, contraindications to manipulation, no indications of musculoskeletal dysfunction, litigation for a health-related claim, chiropractic care within the last mo, or unwillingness to postpone other types of manual therapy during the study	Mean age: 52 yrs % of male: IG = 50%; CG = 44% Racial composition: 52% White Work status: ds of missed work in past mo: 0 Other socio-demographics: 13% Smokers Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: sub-acute or chronic, (median) IG = 4 yrs, CG = 7 yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 54) **–** Manipulation: pressure applied to lumbar/lumbosacral region with PA force of 80-160 N, Trigger point therapy: 40-75 N for 4-7 sec, releasing for 3-5 sec with a max. of 3 reps; 8 tx over 3 wks Total Drop outs: A = 119, B = 15 CG (n = 57) – Control tx: Instrument set to its "zero point" delivering weight of instrument, applied 2 inches lateral to spine and not more than 12 N, effleurage applied to pt's low to middle back for 5-10 sec at 10-20 N; same as IG	**Outcomes:** Pain: PDI; RMDQ **Results:** Baseline: Pain: IG = 26.8 (12.1), CG = 26.1 (12) RMDQ: IG = 7.4 (3.9), CG = 7.8 (4.6) Immediate post tx: Pain-mean change: IG = 9.1, CG = 7.9 RMDQ: IG = 2.2, CG = 1.5 Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Number of pts with overall complete improvedment: **Results:** Immediate post tx: 0 vs. 1 Short term: NR Intermediate: NR Long term: NR **Harms:** N = 1 in IG, BP became worse during visit ; n=1 WDAE in IG vs. 0 in CG

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hawk, C (1999)[165] Country: US Quality score: /13 Initial of reviewer: SG	**Trial Design-RCT Crossover Design** Tx duration: 2 wks Final assessments: 2 wks N screened: 18 N randomized: 13 N completed tx: 13 N attended last fu: 13 **Inclusion:** 18 yrs of age or older; self-report of LBP within the last 6 mo **Exclusion:** Unsuited to chiropractic tx: the clinician took a case history on all pts and completed a screening orthopedic and neurological examination to rule out contraindications to chiropractic tx; litigation; pregnancy	Mean age (SD/range): 33.5 yrs (all grps) % of male: 66.6% all grps Racial composition: NR Work status: chiropractic college students or faculty or staff members. Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Unknown Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 8) – Active tx first, symptomatic pts: Chiropractic Adjustment (active) - Flexion-distraction technique.; 4 visits, 2 wks Drop outs: 0 CG (n = 5) – Placebo tx first, symptomatic pts: Sham adjustments were performed with a hand-held instrument used in certain chiropractic techniques; as IG Drop outs: 0	**Outcome instruments:** Pain: VAS (10 cm) **Results:** Immediate post tx: Pain-mean change: decrease in pain in IG vs. increase in CG: -0.7 vs. +0.5 Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Global well being: results reported for individual pts- not shown Short term: NR Intermediate: NR Long term: NR **Harms:** one pts showed a negative response to both tx with decrease in the GWBS of 1.10 cm for the active tx and 0.20 cm for the placebo; another **Summary:** improvements were greater after IG than CG

Table 1.33 Low Back Pain – Flexion Distraction Technique – Unknown - Specific- No studies

Table 1.34 Low Back Pain – Flexion Distraction Technique – Unknown -Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Beyerman KL (2006)[166] Country: US Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 5 wks Final assessments: 5 wks N screened: NR N randomized: 217 N completed tx: 217 N attended last fu: 217 **Inclusion:** English speaking pts with arthritis, OA, degenerative joint/disc disease, facet arthropathy, capable of traveling to the appointments **Exclusion:** Present use of chiro therapy, PT, or anti-inflammatory Meds	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** osteoarthritis Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 124) – FD + moist hot pack: impulsion, FD in prone position secured to table with strap around ankles; traction in lumbar spine; flx added by using distractive repetitions of the table manually controlled; hot packs applied for 15 min, 2-3 visits/wk, 5 wks Drop outs: n = 35 (total sample) CG (n = 93) – Moist heat: hydro collator pack stored at 150-170 degrees; using 6 layers of towel covering, 3 between the skin and hot pack and 3 on the transverse oscillatory rot of the hot pack; as IG	**Outcome instruments:** Disability: ODQ (pain intensity); ODQ (ADL) **Results:** Immediate post tx: Disability: IG = 0.69 (1.15), CG = 1.31 (1.45); ODQ: IG = 8.56 (7.1), CG = 12.82 (7.66) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: NA **Results:** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** no AEs was repoted by pts

Table 1.35 Low Back Pain - Massage – Acute/Sub-acute - Specific Pain – No studies

Table 1.36 Low Back Pain - Massage – Acute/Sub-acute - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Farasyn A (2006)[167] Country: Belgium Quality score: 7/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: One session Final assessments: Post-tx N screened: 170 N randomized: 60 N completed tx: 60 N attended last fu: 60 **Inclusion:** 21-75 yrs; N-S subacute LBP with or without referred pain to the leg **Exclusion:** Acute (3 wks) and chronic (> 12 wks) LBP and/or neuropathy (sciatica or severe root compression); Fibromyalgia; use of any Med, and/or psychological tx; pregnancy and the existence of any significant pathology (no reported abnormal spinal x-ray findings e.g. spinal fracture, tumor, infection, structural deformity, inflammatory disorders)	Mean age (SD/range): IG = 41 (11), CG1 = 43 (12), CG2 = 40 (12) yrs % of male: IG = 35, CG1 = 45, CG2 = 44 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Sub-acute, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 20)– Roptrotherapy: deep cross-friction massage with the aid of a myofascial T-bar made of bronze, applied within the tolerable threshold of one 30 min session Drop outs: 0 CG1 (n = 20) – Endermology - a LPG device was adjusted to a minimal but continuous suction power s; same as IG Drop outs: 0 CG2 (n = 20) – no tx(delayed tx); same as IG Drop outs: 0	**Outcome instruments:** Pain: VAS (100 mm) Disability: ODI – Dutch language version **Results:** Baseline: Pain: IG = 56 (26), CG1 = 57 (20), CG2 = 49 (22) Disability: IG = 34 (11), CG1 = 36 (11), CG2 = 29 (11) Immediate post tx: Pain: IG = 37 (19), CG1 = 59 (21), CG2 = 52 (21) Disability: IG = 16 (5), CG1 = 38 (11), CG2 = 31 (12) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Aleksiev (1995)[168] Country: Bulgaria Quality score: 2/13 Initial of reviewer: FY	**Trial Design-**RCT- cross over Tx duration: 12 sessions in 20 days Fu duration (last assessment): 1 year N screened: NR N randomized: 26 N completed tx: 26 N attended last fu: 26 **Inclusion:** Pts with LBP > 1 month more lumbar vertebrae **Exclusion:** compressive neuropathy, traumatic fractures, spondylolisthesis, osteoporosis, inflammation, or tumors	Mean age (SD/range): NR % of male: Racial composition: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** LBP- NS Duration of Pain, mean Mixed, mean range 16.7 to 18.1 days Severity of pain (Grading): NR Current treatment/ co-intervention common in all groups: NR	**Groups** IG1 (n = 29) – post isometric relaxation of the LBP muscles and illiopsoas 12 sessions in 20 days Drop outs: NR IG2 (n = 21) – Average frequency sinuous modulated current tx + sham mobilization 12 sessions in 20 days Drop outs: NR IG3 (n=26): Perl's traction therapy + sham mobilization 12 sessions in 20 days Drop outs: NR CG (n=19) sham mobilization + NSAIDs 12 sessions in 20 days Drop outs: NR	**Outcomes:** Pain: VAS **Results:** **Pain:** Data presented in graph—not used Summary of findings: statistically significant improvement of pain in mobilization group only immediately post tx All other tx and follow up outcomes were non-significant compare to baseline. Improvements better in IGs vs. CG ($p< 0.05$) at short term fu All pts were pain free at 1 year fu	**Outcomes:** Range of movements (ROM) No numerical values reported **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Konrad K (1992)[169] Country: Hungary Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 4 wks Final assessments: 6 mos N screened: NR N randomized: 158 N completed tx: 158 N attended last fu: 158 **Inclusion:** NS LBP with or without radiation to the thigh, 1 mo ≤ duration ≤ 3 mo, a pain free yr before the present episode **Exclusion:** pregnancy, back surgery, spondylolisthesis, infections, tumors, fractions, ankylosing spondylitis, senile osteoporosis, scoliosis	Mean age (SD/range): IG1 = 42 (8.8), IG2 = 39 (9.1), IG3 = 44 (7.6), CG = 41 (8.6) yrs % of male: 44.7 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Sub-acute, IG1 = 2.5 (1.1), IG2 = 2.7 (1.4), IG3 = 2.7 (1.8); CG = 2.4 (1.7) mo Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 35)–Balneotherapy: pts immersed in heated water with minerals; 4 wks Drop outs: 3 IG2 (n = 44)–Underwater traction bath traction was applied; traction belt was applied to the pelvis with 3 kg weight on both sides; As IG1 Drop outs: 0 IG3 (n = 26)–Underwater massage: movement while a stream of hot water played on the affected part; As IG1 Drop outs: 9 CG (n = 53) – No tx Drop outs: NR	**Outcomes:** Pain: VAS Disability: NR **Results:** Baseline: Pain: IG1 = 63.4 (24.1), IG2 = 56.7 (28.2), IG3 = 68.4 (31.9), CG = 61.5 (32.8) Disability: ---- Immediate post tx: Pain: IG1 = 31.7 (16.2), IG2 = 24.6 (11.9), IG3 = 33.5 (19.1), CG = 53.7 (23.8) Disability: ---- Short term: NR Intermediate: VAS: IG1 = 49.5 (25.7), IG2 = 45.8 (26.2), IG3 = 54.7 (33.7), CG = 54.9 (24.8) Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Pope, M (1994)[113] Country: California, US Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3 wks Final assessments: 3 wks N screened: NR N randomized: 150 N completed tx: 148 N attended last fu: 148 **Inclusion:** ages 18-55 yrs; general good health; LBP between 3 wks-6 mo; free from LBP for minimum 3 wks **Exclusion:** pregnancy; sciatica; neurologic deficits, loss of sensation, strength and reflex; no prior vertebral fracture, tumor, infection or spondyloarthropathy; no prior back surgery; Davenport weight index > 33	Mean age (SD/range): 32 yrs % of male: 62% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** NR Duration of Pain: Mix Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 60)– SM through ROM, end a dynamic short level, HVLA thrust on the lumbar spine and/or sacroiliac joint; 3 x/wk for 3 wks Drop outs: B = 17 CG (n = 30) – Soft-tissue massage: Effleurage in prone - on-rhythmic motion,; 15 min/tx, 3 x/wk for 3 wks Drop outs: B = 10 IG2 (n = 30) – TENS:, max 91 mA, ; 8 hrs/d, on for min. 1 hr at a time; 1x/wk for 3 wks Drop outs: B = 10 IG3 (n = 30) – Lumbo sacral corset during waking hrs except while bathing; 3 x/d; 1x/wk for 3 wks Drop outs: B = 6	**Outcomes:** Pain: 10 cm VAS ROM-modified Schober's test: Flexion; Extension **Results-**Baseline: Pain: NR Disability: NR Immediate post tx: Pain: IG = -24.1 (27), CG = -17.2 (25.1), IG2 = -9.6 (30), IG3 = -15.9 (27) Disability-mean change: IG = 0.38 (1.25), CG = -0.08 (1.2), IG2 = -0.02 (0.82), IG3 = 0.33 (0.93); IG = -0.29 (0.59), CG = -0.32 (0.63), IG2 = 0.63 (0.89), IG3 = -0.27 (0.72) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** No significant differences were observed for any of the outcomes between txs.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Preyde M6 (2000)[170] Country: Guelph, ON Quality score: /13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 1 mo Final assessments: 3 mos N screened: 165 N randomized: 98 N completed tx: 98 N attended last fu: 91 **Inclusion:** 18-81 yrs; existence of subacute (between 1 wk and 8 mo LBP; stable health **Exclusion:** Significant pathology, such as bone fracture, nerve damage, or severe psychiatric condition including clinical depression as determined by a physician; pregrnancy. LBP > 8 mo subacute cut-off (15 pts), they were not currently experiencing LBP (13 pts), or a diagnosis of complex health problems such as multiple sclerosis (9 pts)	Mean age (range):42 – 48 yrs % of male: 48.25 Race: NR Work status: 25.5% Unemployed/ retired Other socio-demographics: 68.5% Partnered/ married Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** Mild strain: 24.2%; Sports injury: 14.5%; Bending/lifting injury: 34%; Fall/accident: 7.25%; Stress related: 6.2% % NS: 14% Duration of Pain: Sub-acute, IG1 = 12 (9.1); IG2 = 14.8 (8.2); CG1 = 13.2 (11.1); CG2 = 13.3 (8.8) Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 25)– Comprehensive massage+ general strengthening or mobility EXs; 30-35 min/ tx, 6 tx over 1 mo Drop outs: A = 1, B = 0, C = 1 IG2 (n = 25) – Soft-tissue manipulation: same as IG1; 6 tx over 1 mo Drop outs: A = 0, B = 2, C = 3 CG1 (n = 22) – Remedial EXs: as IG1; as IG2 Drop outs: A = 1, B = 1, C = 1 CG2 (n = 26) – Sham laser tx (low level); 20 min/ tx, 6 tx over 1 mo Drop outs: A = 0, B = 1, C = 2	**Outcomes:** Pain: McGill: PPI; PRI scores Disability: RDQ (0-24) **Results:** Immediate post tx: Pain: IG1 = 0.44 (0.6), IG2 = 1.04 (0.7), CG1 = 1.64 (0.8), CG2 = 1.65 (0.8) Disability: IG1 = 2.36 (2.8), IG2 = 3.44 (2.8), CG1 = 6.82 (5.6), CG2 = 6.85 (3.5); Short term: Pain: IG1 = 0.42 (0.6), IG2 = 1.18 (1.5), CG1 = 1.33 (0.8), CG2 = 1.75 (0.6) Disability: IG1 = 1.54 (2), IG2 = 2.86 (3.1), CG1 = 5.71 (4.8), CG2 = 6.5 (4.2) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Modified schober test (cm) Immediate post tx: IG1 = 6.36 (1.2), IG2 = 5.87 (1.5), CG1 = 5.86 (1.3), CG2 = 5.98 (1.2) Short term: NR IG1 = 6.47 (1.2), IG2 = 5.93 (1.4), CG1 = 5.39 (1.4), CG2 = 5.5 (1.5) Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Yip, YB (2004)[171] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: NR Final assessments: 3 wks N screened: NR N randomized: 61 N completed tx: 51 N attended last fu: 51 **Inclusion:** pts aged 18 or older with N-S subacute LBP for most ds in past 4 wks; no acu, PT or SM in past wk **Exclusion:** S cause of LBP; systemic disease, contraindication to massage, pregnant, allergic to natural lavender oil, wound at any of the acupoint of the back or lower limb	Mean age (SD/range): 43.8 (3.0) vs. 48.1 (4.0) yrs % of male: 15% Racial composition: NR Work status: occuPts reported Other socio-demographics: Education levels reported Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 32)– Massage: acupoint relaxation flollowod by acupuressure with lavender oil 8 sessions/ 3 wks Drop outs: NR CG (n = 29) – usual care only; as IG Drop outs: NR	**Outcome instruments:** Pain: VAS Disability: NR **Results:** Immediate post tx: Pain: ---- Disability: ---- Short term- 4 wks: Pain: 0.61 (0.06) vs. 0.99 (0.06) reduction in pain (VAS) one wk post tx: IG 39% more reduction thant CG Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: lateral fingertip to ground (cm) Immediate post tx: NR Short term- 1 wk post tx: 0.96 (0.01) vs. 1.01 (0.01) cm Intermediate: NR Long term: NR **Harms:** no AEs were reported. **Summary:**

Table 1.37 Low Back Pain - Massage - Chronic- Specific Pain – No Studies
Table 1.38 Low Back Pain - Massage - Chronic - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Cherkin, DC (2001)[20] Country: U.S Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** **Tx duration:** 10 wks **Final assessments: immediately post tx** **N screened:** 693 **N randomized:** 262 **N completed tx:** 249 **N attended last fu:** NR **Inclusion:** Ages 20-70 yrs who visited a primary care physician for LBP who had persistent LBP for 6 wks. **Exclusion:** Sciatica; acu or massage for BP within past yr, back care from a specialist /CAM provider, severe clotting disorders or anticoagulant therapy, cardiac pacemakers, underlying systemic or visceral disease, pregnancy	Mean age (range): 44 – 45 yrs % of male (range): 31 – 48% Racial composition: White: 82 – 89% Work status: employed or self-employed: IG1 and CG = 82%, IG2 = 90% Other socio-demographics: family income > 35K/y: IG1 = 55%, IG2 = 59%, CG = 71% Co morbidities: NR Prior surgery related to current complaint: IG1 = 5%, IG2 = 5%, CG = 8%	**Cause of Pain:** N-S, Radiation below knee: IG1 = 24%, IG2 = 30%, CG = 31% **Duration of Pain:** Chronic, % with pain > 1 yr: IG1 = 57%, IG2 = 64%, CG = 62% **Severity of pain (Grading):** NR **Co-interventions:** narcotic analgesics: IG1 and CG = 9%, IG2 = 12%	**Groups** IG1 (n = 94)– Acu: chinese medical acu-, e-stimulation + manual manipulation of the needles, indirect moxibustion, IR heat, cupping,+ EX; up to 10 visits over 10 wks Drop outs: B = 5, E= 2 IG2 (n = 78) Soft tissue manipulation - Swedish massage, movement reeducation, deep-tissue, neuromuscular , and trigger and pressure point;; same as IG1 Drop outs: B = 1, E= 2 CG (n = 90) – Self care: high-quality educational material (book + video tapes); NA Drop outs: B = 7, E= 7	**Outcome instruments:** Pain: Symptom bothersomeness during past wk (0-10 scale) Disability: Roland Disability(0-23 scale); National Health interview survey **Results:** Immediate post tx (10 wks): Pain: 4.0 vs. 3.6 vs. 4.6 Disability: 7.9 vs. 6.3 vs. 8.8 Short term : NA Intermediate: NR Long term (1 yr): Pain, mean: 5.4 vs. 3.2 vs. 3.8 Disability: 8.0 vs. 6.8 vs. 6.4	**Outcome instruments:** QoL/ well being: SF-12, Mental Health summary scales Other: %pts using Med at 10 wks fu: from 69% to 51% in acu vs. from 73% to 47% in massage group, and little change in self care group Short term: NR Intermediate: NR Long term: NR **Harms:** No SAEs, or WDAE **Summary:** At 1 yr no significant difference in % of pts with recurrence of BP in last 6 mo (80%), seeking back care (40%) or visiting an acu tx (15%)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Field T (2007)[172] Country: Miami, US Quality score: 2/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: Two sessions Final assessments: immediately post tx N screened: 30 N randomized: 30 N completed tx: 30 N attended last fu: NR **Inclusion:** Adults with LBP of a duration of at least 6 mo; cleared by their primary physician to participate in the study **Exclusion:** BP due to fractured vertebrae, herniated or gegenerated disks, pts who had undergone surgery for their back pain (i.e. laminectomies or fusions) and pts with sciatic nerve involvement or legal action pending, such as workmen's compensation	Mean age (SD/range): 41 yrs % of male: 53% Racial composition: 67% Caucasian Work status: NR Other socio-demographics: Group avg =middle class; M=2.5 on Hollingshead Index Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 15)– Massage therapy: kneeding, rubbing, stroking along entire back and legs; two 30 min sessions/ wk Drop outs: NR CG (n = 15) – Relaxation therapy: PTS were shown how to use progressive MR EXs including tensing and relaxing large muscle groups starting with the feet and progressing to the calves, thighs, hands, arms, back and face; two 30 min sessions at home/ wk Drop outs: NR	**Outcomes:** Pain: VAS (10 cm) Disability: Trunk flx (cm); pain flx (cm) – higher scores optimal **Results:** Baseline: Pain: IG = 5.1 (2.9), CG = 4.4 (2.1) Disability: IG = 58.9 (7.5), CG = 59.1 (7.9); IG = 61.6 (8.1), CG = 61.1 (7.6) Immediate post tx: Pain: IG = 1.4 (1.6), CG = 2.7 (2.4) Disability: IG = 61.9 (8), CG = 60.7 (4.7); IG = 63.5 (8.1), CG = 63.6 (4) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Franke (2000)[173] Country: Germany Quality score: 8/13 Initial of reviewer: SG	**Trial Design- RCT** **Tx duration:** NR **Final assessments: immediately post tx** **N screened:** 190 **N randomized:** 190 **N completed tx:** 179 **N attended last fu:** 179 **Inclusion:** 25-55 yrs old, chronic BP> 1 yr, German speaking **Exclusion:** neurological deficits, neurosis, psychosis, Med for >3 ds, therapy interruption for >5 ds, people applying for early retirement due to disability, people unable to work > 4 wks before rehab or >3 mos in previous yr	Mean age (SD/range): IG1 = 45.2 (8), IG2 = 43.5 (9), IG3 = 45.6 (7.5), CG = 44.4 (8) yrs % of male: All Grps : 61% Racial composition: NR Work status: NA Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Degenerative Disease **Duration of Pain:** > 1 yr **Severity of pain (Grading):** VAS: IG1 = 5.4 (2.6), IG2 = 4.2 (2.4), IG3 = 4 (2.2), CG = 4.4 (2.2), Flexion lumbar spine IG1 = 46.4 (15.6), IG2 = 49.4 (12.4), IG3 = 52.8, CG = 49.1 (13.1), Extension lumbar spine IG1 = 12.9 (6.4), IG2 = 13.6 (6.6), IG3 = 14.8 (7), CG = 12.2 (6.6) **Co-interventions:**NR	**Groups** IG1 (n = 46)– Acupuncture massage of entire meridians+ group EX (GE): 12-16 sessions each 30min Drop outs: 1 IG2 (n = 49)– Swedish Massage (SM) + GE 30 min/ session, 8-10 sessions In gym and 4-6 session in pool Drop outs: 3 IG3 (n = 46)– Acupuncture massage + individual medical EX (IE) 30 min/ session, 4 sessions Drop outs: 5 CG (n = 49) – SM + IE 15 min/ session for 8 sessions Drop outs: 2	**Outcome instruments:** **Pain:** VAS, flx & ext Disability: Functional Questionnaire Hanover (FFbH) **Results:** Baseline: Pain: IG1 = 5.4 (2.6), IG2 = 4.2 (2.4), IG3 = 4 (2.2), CG = 4.4 (2.2) Disability: 86 (18) for all pts Immediate post tx: Pain: Mean: IG1 = -1.83, IG2 = -1.00, IG3 = -1.46, CG = -0.62 Disability, change from baseline APM vs. SM: 7.0% (95% CI: 2.5, 11.6) Short term: NR Intermediate: NR Long term: NR	QoL/ well being: NR Results- mean: NR Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** results with APM are promising, warrant further investigation, no superiority individual vs. grp EXs

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Geisser, M (2005)[174] Country: Michigan, US Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 5 wks Final assessments: post tx N screened: 100 N randomized: 100 N completed tx: NR N attended last fu: NR **Inclusion:** 18-65 yrs with single or primary complaint of CLBP and judged to have musculoskeletal pain based on evaluation by the physician or physical therapist **Exclusion:** Down's syndrome, osteoporosis of the spine, agenesis of the odontoid process, primary joint disease (active rheumatoid arthritis), metabolic bone disease, malignant bone disease, fracture, hypermobility of the lumbar/sacral spine, cardiovascular or other medical disorders	Mean age (range): 37 - 46 yrs % of male: 34 (avg of all grps) Racial composition: 85 Caucasian, 8 African-Am, 5 Asian-Amer., 2 Hispanic Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, 76.9 mo Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG1 (n = 26) – Manual therapy, S EX:; 5 wkly EXs for 20 min, stretching twice daily (10 reps, hold for 30 sec each) Drop outs: NR IG2 (n = 25) –Sham therapy, S EX: Same as IG but MET not performed; same as IG1 Drop outs: NR IG3 (n = 24) –manual therapy, nonS EXs: pts free to choose how to perform aerobic EX; same as IG1 Drop outs: NR IG4 (n = 25) – Sham therapy, N-S EX: same as IG3; same as IG1 Drop outs: NR	**Outcomes:** Pain: VAS (0-10); MPQ (0-78) Disability: Quebec Back Pain Disability Scale (QBPDS) (0-100) **Results-** Immediate post tx: Pain-mean change: VAS: IG1 = -2.05, IG2 = -0.38, IG3 = -0.52, IG4 = -0.91 MPQ: IG1 = -9.39, IG2 = -4, IG3 = -2.47, IG4 = -1.28 QBPDS-mean change: IG1 = -5, IG2 = -0.97, IG3 = -6.67, IG4 = -8.58 Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results:** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Pts in IG1 displayed significant improvements in pain. No significant changes in disability were observed with the exception that the IG2 displayed a significant increase in disability

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hernandez-Reif M (2001)[175] Country: US Quality score: 2/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 5 wks Final assessments: immediately post tx N screened: NR N randomized: 24 N completed tx: 24 N attended last fu: post tx **Inclusion:** adults with LBP with a duration of at least 6 mos **Exclusion:** BP due to fractured vertebrae herniated or degenerated disks, pts who had undergone surgery for their back pain, and pts with sciatic nerve involvement or legal action pending, such as workmen's compensation.	Mean age (SD/range): IG = 43.8 (13.7) vs. CG = 36.7 (16.1) yrs % of male: IG = 41.6%, CG = 50% Racial composition: 66.7% Caucasian Work status: NR Other socio-demographics: 37.4% Middle class Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 12) – Massage therapy: stroking, kneeding, rubbing applied to the entire back at a level tolerant to the pt and to legs; two 30 min sessions/wk over 5 wks Drop outs: NR CG (n = 12) – Relaxation: instructed on progressive MR exercices tensing and relaxing large muscle groups starting with the feet and progressing to the calves, thighs, hands, arms, back and face; 30 min/ session at home, twice/wk for 5 wks Drop outs: NR	**Outcomes:** Pain: SF-MPQ; VAS (0-10) Disability: **Results:** Baseline: Pain: MPQ: IG = 16.5 (8.2), CG = 16.7 (7.5) VAS: IG = 5.62 (2.2), CG = 4.5 (1.9) Disability: NR Immediate post tx: Pain: MPQ: IG = 4.1 (4.9) CG = 6.4 (6.4) VAS: IG = 1.7 (2.3), CG = 2.9 (2.8) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: ROM: Trunk flx; pain flx (cm) Results: Baseline: IG = 56 (7.4), CG = 57.5 (7.9); IG = 57.7 (8), CG = 61.1 (7.6) Immediate post tx: IG = 61.4 (7.4), CG = 58.2 (3.6); IG = 61.3 (9.1), CG = 60.6 (3.9) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Note:** massage group had less pain, depression, anxiety and had improved sleep

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hsieh LLC (2006)[176] Country: Taiwan Quality score: 9/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 1 mo Final assessments: 6 mos N screened: 188 N randomized: 129 N completed tx: 129 N attended last fu: 129 **Inclusion:** Pts aged > 18 yrs with CLBP (> 4 mo) **Exclusion:** cancer, systemic diseases, psychiatric disorders, pregnancy, acute severe pain in need of surgery or immediate tx, contraindication to acupressure	Mean age (SD/range): IG = 50.2 (13.8) vs. CG = 52.6 (17.2) yrs % of male: IG = 33%, CG = 26% Racial composition: NR Work status: NR Other socio-demographics: Married: 83.5% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic, median (range) IG = 3.3 (0.2-33.3) yrs, CG = 1.6 (0.2-34.3) yrs Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 64)– Acupressure: NR; 6 sessions in 1 mo Drop outs: D = 9 CG (n = 65) – PT: pelvic manual traction, SM, thermotherapy, infrared light therapy, ES, and EX; same as IG Drop outs: D = 11	**Outcome instruments:** Pain: Core outcome measure-LBP;VAS-ITT Disability: RMDQ; Modified Oswestry **Results-** Immediate post tx: Pain: IG = 2.11 (0.86), CG = 2.57 (0.83); IG = 30.6 (21.75), CG = 48 (23.4) Disability: IG = 5.4 (5), CG = 9.2 (5.8) IG = 17 (7.6), CG = 20.6 (8.8) Intermediate: Pain: IG = 1.59 (0.73), CG = 2.17 (0.89); IG = 16.1 (17.4), CG = 41.4 (24.6) Disability: IG = 2.2 (3.2), CG = 6.7 (5.5); IG = 12.2 (4.9), CG = 17.9 (8.1)	**Outcome instruments:** QoL/ well being: NR Other: pts with significant degree of disability (no.) Baseline: 28 vs. 20 Post tx: 8 vs. 19 Intermediate: 1 vs. 8 Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Hsieh, L (2007)[177] Country: Taiwan Quality score: 9/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 4 wks Final assessments: 6 mos N screened: 220 N randomized: 146 N completed tx: 146 N attended last fu: 121 **Inclusion:** 16 - 84 yrs with CLBP **Exclusion:** LBP caused by severe systematic diseases (SLE or rheumatoid disease); contraindications to acupressure and physical therapy; cancer, pyschiatric disease with the presence of overt clinical symptoms before participation; severe pain (pain score >90%), surgical operation prescribed by a physician as tx for LBP	Mean age (SD/range): IG = 47.6 (13.6) vs. CG = 47.6 (14.9) yrs % of male: IG = 43.4%, CG = 51.9% Racial composition: NR Work status: 27.5% Householder Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic (1 mo – over 10 yrs) Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 69) – Acupressure: no description given; 6 session over 4 wk period, 15 min/ tx Drop outs: A = 4, B = 0, D = 13 CG (n = 77) – Physical therapy: followed the routine practice of the hospital. Included pelvic manual traction, thermotherapy, infrared light therapy, ES, and EX therapy, as decided by one senior physical therapist; same as IG Drop outs: A = 5, B = 0, D = 12	**Outcomes:** Pain: Pain visual scale (0-5)- SF-PQ **Results:** Baseline: Pain: IG = 1.95 (2.96), CG = 2.23 (3.33); NR Immediate post tx: Pain: NR; IG = 2.28 (2.62), CG = 5.05 (5.11) Short term: NR Intermediate: NR; IG = 1.08 (1.43), CG = 3.15 (3.62) Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: NA Results: Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** No AEs were reported in the acupressure group

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Little, P (2008)[178] Country: UK Quality score: 8/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 4/6 wks, 5 mos Final assessments: 1 yr N screened: 1027 N randomized: 579 N completed tx: NR N attended last fu: 464 **Inclusion:** significant recurrent or CLBP, presenting to primsry care with LBP > 3 mo (to exclude 1st episode), currently scoreing ≥ 4 on Roland disability scale, current pain for ≥ 3 wks (**Exclusion:** previous experience of Alexander techniques (AT); pts under 18 or over 65; serious spinal disease; current nerve root pain (below knee in dermatomal distribution), previous spinal surgery, pending litigation; history of psychosis or major alcohol misuse	Mean age (SD): IG1 = 46 (10), IG2 = 45 (11), IG3 = 45 (11), IG4 = 46 (10) yrs % of male: 30.5 Racial composition: NR Work status: 74.5% Employed Other socio-demographics: 59.2% Married Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic (> 3 mo) or recurrent (last episode > 3 wks in duration) Severity of pain (Grading): ≥ 4 on Roland disability scale Co-interventions:NR	**Groups** IG 1a (n = 75) Massage 1b – massage + EX, (n = 72); 6 sessions, 1 session/ wk for 6 wks, EX at 6 wks Drop outs: C = 29, E = 27 IG (n = 144) 2a – 6 Alexander technique lessons;; 6 lessons, 4 wks Drop outs: C = 21, E = 29 IG (n = 144) 3a – 24 Alexander lessons; in 5 mo Drop outs: C = 29, E= 27 IG (n = 144) 4a – Usual care + EX; started EX tx at 6 wks Drop outs: C = 36, E = 33	**Outcome instruments:** Pain: Median ds with no pain (IQR) Disability: Roland disability score **Results:** Baseline: Pain: IG1 = 28 (14-28), IG2 = 28 (8-28), IG3 = 28 (13-28), IG4 = 24.5 (14-28) Disability: NR Immediate post tx: Pain: NR Disability: Short term: changecompared to control from baseline RDS: -1.90 vs. -1.71 vs. -2.91 Intermediate: NR Long term: \ Number of ds with LBP was lower after lessons and QoL improved also.	**Outcome instruments:** QoL/ well being: NR Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** worse pain by one pts no group designation reported

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Mackawan S (2007)[145] Country: Thailand Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: one session Final assessments: post-tx N screened: NR N randomized: 67 N completed tx: 67 N attended last fu: 67 **Inclusion:** 20-60 yrs; persistent CLBP (> 12 wks); no evidence of underlying diseases or anatomical abnormalities **Exclusion:** menstruation; pregnancy; body temp 38.5°C on d of exam.; a history of acute trauma, back surgery, spinal fracture, joint subluxation or instability, inflammatory joint disease muscle disease, malignancy or infection; evidence of neurologic deficits, multiple sclerosis, hemi/para paresis or myelopathy, skin diseases, or infectious diseases	Mean age (SD/range): IG = 38.97 (7.85) vs. CG = 38.57 (7.66) yrs % of male: IG = 34%, CG = 44% Racial composition: NR Work status: Government service= 49% Private officer= 32.5%; Student= 6%; Business owner = 11.5% Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 35)– Traditional Thai massage(TTM): Deep massage with prolonged pressure (5-10s/point) on the muscles along with passive stretching. Gentle stretching of the joints and muscles relieves tension, enhances flexibility, and induces a deep state of tranquility; one 10 min session Drop outs: NR CG (n = 32) – Joint Mob: Spinal Mob is a passive movement of a spinal segment with and occasionally beyond its active ROM.; as IG Drop outs: NR	**Outcomes:** Pain: VAS (10 cm); substance p levels in saliva **Results:** Baseline: Pain: IG = 4.22 (1.98), CG = 4.35 (1.71); IG = 73.86 (62.31), CG = 80.61 (85.26) Immediate post tx: Pain: IG = 2.45 (1.75), CG = 3.39 (1.66); IG = 50.43 (64.39), CG = 56.27 (72.77) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Results: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Poole, H (2007)[179] Country: UK Quality score: 5/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 6-8 wks Final assessments: 6 mos N screened: 650 N randomized: 234 N completed tx: 191 N attended last fu: 156 **Inclusion:** 18 - 65 yrs with benign CLBP **Exclusion:** pregnancy, significantly co-existing major medical illness, diagnosis with a significant co-existing psychiatric disorder and under the care of a psychiatric services; in litigation; previous use of reflexology and contraindication to reflexology including: recent surgery and circulatory disorders of the lower limb	Mean age (SD/range): IG = 47.2 (10.5), CG1 = 45.6 (12), CG2 = 47.25 (10.2) yrs % of male: IG = 37.6, CG1 = 35.4, CG2 = 49.3 Racial composition: NR Work status: 50% Employed Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: Chronic, IG = 120.6 (114.5) mo; CG1 = 128.4 (104.5) mo; CG2 = 114.7 (106.7) mo Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 77)– Reflexology: Morrell technique. No standardised protocol was provided, reflexologists were advised to treat pts CLBP as per their standard practice; 6 tx of 1 hr/wk over 6-8 wks Drop outs: A = 9, B = 13, D = 8 CG1 (n = 82) – Relaxation: Progressive MR; 6 tx of 1 hr/wk over 6 wks in groups of 1 - 4 Drop outs: A = 13, B = 12, D = 3 CG2 (n = 75) – Non-intervention: Continue regular visits to GP Drop outs: A = 21, B = 11, D = increase of 2 pts	**Outcomes:** Pain: SF-36- pain component (0-100); VAS (0-100) Disability: ODQ **Results:** Immediate post tx: Pain VAS: 39.8 (29.2) vs. 41.3 (28.5) vs. 42.7 (28.4) Disability: 29 (20.2), CG1 = 31.3 (21.1), CG2 = 32.9 (17.6); Short term: NR Intermediate: Pain: 39.8 (29.2) vs. 41.3 (28.5) vs. 42.7 (28.4) Disability: No change Long term: NR	**Outcomes:** QoL/ well being: Back depression inventory- 21 items, 4 pt scale (0-3) Immediate post tx: IG = 11 (10.2), CG1 = 12.9 (11.7), CG2 = 14.4 (10.5) Short term: NR Intermediate: IG = 11.6 (10.9), CG1 = 12.6 (10.9), CG2 = 12.8 (9.2) Pts not using any tx at the end of trial: 31 vs. 21 vs. 13 **Harms:** NR **Note:** adding reflexology to GP was not more effective than usual GP alone

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Quinn, F (2008)[180] Country: UK Quality score: 9/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 6 wks Final assessments: 3 mos N screened: 15 N randomized: 15 N completed tx: 15 N attended last fu: 15 **Inclusion:** Staff employed at the U of Ulster with N-S LBP, any phisiotherapy, Med or other tx for LBP has been stabilized for at least 3 mos, no involvement in other research projects within past 3 mos, reflexology naïve (with no detailed knowledge of S reflexology points), not pregnant. **Exclusion:** NR	Mean age:43 yrs % of male: IG = 14.3%, CG = 50% Racial composition: NR Work status: All employees of University of Ulster Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** N-S Duration of Pain: NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 7) – Reflexology: Reflexology on key points of the feet that are representative of the vertabrae of the spine and the surrounding musculature (inner edge of both feet); 40 min/ wk for 6 wks Drop outs: 1 pt received only 4 tx CG (n = 8) – Sham (foot massage): simple foot massage using same sequences as in the reflexology tx group but less pressure, points representative of the vertabrae of the spine and surrounding musculatire were avoided; same as IG Drop outs: None	**Outcomes:** Pain: VAS (10 cm); McGill Pain (0-77); SF-36 (bodily Pain measure)- ITT Disability: RMDQ **Results:** Immediate post tx: Pain: IG = 3.1, CG = 3.9; IG = 46.1 (5.2), CG = 41.8 (9.6) Disability: IG = 6 (1.8), CG = 5 (2.6); Short term: Pain: IG = 2.2 (1.2), CG = 3.2 (1.5) IG = 11 (8.1), CG = 6.5 (1.6); IG = 51.1 (6.7), CG = 46.1 (0.7) Disability: IG = 4 (2.2), CG = 3.5 (2.2) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: Physical functioning SF-36- (0-100) Immediate post tx: NA IG = 48.6 (2.2), CG = 43.4 (7.4) Short term: NR IG = 48.6 (2.2), CG = 44.4 (3) Intermediate: NR Long term: NR **Harms:** no AEs reported in any of the grps throughout the tx period

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	*Outcome results: Other Outcomes/ Harms*
Zaproudina, N (2009)[181] Country: Kuopio, Finland Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: not clear Final assessments: 12 mos N screened: 221 N randomized: 122 N completed tx: NR N attended last fu: NR **Inclusion:** CLBP with or without referred leg pain; minimal VAS of 30 and/or Oswestery Disability Index of at least 16% **Exclusion:** Pregnancy; rheumatic or other disease; severe structural deformity; back operation; acute disk herniation; severe sciatica; receiving any therapy during previous mo	Mean age (SD/range): IG = 41.7 (5.8) vs. CG = 40.7 (5.3) yrs % of male: IG = 51%, CG = 47% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: Chronic, NR Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 63)– Physical and EX therapy: massage, therapeutic stretching and EX therapy; individual EX programs for home training and ergonomic instructions; timetable and kind of tx freely chosen by physiotherapist; 5 sessions Drop outs: A=3,B=1 CG (n = 59) – Traditional bone setting; NR; 3-5 sessions, 90 min/session, 1 or 2 wk intervals Drop outs: A=5,B=3	**Outcomes:** Pain: VAS (0-100) Disability: Oswestry Disbility Index (ODI) (0-100) **Results:** Baseline: Pain: IG = 40.8 (20.9), CG = 40.9 (22.9) Disability: IG = 21.5 (8.3), CG = 19.9 (9.7) Immediate post tx: Pain: ---- Disability: ---- Short term: VAS: IG = 26.8 (20.3), CG = 21.8 (24.5) ODI: IG = 16.3 (9.9) CG = 12.2 (11) Intermediate: no numeric data reported Long term: no numeric data	**Outcome instruments:** QoL/ well being: NR Other: NA **Results:** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** worsening of pain (WDAE), 2 vs. 1

Table 1.39 Low Back Pain - Massage - Mixed - Specific Pain –

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, J (2004)[182] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3-6 wks? Final assessments: post tx N screened: 165 N randomized: 165 N completed tx: 165 N attended last fu: NR **Inclusion:** diagnosed as Shanghai Chinese Medical Diagnostic and therapeutic Effective Standard, score between 0-23 based on Lumbar Function Assessment (ref[5]), 20-60 yr, no other tx before, volunteer participation **Exclusion:** pregnant, brest feeding, with fracture, tumor, low bone density, skin damage, tubercal	Mean age (SD/range): IG = 40.9 (10.5), CG1 = 41.2 (10.8), CG2 = 42.1 (10.5) yrs % of male: 57% Racial composition: Most likely Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease: lumbar disc herniation Duration of Pain: Acute, Sub-acute and chronic, IG = 6.8 (2.3), CG1 = 6.9 (2.3), CG2 = 6.8 (2.4) mo Severity of pain (Grading): NR Co-interventions:NR	**Groups** CG (n = 55)– Traction: traction table, 0.5 weight-weight, 20 min/tx; 1 tx/d, 20 tx total Drop outs: A = NR, B = 0 IG (n = 55) – Massage: NR; 20 min/ tx; 3 tx/wk, 20 tx total Drop outs: A = NR, B = 0 IG2 (n = 55) – Massage + EX: Massage: 20 min/tx, 3 tx/wk 20 tx total. Exercise: 20-30 min/tx, 3 tx/wk Drop outs: A = NR, B = 0	**Outcomes:** Pain: Score based on Shanghai Chinese Mediccal diagnosis and treament Standard Procedure **Results:** Baseline: Pain: CG= 12.78 (1.68), IG1 = 12.75 (1.65), IG2 = 12.79 (1.67) Immediate post tx: Pain: CG= 17.87 (7.51), IG1 = 25.71 (4.95), IG2 = 25.83 (5.02) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Other: marked effect of tx Results : Immediate post tx: The markedly effective rate in IG1 was no diff. than IG2 but the rate for IG was better than CG ($t = 2.4$, $p < 0.05$) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 1.40 Low Back Pain - Massage - Mixed - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Chatchawan U (2005)[183] Country: Thailand Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3-4 wks Final assessments: 3 wks and 1 mo post tx N screened: 214 N randomized: 180 N completed tx: 177 N attended last fu: 172 **Inclusion:** 21-50 yrs; persistent LBP; >/= one TP was present in the upper and/or lower torso region (TP = presence of focal tenderness at a palpable nodule in a taut band + pain recognition) **Exclusion:** menstruation; pregnancy; fever; a hx of acute trauma, back surgery, spinal fracture, other significant disorders of musckuloskeletal or nerveous system	Mean age (SD/range): IG = 37.3 (8.8) vs. CG = 35.5 (8.8) yrs % of male: 36% Racial composition: NR Work status: 95% Light workers Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: IG = 6.7 (8.1) wks; CG = 5.2 (5) wks Prior CAM intervention: NR Prior surgery related to current complaint: None	**Cause of Pain:** Myofacial pain syndrome Duration of Pain: Sub-acute/chronic, IG = 36.6 (38.8) mo; CG = 34.8 (35.6) mo Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 90)– Traditional Thai massage (TTM); 6 sessions over a 3-4 wks, generally 2 sessions/wk for 3 wks Drop outs: A = 1, B = 0, C = 4 CG (n = 90) – Swedish Massage (SM): performed using body-oil for lubrication for the skin; Same as IG Drop outs: A = 1, B = 1, C = 1	**Outcomes:** Pain: VAS (10 cm) N based on ITT Disability: ODQ **Results-**Baseline: Pain: IG = 5.5 (1.5), CG = 5.2 (1.7) Disability: IG = 20.7 (8.9), CG = 20.7 (8.3) Immediate post tx: Pain: IG = 2.2 (1.9), CG = 2 (1.7) Disability: IG = 13.8 (8.8), CG = 15.4 (9.1) Short term: VAS: IG = 2.4 (1.9), CG = 2.5 (2) ODQ: IG = 13.4 (10.1), CG = 13.9 (8.9) Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: NR Other: Back performance (data not shown) Results: Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** one Pt in IG droped out due to car accident

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Hoehler F (1981)[134] Country: US Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: NR Final assessments: immediately post tx; and long term (as stated in the study) N screened: 1880 N randomized: 95 N completed tx: NR N attended last fu: NR **Inclusion:** presence of palpatory cues indicating that SM might be successful **Exclusion:** Spinal manipulation contraindicated or alternative tx strongly indicated; pregnancy; previous experience with manipulation; disability income; pending litigation; previous back surgery; obesity; drug or alcohol abuse	Mean age (SD/range): IG = 30.1 (8.4) vs. CG = 32.1 (9.8) yrs % of male: 59% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** N-S Duration of Pain: 50% Acute, 23% Chronic Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 58)– Manipulation: rotal manipulations of the lumbosacral spine; # of tx varied Drop outs: NR CG (n = 39) – Soft-tissue massage: soft-tissue massage of the lumbosacral areas, with the rotal thrust omitted; same as IG Drop outs: NR	**Outcome instruments:** Pain: improvement in amout of pain Disability: NR **Results:** Immediate post tx: % of Pts with improved pain: 84% vs. 68% Disability: NR Short term: NR Intermediate: NR Long term: Pts reporting tx as effective: 88% vs. 86%)	**Outcome instruments:** QoL/ well being: NR Improvement in SLR, degrees: **Results:** Immediate post tx: To pelvic rot 1.6 (6.3) vs. 1.0 (6.3) To pain: 3.3 (6.2) vs. – 0.5 (5.9) Short term: NR Intermediate: NR Long term: SLR to pelvic rot 8.0 (9.3) vs. 4.1 (8.6); to pain: 7.8 (7.4) vs. 8.6 (8.4) Improvement in forward flextion (cm): 11.4 (15.9) vs. 10.7 (14.2) **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Zhang, J (2004)[182] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3-6 wks? Final assessments: immediately post tx N screened: 165 N randomized: 165 N completed tx: 165 N attended last fu: NR **Inclusion:** diagnosed as Shanghai Chinese Medical Diagnostic and therapeutic Effective Standard, score between 0-23 based on Lumbar Function Assessment (ref[5]), 20-60 yr, no other tx before, volunteer participation **Exclusion:** pregnant, brest feeding, with fracture, tumor, low bone density, skin damage, tubercal	Mean age (SD/range): IG = 40.9 (10.5), CG1 = 41.2 (10.8), CG2 = 42.1 (10.5) yrs % of male: 57% Racial composition: Most likely Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc/joint disease: lumbar disc herniation Duration of Pain: Acute, Sub-acute and chronic, IG = 6.8 (2.3), CG1 = 6.9 (2.3), CG2 = 6.8 (2.4) mo Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 55)– Traction: traction table, 0.5 weight-weight, 20 min/tx; 1 tx/d, 20 tx total Drop outs: A = NR, B = 0 CG1 (n = 55) – Massage: NR; 20 min/ tx; 3 tx/wk, 20 tx total Drop outs: A = NR, B = 0 CG2 (n = 55) – Massage + EX: Massage: 20 min/tx, 3 tx/wk 20 tx total. Exercise: 20-30 min/tx, 3 tx/wk Drop outs: A = NR, B = 0	**Outcomes:** Pain: Score based on Shanghai Chinese Mediccal diagnosis and treament Standard Procedure **Results:** Baseline: Pain: IG = 12.78 (1.68), CG1 = 12.75 (1.65), CG2 = 12.79 (1.67) Immediate post tx: Pain: IG = 17.87 (7.51), CG1 = 25.71 (4.95), CG2 = 25.83 (5.02) Short term: NR Intermediate: NR Long term: NR	**Outcome instruments:** QoL/ well being: Results: Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 1.41 Low Back Pain - Massage - Unknown - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Li, ZY (2006)[184] Country: China Quality score: 10/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: NR Final assessments: post-tx N screened: 60 N randomized: 60 N completed tx: 60 N attended last fu: 60 **Inclusion:** Typical symptoms; Clinical positive signs; Diagnosed by CT or MRI; aged 20-55 yrs **Exclusion:** Severe lumbar trauma; History of lumbar surgery; Lumbar spine bone destruction; Central nervous symptoms; Serious visceral disease	Mean age (SD/range): IG = 46.17(2.99) vs. CG = 44.67 (3.23) yrs % of male: IG = 53.8%; CG = 53.3% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Cause of Pain:** Disc herniation Duration of Pain: Cannot tell Severity of pain (Grading): NR Co-interventions:NR	**Groups** IG (n = 30) **–** Living acupoint tx: massage at acupoint; NR Drop outs: A=0;B=0 CG (n = 30) – Oblique-pulling: SM, oblique-pulling on the pt's lumbar vertebra; NR Drop outs: A=0;B=0	**Outcomes:** Pain: score evaluation of pain; VAS **Results:** Baseline: Pain: IG = 40.6 (2.93), CG = 42.83 (3.63) IG = 8.99 (0.26), CG = 8.94 (0.27) Immediate post tx: Pain: IG = 64.77 (4.14), CG = 60.7 (5.78) IG = 4.71 (0.52), CG = 5.59 (0.8) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results:** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Outcomes: ODQ=Oswestry disability questionnaire; RMQ=Roland Morris Questionnaire; NPQ=Northwick Neck Pain Questionnaire; MPQ=McGill Pain Questionnaire; ODI=Oswestry Disability Index; NDI=Neck Disability Index; NHP=Nottingham Health Profile; HFAC=Hanover Functional Ability Questionnaire PDI=pain disability index; GWBS=global well-being scale; SLR=straight leg raising; GPE=global perceived effect; FTF=finger-to-floor; PPI=present pain intensity; PRI=pain rating index; PUP=pain under pressure; MRP=motion related pain; NPAD=Neck Pain and Disability Scale; QoL=Quality of Life; MVEE=maximum voluntary extension effort; PQ=pain questionnaire; MPQ=Short Form McGill Pain Questionnaire; RMAS=Roland Morris Activity Scale; QBPDS=Quebec Back Pain Disability Scale; mRDQ=modified Roland Morris Questionnarie NRS=numeric pain rating scale; PPT= pressure pain VAS=visual analogue scale;; SF= short form threshold; **Special terms:**HVLA=high velocity low amplitude; ETOIMS=electrical twitch-obtaining intramuscular stimulation; IMS=intramuscular stimulation; FDT=

flexion distraction technique; TrP=trigger point; GP=general practitioner; CAM=complementary and alternative medicine; NSAIDs=non-steroidal anti-inflammatory drugs; NP=neck pain; N-S=non-specific; S=specific; Med=medication; PT= physiotherapy; ST=standard therapy; E-acu=electro acupuncture; MR= muscle relaxation; EX=exercise CLBP=chronic low back pain; A=baseline evaluation; B=immediately post treatment; C= short term follow up (up to 3 months post treatment); D=intermediate follow up (up to 6 months post treatment); E=long term follow up (over 6 months post treatment); acu=acupuncture; SM=spinal manipulation; LBP= low back pain; NP=neck pain; TP=thoracic pain TENS/TNS= transcutaneous electrical nerve stimulation; ROM=range of motion; MPS=myofascial pain syndrome; Mob=mobilization; ext=extension; flx=flexion; rot=rotation; MS=MS; PM=physical modalities; mA=milli Amp; **Statistical:** NS=statistically non-significant; SD=standard deviation; SE=standard error; WMD=weighted mean difference ; p=p-value; 95% CI= 95% Confidence Interval; SS= statistically significant; **General terms:** NA=not available/applicable; NR=not reported; Pt(s)=patient(s); d=day(s); mo(s)=month(s); yr(s)=year(s); wk(s)=week(s); N=number NS= not significant; pt/s= patient/s; tx=treatment/intervention Fu=follow up; ITT=intention to treat; IG=intervention group; CG=control group; RCT=randomized controlled trial; AE(s)=adverse event(s); SAE= serious adverse events; WDAE= withdrawal due to adverse events

CAM Back Pain II- Evidence Table – Neck Pain

Table 2.1 Neck Pain - Acupuncture - Acute - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Aigner, N (1999)[185] Country: Austria Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Fu duration (last assessment): NR N screened: 84 N randomized: 84 N completed tx: NR N attended last fu: NR **Inclusion:** whiplash for no longer than 4 ds. 18 – 65 yrs old **Exclusion:** fresh traumatic bone fractures near cervical spine, massive neurological symptoms, pts with small degree of injury	Mean age (SD/range):NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Cervical spine **Cause of Pain:** NR Duration of Pain, mean (SD/range): Acute, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 28) – cervical collar, Chlormezanon, Paracetamol + Verum Acupuncture: AP points T.B.5 (Wai Kuan), S.I.6 (Yang Ku) needled on both sides, propagated sensation along the channel, paresthesia along the meridians; NR Drop outs: NR IG (n = 23) – cervical collar, Chlormezanon, Paracetamol + laser acu: low level laser therapy; NR Drop outs: NR CG (n = 33) – Chlormezanon, Paracetamol and cervical collar: NR; NR Drop outs: NR	**Outcomes (describe instrument used):** Pain: data presented in bar graphs – not shown here. Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean:** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NA **Harms:** NR **Summary:** sig improvement in IG in reduction in duration of pain and sick leave

Table 2.2 Neck Pain - Acupuncture - Acute - Non –Specific Pain - No Studies
Table 2.3 Neck Pain - Acupuncture - Chronic - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Birch S (1998)[190] Country: US Quality score: 2/13 Initial of reviewer: SG	**Trial Design:** RCT Tx duration: 12 wks Fu duration (last assessment): 6 mos N screened: 59 N randomized: 46 N completed tx: 46 N attended last fu: 36 **Inclusion:** Chronic myofascial NP (> 6 mo), identifiable painful area with hightened sensitivity to moderate touch; unsuccessful response to PT (traction, heat, US, massage) **Exclusion:** disc herniation, cervical osteoarthritis, infection, malignancy, collapsed vertebra, collagen-vascular disease, brachial plexopathy, schizophrenia, delusional, psychotic, or bipolar disorder	Mean age (SD/range): IG1 = 40.9, IG2 = 38, CG = 38.6 yrs % of male: IG1 = 14.3%, IG2 = 23%, CG = 14.3% Racial composition: NR Work status: NR Other socio-demographics: 33.6% married Co morbidities: NR Prior episode of pain if acute: accident related injury: 33.6% Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** **Cause of Pain:** S, NR Duration of Pain, mean (SD/range): Chronic, IG = 81.9 mo, IG2 = 92.2 mo, CG = 91.1 mo Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: 500 mg/d NSAIDs	IG1 (n = 15) – Acu-relevant: 1) gauge 2 (0.18) mm) shallow needling in points 9SI3, BL62, GB41, TW5 to 2-3 mm in depth, needles connected to IP cords and left in place for 10 min. 2) needling done in neck, shoulder, upper back in left/right, then heat applied for 10 min; 14 tx, 12 wks Drop outs: D = 4 IG2 (n = 16) – Acu-irrelevant: shallow needling with gauge 2 (0.18 mm) bilaterally to 2-3 mm depth in hands and feet at LI5, GB42, TW8, ST41, needles connected by cords as like IG1, left for 10 min, points BL16, SI9, LI15 needled bilaterally by 6 needles to 2-3 mm depth; Same as IG1 Drop outs: D = 3 CG (n = 15) Medication: NSAIDs; 12 wks Drop outs: D = 3	**Outcomes:** Pain: SF-MPQ (no numerical data given); Pain intensity rating (1-10) **Results:** Baseline: Pain: IG1 = 4.8, IG2 = 4.7, CG = 4.9 Immediate post tx: Pain: IG1 = 1.58 (1.9), IG2 = 3.37 (2.14), CG = 4.76 (2.05) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Ceccherelli F (2006)[194] Country: Italy Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 8 wks Fu duration (last assessment): 6 mos N screened: NR N randomized: 62 N completed tx: 62 N attended last fu: 62 **Inclusion:** Myofascial cervical pain **Exclusion:** fibromyalgia, severe systemic illness (asthma, emphisema, chronic bronchitis, severe myocardial failure, hypertensive tx with reserpine/clonidine, osteoporosis, tranquilizers, drug/alcohol use, peripheral or central neurological illness (MS, epilepsy, brain injury, diabetes), adipose panniculus	Mean age (SD/range): IG = 45.5 (10.28) vs. CG = 39.8 (9.01) yrs % of male: 26% total sample Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** S, NR Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: 1 g paracetamol permitted in acute pain episodes	**Groups** IG (n = 31)– somatic Acupuncture; at 3 SI (Houxi), 5 TE (Waiguan), 4 LI (Hegu), 10 BL (Tianzhu), 20 GB (Fengchi) embedded bilaterally; points 14 GV (Dazhui) and 15 GV (Yamen) embedded only in the median line. ; 20 min sessions, 8 sessions, once/wk Drop outs: 8 (NR), based on total sample CG (n = 31) – Acu + Auricular acu-Tx: Acu as IG; after Acu, auricular needles were inserted (4 points in each ear) as follows: Shen menn pont, Lung point; Cervical column area, and Cephalea point; needles with diameter of 300 micro m and length of 18 mm were used and stimulated two at a time witha rotary movement dx/sx for 20s only at the moment of embedding; same as IG	**Outcomes:** Pain: MPQ; VAS **Results:** Baseline: Pain: IG = 40.7 (17.78), CG = 38.9 (15.31); IG = 57.9 (18.87), CG = 61 (20.73) Immediate post tx: Pain: IG = 13.32 (9.62), CG = 13.43 (10.96); IG = 15.64 (12.69), CG = 19.5 (19.31) Short term: IG = 14.2 (10.99), CG = 11.4 (12.16); IG = 15.3 (15.69), CG = 18.5 (17.96) Intermediate: IG = 15.64 (11.43), CG = 12.9 (13.87); IG = 18.96 (15.6), CG = 21 (19.88) Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Ga, H (2007)[186] Country: Korea Quality score: 5/13 Initial of reviewer: SG	**Trial Design:** RCT Tx duration: not clear Fu duration (last assessment): 3 mos N screened: NR N randomized: 39 N completed tx: 39 N attended last fu: 39 **Inclusion:** Pts aged > 60 yrs complaining of chronic shoulder/NP or headache for more than 6 mo **Exclusion:** Pts who had had MTP injections or Acu within 6 mo preceding the study; neck/shoulder surgery within 1 yr; taking strong opioids (morphine); fibromyalgia; cervical radiculopathy, myelopathy; severe CVD or respiratory diseases; allergy to drugs/ injections, drug abuse; cognitive deficiency	Mean age (SD/range): IG = 79.2 (6.8) vs. CG = 75.9 (8.7) yrs % of male: IG = 5.5%, CG =9.5% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** NR Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 18)– Acu: Used modified Simons et al technique on pts in prone position at TPs needled repeatedly without pause until all TPs were inactivated, needle diameter 0.3 mm and length 60 mm, needling depth was 30-35, all MTPs treated bilaterally; 3 txs at wks 0, 1, 2 Drop outs: 1 CG (n = 21) – Lidocaine: MTP injections, same method as IG using 5 ml syringes and 25 guage, 1.5 in long needles prefilled with 0.5% lidocaine, each MTP injected with 0.2 ml of lidocaine; same as IG Drop outs: 0	**Outcomes:** Pain: VAS; FACES; PTS **Results:** Baseline: Pain: IG = 6.98 (1.32), CG = 6.43 (2.08); IG = 3.5 (0.71), CG = 3.43 (0.87); IG = 2.44 (0.7), CG = 2.19 (0.6) Immediate post tx: Pain: IG = 4.69 (2.05), CG = 3.9 (2.12); IG = 2.83 (0.99), CG = 2.62 (0.92); IG = 1.94 (0.87), CG = 1.76 (0.77) Short term: IG = 3.82 (2.47), CG = 3.46 (2.47); IG = 2.11 (1.13), CG = 2.25 (1.16); IG = 1.33 (0.69), CG = 1.71 (0.72) Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Other: Passive ROM Immediate post tx: Flexion: 68.9 (11.2) vs. 68.3 (14.8) Extension: 67.7 (14.1) vs. 65.0 (13.9) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Irnich D (2002)[188] [crossover] Country: Germany Quality score: 8/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: single session (30 min.) Fu duration (last assessment): immediate post-tx N screened: 36 N randomized: 102 N completed tx: 101 N attended last fu: 101 **Inclusion:** Pts with chronic NP (> 2 mo) and myofascial or irritation syndrome **Exclusion:** radicular cervical syndrome, segmental instability, fractur or surgery of the cervical spine, contraindications to acu Tx, drug Tx, physical Tx or manual Tx any time in the last 4 wks	Mean age (SD/range): 51.9 yrs (total sample) % of male: 26.4% (total sample) Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Myofascial syndrome Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Myofascial pain syndrome Duration of Pain, mean (SD/range): Chronic, 36.7 mo (total sample) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: None	**Groups** IG1 (n = 34)– NL-Acu: affected channels were indicated by pain localization and direction of limited mobility; classical distant Acu points at the extremities were used; in addition, one-two ear points were chosen; single session, 30 min Drop outs: A = 1 IG2 (n = 34)– L-Acu (DN)[dry needling]: strong ME on tender spots called 'ah shi' points, needles inserted in local points and manipulated until local twitch obtained; Same as IG1 Drop outs: A = 1 CG (n = 34) – Sham-Laser acu: Using a handy laser pen emitting red light only, did not touch the skin(distance: 0.5-1 cm); Same as IG1 Drop outs: 0	**Outcomes:** Pain: VAS motion-related(only crossover data reported) **Results:** Baseline: Pain: IG1 = 35 (22.64), IG2 = 33.4 (19.41), CG = 30.4 (18.62) Immediate post tx: Pain: IG1 = 19.1 (16.11), IG2 = 29.2 (21.9), CG = 28 (19.36) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** No SAEs were observed

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Li, DJ (2006)[191] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 2 - 4 wks Fu duration (last assessment): 6 mos N screened: 150 N randomized: 150 N completed tx: 150 N attended last fu: 150 **Inclusion:** Spinal stenosis of neck; age < 69 yrs; Disease course < 2 yrs; Diagnosed by CT or MRI; Related signs is positive **Exclusion:** spinal trauma in 4 mo; Systemic infection and fever; Cervical tumor	Mean age (SD/range): 49 yrs total % of male: IG1 = 52%, IG2 = 56%, CG = 58% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Spinal stenosis Duration of Pain, mean (SD/range): Chronic (3 mo-2 yrs), NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = NR)– Spinal manipulation: NR; 1 tx/wk, 3 - 4 wks Drop outs: A = 0, B = 0, C = 0 IG2 (n = NR)– Warm acu: Acupuncture at Ashi points and then warm needle; 15 min/2 wks Drop outs: A = 0, B = 0, C = 0 CG (n = NR) – Combination: Spinal manipulation + Warm acu: NR; warm acu was performed twice after every one times of SM Drop outs: A = 0, B = 0, C = 0	**Outcomes (describe instrument used):** Pain: VAS **Results:** Baseline: Pain: IG1 = 8.81 (1.82), IG2 = 8.84 (1.81), CG = 8.62 (1.39) Immediate post tx: Pain: --- Short term: IG1 = 4.43 (2.51), IG2 = 4.46 (3.11), CG = 2.36 (2.8) Intermediate: IG1 = 3.48 (2.5), IG2 = 2.04 (3.71), CG = 1.12 (2.78) Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** SM is effecitve for relieving muscle spasm & relaxing nerve root adhesion; warm acu more effective in eliminating the aseptic inflammation of the soft tissue & improving the blood suppy and relaxing the muscles

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Lundenberg, T (1991)[193] Country: Sweden Quality score: 1/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: one 40 min session Fu duration (last assessment): NR N screened: 58 N randomized: 58 N completed tx: 58 N attended last fu: NR **Inclusion:** 44 - 76 yrs; osteoarthritis of the cervical and/or thoracic spine (C1-T1) and with no previous experience of acu; pain for 6 mo or more **Exclusion:** sensory or motor deficit	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP and/or TP **Cause of Pain:** Degenerative disease (osteo-arthritis) Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** CG (n = 14) – Sham-acu: Superficial needling; 40 min session Drop outs: 0 IG1 (n = 14)– Acu + ME: acu for 40 min on points Li 3 (bilateral), Du 14, Du 16, and Gb 20 (bilateral); manual rots of the needles after insertion for 10 sec/5 min.; As CG1 Drop outs: 0 IG2 (n = 15)– 2Hz elecro-acu: bipolar square wave pulses of 0.2 ms duration current adjusted to localized muscle contractions; As CG Drop outs: 0 IG3 (n = 15) – 80 Hz electro-acu: intensity was adjusted as that paraesthesias were evoked in the stimulated area; as CG1 Drop outs: 0	**Outcomes (describe instrument used):** Pain: VAS sensory (10 cm); VAS affective (10 cm) [no data] **Results:** Immediate post tx: Sensory pain: 2.8 (1.3) vs. 1.8 (1.0) vs. 2.2 (1.7) vs. 2.4 (1.9) Affective pain score: 2.2 (1.2) vs. 1.8 (1.0) vs. 1.4 (1.5) vs. 1.5 (1.1) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Lv, YX (2006)[187] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 12 ds Fu duration (last assessment): immediate post-tx N screened: 80 N randomized: 70 N completed tx: 70 N attended last fu: 70 **Inclusion:** Cervico-genic headache **Exclusion:** NR	Mean age (SD/range): IG1 = 40.33 (8.16) vs. IG2 = 42.46 (6.72) yrs % of male: IG = 36.1%, CG = 41.2% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervico-genic headache Duration of Pain, mean (SD/range): Chronic (≥ 12 wks), NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: TDP	**Groups** IG1 (n = 36) – Turthe-probing needling: choice acupoint at Tian zhu, Feng chi, needle size 40 mm; 30 min/d x 6 d x 2 courses Drop outs: A = 0, B = 0 IG2 (n = 34) – Routine acu: choice acupoint at Tian zhu, Feng chi,shuai gu,Tou wei, Jia ji, Hou xi and Ashi, needle size 40 mm; Same as IG1 Drop outs: A = 0, B = 0	**Outcomes (describe instrument used):** Pain: VAS **Results:** Baseline: Pain: NR Immediate post tx: Pain: $p < 0.05$ Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Turthe-probing has fast onset of action and better than routine acu

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Thomas, M (1991)[195] Country: Sweden Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: not clear Fu duration (last assessment): immediate post-tx N screened: NR N randomized: 44 N completed tx: NR N attended last fu: NR **Inclusion:** Pts with chronic cervical osteoarthritis, with pain for 6 mo or more. Pain more severe when joints are in movement than at rest **Exclusion:** NR	Mean age (SD/range): 42-77 yrs % of male: NR Racial composition: (assume all white) Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Cervical ostearthritis (spine & neck) **Cause of Pain:** S, Osteoarthritis Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 11) – Acu: Points were Li3, Du14, Du16, Du20 and GB20 (bilateral). Needles were 2.5 cm long, Insertions made to depths 0.6-1.3 cm. Stimulation brought about by manual rots of needles which evoked tingling, deqi sensation; 40 min tx, repeated 10 sec/5 min by further rots, 3-5 d between trials Drop outs: NR for all CG1 (n = 11) – Sham-Acu: Needles inserted superficially and left without eliciting further sensation; 3-5 d between trials IG2 (n = 11) – Pts were administered 5mgm diazepam orally; As CG1 CG2 (n = 11) – Sham-Diazepam: pts given 5 mgm placebo-diazepam orally; as CG1	**Outcomes:** Pain: VAS affective score (0-10); VAS sensory score (0-10) **Results:** Baseline: Pain: IG1 = 3.5 (1.2), CG1 = 3.1 (1.1), IG2 = 3.0 (0.8), CG2 = 2.7 (1); IG1 = 2.5 (0.8), CG1 = 2 (0.9), IG2 = 1.9 (0.7), CG2 = 1.9 (0.8) Immediate post tx: Pain: IG1 = 2.3 (1.5), CG1 = 2.4 (1.2), IG2 = 2.2 (1), CG2 = 2.2 (1.3); IG1 = 1.8 (1.2), CG1 = 1.6 (1.1), IG2 = 1.6 (0.7), CG2 = 1.7 (1) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Results- mean : Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Acu was significantly more effective than placebo-diazepam, but NSly more effective than diazepam or sham-acu

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
White, PF (2000)[192] Country: US Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT- cross over Tx duration: 3 wks Fu duration (last assessment): immediate post-tx (data shown for 1st phase before cross over) N screened: NR N randomized: 68 N completed tx: 68 N attended last fu: 68 **Inclusion:** pts with history of NP and cervical disk disease with a stable level of pain for a period of at least 3 mo before enrollment **Exclusion:** pain with a radicular components, a recent history of drug or alcohol abuse (< 1 yr), chronic use of opiod analgesics, past experience with electro-analgesic therapies, recent change in analgesic Med (< last 3 mo), or an inability to reliably complete the assessment tools use to measure short term outcomes.	Mean age (SD/range): 52 (23) yrs total % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Disc disease Duration of Pain, mean (SD/range): Chronic, 43 (19) mo Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 68) – acu with ES at local points: 10 probed connected to 5 bipolar leads, stimulated for 30 min at alternating freq. of 15/30 Hz, intensity adjusted to produce gentle tapping sensation without muscle contraction, max. amp of 37 mA, pulse width of 0.7 ms; 30 min, 3 tx/wk for 3 wks Drop outs: 0 IG2 (n = 68) – acu with ES at remote points (LB) : Ten 32-guage acu-like needles to depth 2 – 4 cm into soft-tissue and /or paraspinous muscle in LB region; As IG1 Drop outs: 0 CG (n = 68) – acu needles only at neck: Same as IG2 but in cervical region according to dermatomal distribution of NP; As IG1 Drop outs: 0	**Outcomes:** Pain: VAS (10 cm)[cross-over design] Disability: SF-36 **Results:** Baseline: Pain: 7.8 (2.5) Disability: NR Immediate post tx: Pain: NR Disability-mean change: IG1 = 7.9 (3.6), IG2 = 3.7 (1.9), CG = 3.4 (1.7) Decrease in pain (mean, SD%): 38% (17) vs. 9% (16) vs. 13% (18) Short term: NR Intermediate: NA Long term: NR	**Outcomes:** QoL/ well being: NR Quality of sleep (data not shown) Physical activity Use of analgesics **Results- mean :** Immediate post tx: Increased in physical activity, mean% (SD): 41% (21) vs. 11% (17) vs. 16% (15) Decrease in average oral analgesic Med, mean% (SD): 37% (18) vs. 9% (13) 6% (15) **Harms:** only needle site AEs were mentioned **Summary:** IG1 produces greater short term improvement in pain control, physical activity, and quality of sleep in pts with chronic NP

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Yang, T (2009)[197] Country: China Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Fu duration (last assessment): 3 mos N screened: NR N randomized: 66 N completed tx: NR N attended last fu: NR **Inclusion:** Pts with chronic pain of cervical intervertebral disc **Exclusion:** NR	Mean age (SD/range): NR % of male: 50% total Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical intervertebral disc Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 33)– Acupoint sticking: Tianding (LI 17), Futu (LI 18), Dazhui (GV 14), Tianzong (SI 11), etc.; NR Drop outs: NR CG (n = 33) – Acu: NR; NR Drop outs: NR	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: NA Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Other: Effective rate Immediate post tx: IG = 93.5%, CG = 72.4% Short term: IG = 90.3%, CG = 65.5% Intermediate: NR Long term: NR **Harms:** NR **Summary:** IG has a satisfactory therapeutic effect on chronic pain of cervical intervertebral disc

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zhao, Z (2004)[196] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 – 40 ds Fu duration (last assessment): immediate post-tx N screened: Don't know N randomized: 106 N completed tx: 106 N attended last fu: 106 **Inclusion:** Diagnostic using Chinese Standard; X-ray show unstable of neck spinal and discs **Exclusion:** age < 18 or age > 60 yrs	Mean age (SD/range): IG = 47.34 (5.1), CG = 46.15 (3.5) yrs % of male: IG = 50.9%, CG = 47.2% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain: S** Duration of Pain, mean (SD/range): Chronic, IG = 18.47 (2.5), CG = 16.51 (1.3) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 53) – Shencongding moxibustion + acu: acu points: sishengchong, baihui 0.35mm diameter, 50mm long needle, puncture down to 20mm under skin, twist needles for 2-3 min, then moxibustion for 7 time, retention 60 min; 1 tx/d, 10 tx/course, 2 courses Drop outs: B = 0 CG (n = 53) – Acupuncture: other than moxibusion, the other procedures were the same IG; 2 tx/2 d, 10 tx/course, 2 courses Drop outs: B = 0	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: Well being, n (%) Other: **Results- mean :** Baseline: Immediate post tx: IG = 51 (96.2%), CG = 44 (83%) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Shencongdin moxibusition has a definite therapeutic effect with a better clinical a pplication prospection for cervical headache

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zhu XM (2002)[189] [crossover] Country: Australia Quality score: 7/13 Initial of reviewer: SG	**Trial Design-** RCT cross over Tx duration: 3 wks Fu duration: immediate post-tx N screened: NR N randomized: 29 N completed tx: 29 N attended last fu: 29 **Inclusion:** Pts with CNP, 31-71 yrs had neck complaints ≥ 6 mo, degenerative joint disease, osteoarthritis, cervical spondylitis, soft tissue injuries, cervical sprain or whiplash injury, pain felt in the neck and radiating to the occiput or shoulders limiting neck movement **Exclusion:** any neck condition < 6 mo, any viral (hepatitis or HIV), cancer, decreased or absent deep tendon reflexes, depression, fibromyalgia syndrome, pregnancy, previous cervical spine surgery, acu tx, hypertension, thyroid problem, or diabetes	Mean age (SD/range): IG = 50 (10.6) vs. CG = 48.9 (10.1) yrs % of male: IG = 64%, CG = 40% Racial composition: NR Work status: Unemployed: 30.95% Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Neck injury, n = 17 Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, IG = 79.8 (60) mo; CG = 59.7 (104.9) mo Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 14)– Acu: Chinese acu dry needling both on two local and 2 distal points; 9 sessions, 3 wks Drop outs: NR CG (n = 15) – Sham-Acu: sham acu points located 2-3 cm lateral to the real acu points; short needles used; weak electro-stimulation once/min was applied for two distal points; Same as IG Drop outs: NR	**Outcomes:** Pain: adapted MPQ; VAS; daily pain duration in 8 hrs (in hrs) Disability: NDI **Results-**Baseline: Pain: IG = 1.65 (0.6), CG = 1.67 (0.5); IG = 51.8 (24.9), CG = 40.3 (16.5); IG = 6 (3.8), CG = 8.3 (5.9) Disability: IG = 10.2 (4.7), CG = 8.2 (3.6) Immediate post tx: Pain: IG = 0.69 (0.3), CG = 1.05 (0.7); IG = 28.9 (15.5), CG = 21.1 (10.3); IG = 2.8 (3), CG = 5.6 (4.7) Disability: IG = 6 (5.5), CG = 5.7 (6.2) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 2.4 Neck Pain - Acupuncture - Chronic - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Abernathy, AP (2008)[198] Abstract Country: US Quality score: 0/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): immediately post and 6 mos after intervention N screened: 123 N randomized: 123 N completed tx: NR N attended last fu: NR **Inclusion:** pts ≥ 18 yrs old with uncomplicated NP for at least 3 mo, with motion-induced pain of at least 30 on 100 mm VAS **Exclusion:** NR	Mean age (SD/range): 46 47 yrs total % of male: NR(majority female) Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic (t least 3 mo) Severity of pain (Grading): VAS at least 30 at baseline Current tx/ co-intervention common in all groups: rescue Med for all pts if needed: diclofenac and tetrazepam	**Groups** IG (n = 113)– Acupuncture: points were chosen based on pain characteristics, and punctures were always bilateral; 5 tx sessions over 3 wks Drop outs: NR CG (n = 110) – TENS: NR; NR Drop outs: NR	**Outcomes (describe instrument used):** Pain: VAS (100 mm) **Results:** Baseline: Pain: IG = 68.7, CG = 42.3 Immediate post tx: Motion related NP, decrease from baseline: 42.1 vs. 14.0, p < 0.001 Short term: NR Intermediate: no numeric data reported. The outcome of pain was reported to be sustained from post tx Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: SF-36 improvement from baseline: 6.3 vs. 0.7, p = 0.002 Short term: NR Intermediate: NR Long term: NR **Harms:** AEs were mild and affected both groups in the similar degree **Summary:** acu produced 3 times the beneficial effects of placebo. This study was single blinded.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Coan RM (1982)[206] Country: US Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 8 wks Fu duration (last assessment): 3 mos N screened: NR N randomized: 30 N completed tx: 30 N attended last fu: 30 **Inclusion:** Neck pain and/or radicular arm and hand pain ≥ 6 mo **Exclusion:** No history of diabetes, previous acu Tx, infection, or cancer	Mean age (SD/range): IG = 51.6 vs. CG = 47 yrs % of male: IG = 13.3%, CG = 40% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S; with radicular arm and hand pain Duration of Pain, mean (SD/range): Chronic, at least 6 mos Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: IG: Chiro: n = 1 CG: Chiro: n = 1 Traction: n = 3 Heat: n = 1 Diathermy: n =1	**Groups** IG (n = 15)– Acu + Usual care: Performed according to the classical oriental meridian theory ; acu point selection varied from pt to pt; 3-4 tx/wk, 8 wks Drop outs: NR CG (n = 15) – Usual care: NR; NR Drop outs: NR	**Outcomes (describe instrument used):** Pain: VAS; Mean N of hrs with pain/d **Results:** Baseline: Pain: IG = 6, CG = 5.3; IG = 11.7, CG = 11.3 Immediate post tx: Pain: --- Short term: IG = 3.6 (2.21), CG = 5.4 (2.23); IG = 3.8, CG = 11.3 Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: NR **Mean pain pills/wk:** Immediate post tx: NR Short term: (3 monhts fu) 7.5 vs. 8.7- change from baseline Intermediate: NR Long term: NR **Harms:** N of pts with worse pain than baseline: 0 vs. 4

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
David J (1998)[207] Country: US Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 6 wks Fu duration (last assessment): 6 mos N screened: NR N randomized: 70 N completed tx: 70 N attended last fu: 65 **Inclusion:** Pts aged 18-75 yrs with chronic NP (> 6 wks); types of NP were postural, whiplash injury, occupational NP, cervical spondylosis **Exclusion:** previous acu Tx or PT, neurological signs, primary piybromyalgia, inflammatory NP, rheumateoid arthritis, osteopathy, ankylosing spondylitis	Mean age (SD/range): IG = 48 (NR), CG = 44 (NR) yrs % of male: 28.6% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Mechanical Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic (≥ 6 wks) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 35)– Acu: sterile disposable 0.25 x 2.5 acumedic needles; TPs were needled; regional (GB21) and distal (L14) needling was also used; the needles were left in situ for 15 min and manually manipulated once at 7 min; 1 tx/wk, 6 tx, 6 wks Drop outs: A = 2, B = 3, D = 1 CG (n = 35) – PT: standard localized Mob techniques, most commonly Maitland rot, postero-anterior oscillatory movement and longitudinal traction; Same as IG Drop outs: A = 7, B = 2, D = 4	**Outcomes (describe instrument used):** Pain: VAS; NPQ (no numerical data given) **Results:** Baseline: Pain: --- Immediate post tx: Pain: --- Short term: NR Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: GHQ (no numerical data given) **Results- mean :** Baseline:--- Immediate post tx: --- Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** No differences were found in pain, disability, or well being in pts between Acu vs. PT groups at B and D; however, both Acu and PT were effective in within-group changes

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Gallacchi G (1983)[204,205] Country: Switzerland Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3-4 wks Fu duration (last assessment): immediate post-tx N screened: 121 N randomized: 113 N completed tx: 113 N attended last fu: 113 **Inclusion:** tendomyotical cervical and lumbar syndrome were under medical and/or physical tx for N of mos before volunteered for AP study **Exclusion:** NR (anyone not meeting inclusion criteria)	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Cervical spine **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): VAS but NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 15)– acu with conv. needles at classical acu points, until propagated sensation-needle retention for 10 min, 2 tx/wk for 4 wks Drop outs: 0 CG1 (n = 14)– acu with placebe needles in classical acu points: at sites/techniques as in IG1; insertion at 5 mm under skin, 2 tx/wk for 4 wks Drop outs: 1 CG2 (n = 14)– acu with conv. needles at placebo points: as IG; 2 tx/wk for 3 wks Drop outs: 1 IG2-IG6 (n = 70)– laser AP at classical acu pts: 1)laser light, 2) no emission of rays, 3) mixed light, 4) red light, 5) infrared light; 60 sec/each AP point, 2 tx/wk for 4 wks Drop outs: 6	**Outcomes (describe instrument used):** Pain: VAS average (data shown in graphs, not extracted) **Results:** Baseline: Pain: NR Immediate post tx: Pain: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** no significant differences between groups

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Giles, LG (2003)[25] [26] Country: Australia Quality score: 5/13 Initial of reviewer: SG	**Trial Design-** RCT Tx duration: Max. of 9 wks Fu duration (last assessment): 12 mos N screened: 109 N randomized: 109 N completed tx: 109 N attended last fu: 62 **Inclusion:** pts at least 17 yrs old with uncomplicated mechanical spinal pain for minimum of 13 wks - for long-term fu (> 1 yr) **Exclusion:** pts with nerve root involvement, spinal anomalies (other than sacralization/lumbarization), pathology other than mild-moderate osteoarthrosis, spondylolisthesis of L5 or S1 > Grade 1, previous spinal surgery, and leg length inequality > 9 mm with postural scoliosis.	Mean age (SD/range): IG1 = 23.8 (4.8), IG2 = 25 (8.1), CG = 29.5 (2.07) yrs % of male: IG1 = 55.9%, IG2 = 51.4%, CG = 57.5% Racial composition: NR Work status: NR Other socio-demographics: Unemployed: 29 (25.7%) Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** LBP, NP, thorax **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic (> 13 wks), NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 34)– Acu: near and far techniques as chosen by clinician; 2 tx/wk, max. of 9 wks Drop outs: B = 12 IG2 (n = 35)– Spinal manipulation: 20 min-appointments. High-velocity, low-amplitude thrust SM to a joint (as judged to be safe and usual tx by the treating chiropractor for the spinal level of involvement to mobilize the spinal joints; same as IG1 Drop outs: B = 10 CG (n = 40) – Medication that have not been tried: Celecoxib/Celebrex (200 - 400 mg/d); Rofecoxib/Vioxx (12.5 - 25 mg/d); paracetamol/acetaminophen (500 mg tablest 2-6/dup to 4 g/d); NR Drop outs: B = 18	**Outcomes:** Pain: VAS (1-100) Disability: Oswestry Back **Results:** Baseline: Pain: IG1 = 6 (2.2), IG2 = 6 (2.9), CG = 5 (3.7) Disability: IG1 = 30 (17.03), IG2 = 22 (22.96), CG = 32 (19.3) Immediate post tx: Pain: IG1 = 4 (4.4), IG2 = 5 (3.7), CG = 6 (4.4) Disability: IG1 = 26 (20.74), IG2 = 14 (24.4), CG = 32 (23.7) Long term: OBD: IG1 = 13 (22.9), IG2 = 16 (17.8), CG = 24 (25.2) VAS: IG1 = 3.9 (3.2), IG2 = 3.7 (4), CG = 3.9 (3.3)	**Outcomes:** QoL/ well being: SF-36 (higher values better) **Results- mean :** Baseline: IG1 = 46 (15.6), IG2 = 57 (22.9), CG = 37 (25.2) Immediate post tx: IG1 = 53 (22.2), IG2 = 70 (38.5), CG = 57 (33.3) Short term: NR Intermediate: NR Long term: IG1 = 55 (26.7), IG2 = 77 (23.7), CG = 66 (36.3) **Harms:** some pts had changed tx modality between the fu due to AE. no report of detail of AEs

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Giles, LGF (1999)[122] Country: Australia Quality score: 1/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3-4 wks Fu duration (last assessment): immediate post-tx N screened: 875 N randomized: 40 N completed tx: 40 N attended last fu: 40 **Inclusion:** pts suffering from spinal pain for at least 13 wks; age of at least 18 yrs **Exclusion:** Nerve root involvements; spinal anomalities; pathology other than mild to moderate osteoarthrosis; previous spinal surgery and leg length inequality of > 9 mm with postural scoliosis	Mean age (SD/range): IG1 = 46.5 (9.6), IG2 = 42.5 (9.6), CG = 35 (14.1) yrs % of male: 35.7% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 10)– Acu: using sterile HWATO Chinese disposable acu guide tube needles 50mm long with a gauge of 0.25 mm for 20 min tx, 3-4 wks Drop outs: NR IG2 (n = 20) – SM- high-velocity, low-amplitude SM was performed as judged to be safe; 6 tx, 3-4 wks Drop outs: NR CG (n = 10) – Medication: tenoxican (20mg/d) and ranitidine (50mg x 2/ d); 15-20 min/ appointment, 3-4 wks Drop outs: NR	**Outcomes:** Pain: VAS Disability: ODI **Results:** Baseline: Pain: IG1 = 40 (31.8), IG2 = 32 (14.8), CG = 28 (21.9) Disability: IG1 = 3.5 (5.5), IG2 = 5 (3.5), CG = 2.7 (4.8) Immediate post tx: Pain-mean change: IG1 = - 6 (14.4), IG2 = -10 (10.4), CG = 0 (10.7) Disability-mean change: IG1 = -0.5 (4.8), IG2 = -2.3 (4.8), CG = -1 (1.3) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

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Itoh K (2007)[199] [crossover design] Country: Japan Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 3 wks Fu duration (last assessment): immediately post-tx N screened: NR N randomized: 36 N completed tx: 31 N attended last fu: 31 **Inclusion:** Pts with chronic NP (> 6 mo) age ≥ 45 yrs, no radiation of NP, well functioning cervical nerve, deep tendon reflexes, voluntary muscle action, sensory and function **Exclusion:** Major trauma or systemic disease, other ongoing tx except those receiving unified dosage for a mo or longer	Mean age (SD/range): IG1 = 62.3 (11) vs. IG2 = 62.3 (10.1) yrs % of male: 27.5% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: Spondylosis n = 5; Discopath n = 3; Radiculopathy n=2 Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Region of pain: NP Cause of Pain: N-S Duration of Pain, mean (SD/range): Chronic, IG = 3.2 (3.1), CG = 2.9 (2.7) yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: Povltice: IG: n = 7, CG: n = 6 Analgesic: IG :n = 2, CG: n = 3 Vit D: IG: n = 1, CG: n = 1	**Groups** IG1 (n = 8) **–** Traditional acu: local points in cervical region: needles inserted into muscle to depth of 20mm-"sparrow pecking" technique-needle retention for 10 min –or until "deqi" sensation; 3 wks Drop outs: A = 2 IG2 (n = 8) – TP-Acu: applied to myofascial TPs located by palpation, local twitch elicited- similar technique as IG1.; 3 wks Drop outs: A = 2 CG1 (n = 10) – Non-TP-Acu: NR; NR CG2 (n = 10) – Sham-Acu: NR; NR	**Outcomes:** Pain: VAS Disability: NDI **Results:** Baseline: Pain: IG1 = 69.5 (18.6), IG2 = 67 (13.2), CG1 = 70.9 (14), CG2 = 64.1 (20.7) Disability: IG1 = 12.6 (6), IG2 = 13 (6.3), CG1 = 15.1 (2.7), CG2 = 12 (3.6) Immediate post-tx: Pain: IG1 = 45.9 (17.5), IG2 = 18.6 (18.5), CG1 = 58.4 (16.9), CG2 = 54.6 (20) Disability: IG1 = 9.3 (5.2), IG2 = 3.9 (3.4), CG1 = 12.8 (2.1), CG2 = 11.3 (3.3) Short term: NR Intermediate: NR Long term: NA	**Outcomes:** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NA **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Nabeta T (2002)[216] Country: Japan Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): 1 mo N screened: NR N randomized: 34 N completed tx: 27 N attended last fu: NR **Inclusion:** Pts with chronic pain/stiffness in neck and shoulder without arm symptoms **Exclusion:** NR	Mean age (SD/range): IG = 34.2 (10.8) vs. CG = 30.8 (12) yrs % of male: 29.4% total Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Myofascial syndrome Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Neck, shoulder **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 17)– Acu: Disposable stainless needles 0.2 x 40 mm inserted into the muscle to a depth of 20 mm and the 'sparrow pecking' technique was applied; when dull pain or acu sensation was felt, the manipulation was stransverse oscillatory rotped and the needle was retained for 5 more min; 3 tx, 3 wks Drop outs: 2 (A - B) CG (n = 17) – Sham-Acu: similar needles used but tips had been cut off and smoothed to prevent penetration of skin; acupuncturist pretended to insert the needle and use the sparrow pecking technique, then removed needles; needle extraction simulated after 5 min by touching the pt, noisily dropping needles into a metal cases; as IG Drop outs: 5 (A - B)	**Outcomes:** Pain: VAS; PPT **Results:** Baseline: Pain: IG = 60.5 (15), CG = 48.8 (28); IG = 1.7 (0.7), CG = 1.6 (0.9) Immediate post tx: Pain: IG = 43.3 (19.7), CG = 46.8 (25.4); IG = 2.6 (1.9), CG = 1.3 (0.5) Short term: NR Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** authors indicate that AEs were not the cause of drop out

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Petrie J (1986)[202] Country: UK Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 4 wks Fu duration (last assessment): 3 mos N screened: 27 N randomized: 25 N completed tx: 24 N attended last fu: 24 **Inclusion:** chronic NP (at least 6 mo) **Exclusion:** peripheral synovitis or malignancy	Mean age (SD/range): IG = 52.9 (9.8) vs. CG = 48.1 (12.8) yrs % of male: IG = 31%, CG = 42% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, IG = 18 (11.2) mo; CG = 26.5 (26.4) mo Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 13)– Acu: Five 28 g standard acu needles inserted at points GB20 and GB21 bilaterally and Du14 in the mid-line. The sensation of "The Chi" was obtained by ME on insertion and at 5 min intervals for 20 min; 20 min, twice/wk for 4 wks Drop outs: B = 0, C = 0 CG (n = 12) – Sham transcutaneous nerve stimulation (TNS): sweep function signal generator placed on transverse oscillatory rot of an oscilloscope. When the apparatus was switched on, the controls of the signal generator were set to display a pulsed high-frequency pattern on the oscilloscope in front of the pt; Same as IG Drop outs: B = 1 (unrelated surgery), C = 0	**Outcomes:** Pain: MPQ; Daily pain intensity score **Results-**Baseline: MPQ: IG = 20.38 (10.93), CG = 14.42 (6.13); Pain intensity: IG = 47.08 (15.88), CG = 31.67 (16.55) Immediate post tx: MPQ: IG = 15.54 (13.68), CG = 14.58 (9.68) Pain intensity: IG = 36.59 (22.95), CG = 32.88 (18.55) Short term: MPQ:IG = 13.85 (11.86), CG = 11.55 (8.66) Pain intensity: IG = 31.77 (24.1), CG = 24.72 (20.6) Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Daily pill count, mean (SD) Immediate post tx: 2.71 (2.56) vs. 1.24 (1.05) Short term: 2.41 (2.66) vs. 0.87 (0.55) Intermediate: NR Long term: NR **Harms:** one ptient in placebo group experiences negative effects (WDAE) **Note:** n=2 in IG and n=1 in CG had complete recovery of pain at last fu

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Petrie JP (1983)[203] Country: New Zealand Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 4 wks Fu duration (last assessment): immediate post-tx N screened: NR N randomized: 13 N completed tx: 13 N attended last fu: 13 **Inclusion:** Chronic cervical pain (> 2 yrs) defined as pain in the neck radiating to the occiput and /or shoulders with some limitations in movement **Exclusion:** active synovitis, neoplasia, steroid or local anesthesia injections to the neck in the previous mo	Mean age (SD/range): 65 yrs total % of male: IG = 14.3%, CG = 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: (n) rheumatoid arthritis: 6; osteoarthritis: 6; ankylosing spondylitis: 2 Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic (≥ 2 yrs), NR Severity of pain (Grading): majority with moderate pain Current tx/ co-intervention common in all groups: anti-inflammatory and analgesics, PT, hot packs, pool therapy	**Groups** IG (n = 7) – Acu: Five standard points were chosen: Du14, GB20, GB 21 (bilateral points), traditional needles 28 g were used to achieve sensation of The Chi described as numbness, soreness, heaviness at the point of insertion; the needles manipulated for 10 min after insertion, no electro stimulation applied; 20 min session, twice/wk, 4 wks Drop outs: NR CG (n = 6) – TENS placebo: sham stimulation; lead electrode applied to each side of the neck 5 cm lateral to C7; although the red light was switched on and the stimulator controls adjusted to the full view of the pt, no electrical current was passing to electrodes; Same as IG Drop outs: NR	**Outcomes (describe instrument used):** Pain: pain relief: 5-point scale (no relevant outcome reported) **Results:** Immediate post tx: Very good or good pain relief: 6 pts in IG vs. 0 in CG Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Acu superior to TENS-placebo after 4 wks of Tx.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Salter GC (2006)[200] Country: US Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 mos Fu duration (last assessment): immediate post-tx N screened: 227 N randomized: 24 N completed tx: 24 N attended last fu: 24 **Inclusion:** Pts with chronic NP aged 18 yrs or older who had consulted the NP practice in the previous 12 mo **Exclusion:** Cancer, rheumatoid arthritis, or ankylosing spondylisis, pain below the elbow, neck surgery, hemophilia, acu, awaiting legal action or not consenting	Mean age (SD/range): IG = 50.8 (17.1) vs. CG = 45.5 (16.4) yrs % of male: IG = 30%, CG = 21% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, IG = 5.7 (6.4); CG = 5.5 (5.5) yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 10) – Acu + GP: Acu: 5-24 needles/tx; 13-50 mm length with guage between 0.18-0.36 mm and insertion depth of 0.2-2.5 cm common points were GB-21, Ah Shi, GB-20, Huatuojaji at C-6, S-13, and Huatuojaji at C-7; other techniques such as massage, relaxation, diet, EX, and rest; GP: Med, massage, recommended EX; 3 mo Drop outs: A = 1, B = 1 CG (n = 14) – GP: Med, massage, recommended EX; 3 mo Drop outs: A = 2, B = 2	**Outcomes (describe instrument used):** Pain: NPQ- lower better **Results:** Baseline: Pain: IG = 34.31 (11.7), CG = 38.4 (18.6) Immediate post tx: NR Short term: NR IG = 22.73 (18.64), CG = 25.72 (16.29) Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: SF-36: no numerical values reported. Use of Med at bseline: 40% vs. 42.9% Immediate post tx: NR Short term: 3 monhts post tx: 11.1% vs. 41.7% Intermediate: NR Long term: NR **Harms:** IG – n = 6: aggravation of symptoms; n = 6: dizziness; n = 4: tiredness; CG – No SAE occured

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Sator-Katzenschlag SM (2003)[215] Country: Austria Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 6 wks Fu duration (last assessment): 3 mos N screened: NR N randomized: 21 N completed tx: NR N attended last fu: NR **Inclusion:** Chronic cervical pain (≥ 6 mo), normal neurologic function, of cervical nerves with no pain radiation, neural or spinal structure pathology, VAS ≥ 5 **Exclusion:** allergy to lornoxicam or tramadol, history of drug abuse, pregnancy, concomitant use of TENS or pacemaker, history of acu Tx	Mean age (SD/range): IG = 52 (12) vs. CG = 52 (9) yrs % of male: 28.5% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: muscular origin, spondylarthrosis, localized protrusion of a disc Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, 3.3 (1.2) (total sample) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 11)– Manual conventional Acu: acu points: cervical spine (37), shen men (55), and cushion (29, 19) by determining the position of the least skin resistance using electric conductance meters; no ES was administered; all needles removed after 48 h of insertion; once/wk for 6 wks Drop outs: 1 (A-B) IG2 (n = 10) – Electro-Acu- auricular: same as IG + the needles were connected to P-STIM which is positioned behind the ear like a hearing aid; needles were continuously stimulated with 2 mA constant current at freq. of 1 Hz for 48 h; all needles removed after 48 h of insertion; Same as IG Drop outs: 1 (A-B)	**Outcomes (describe instrument used):** Pain: VAS (numerical data NR) **Results:** Baseline: Pain: NR Immediate post tx: Pain: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: No numerical data reported Consumption of rescue Med Immediate post tx: NR Short term: Tablets mean (SD) 107 (5.0) vs. 47 (8.0) Intermediate: NR Long term: NR **Harms:** No AE was observed **Summary:** Statistically significantly larger reduction in VAS pain scores and improved well-being in the E-Acu-Acu arm vs. Manual-Acu

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Seidel (2002)[201] Country: Germany Quality score: 10/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 4 wks Fu duration (last assessment): 3 mos N screened: 48 N randomized: 51 N completed tx: 48 N attended last fu: 48 **Inclusion:** at least 6 mo of pain as defined by Schoeps & Senn for cervical syndrome; age 20 – 72 yrs; consent; no AP tx for past 6 mo **Exclusion:** acute blockages within past 3 wks before tx; ongoing process regarding retirement money decision making; neuro, vascular dysfunction, fibromyalgia, epilepsy, acute fever-related diseases, alcohol, Med and drug abuse; other Med	Mean age (SD/range): CG1 = 47, CG2 = 47, CG3 = 48, IG = 56 yrs % of male: 9.8% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: No Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Cervical spine **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic (18 – 480 mo), NR Severity of pain (Grading): VAS pain intensity Current tx/ co-intervention common in all groups: None	**Groups** CG1 (n = 13)– Sham (low level laser therapy, LLLT) on AP points 0 mW: without skin contact – continuing infrared laser, wave length 830 nm; 8 sessions, 2 sessions/wk for 4 wks Drop outs: 1 CG2 (n = 12) – LLLT 7 mW: as CG1; NR Drop outs: 0 CG3 (n = 13) – LLLT 30 mW: as CG1; 1 min radiation/ AP point, max. 15 points Drop outs: 1 IG (n = 13) – Acu: Conventional AP but individualized to location of pain; 15 min/session, max. 15 needles/ session, 0.2 – 15 mm needle depth until De-Qi Drop outs: 1	**Outcomes:** Pain: VAS average intensity; PPT (data not shown) Disability: NR **Results-** Immediate post tx: Pain: CG1 = 25.2, CG2 = 16.8, CG3 = 24.9, IG = 7.0 Short term: 4 wks after the last intervention, reduction in pain IG 82.2% vs. CG2 55.4% vs. CG3 29.1% vs. CG1 26.1% Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Cervical movement – axial rot Immediate post tx: CG1 = 137 (15.14), CG2 = 133.3 (20.79), CG3 = 142.1 (13.34), IG = 135.3 (16.95) Short term: NR CG1 = 122.4 (41.1), CG2 = 137.8 (14.55), CG3 = 128.9 (22.35), IG = 129.2 (15.14) VAS: CG1 = 19.6, CG2 = 17.7, CG3 = 25.2, IG = 9.4 Intermediate: NR Long term: NR **Harms:** NR **Summary:** AP is therapeutic option in tx of common NP

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Vas, J (2006)[208] Country: Spain Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): 6 mos N screened: 149 N randomized: 123 N completed tx: 123 N attended last fu: 85 **Inclusion:** 17 yrs and over with uncomplicated NP over 3 mo duration, symptomatic at examination, motion-related NP intensity 30 and over measured on 100mm VAS, no tx during past wk **Exclusion:** previous acu tx; NP intensity < 30 on 100 mm VAS; dx of neuropathologic, infectious, inflammatory, neoplasic, endocrine, metabolic or visceral NP; fracture or traumatism; px pinal surgery; N-S fever; sever psychiatric illness; severe disorder of overall health state; pregnancy	Mean age (SD/range): IG = 46 (13.7) vs. CG = 47.4 (12.8) yrs % of male: IG = 24.6%, CG = 11.3% Racial composition: NR Work status: NR Other socio-demographics: 28.4% sedentary Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S, 55.25% arthritis, 30.9% rectification % NS: 13.85 % S: 86.15 Duration of Pain, mean (SD/range): Chronic (> 3 mo), IG = 47.4 (60.3) mo; CG = 43 (40.8) mo Severity of pain (Grading): ≥ 3 VAS Current tx/ co-intervention common in all groups: rescue Med - 50mg diclophenac; 50mg tetrazepam	**Groups** IG (n = 61) – Acu: bilateral points with 25mm x 0.25 mm or 40mm x 0.25 mm manually stimulated every 10 min; -"deqi" sensation; needle retention 30 min; Vaccaria seeds taped in ear auricle after sterlizing skin after removing needles; pts instructed to apply pressure to each ear point 10 repeats 3 times/d; 5 sessions over 3 wks Drop outs: B = 3, C = 13 CG (n = 62) – Placebo (TENS):; electrodes at GB 21 bilateral point with pt in prone position; nerve stimulation unit in front of Pt for 30 min with visible and audible flasing diode; Pt checked every 10 min and TENS-placebo potentiometer adjusted Drop outs: B = 5, C = 17	**Outcomes:** Pain: VAS (0-100 mm); Northwick park NPQ (Spanish) Disability: ACM; PCM **Results:** Immediate post tx: Pain-mean change: IG = 44.1, CG = 12.3; IG = 30.2, CG = 12.7 Disability- mean change: IG = 57.2, CG = 33.6; IG = 17.3, CG = 8.9 Short term: Pain-mean change: IG = 41.1, CG = 26.8 Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: SF-36: physical score **Results- mean :** Baseline: IG = 36.7 (9.7), CG = 37.6 (7.9) Immediate post-tx-mean change: IG = 6.3, CG = 0.7; IG = 5.8, CG = 6.3 Short term: NR Intermediate-mean change: IG = 9.3, CG = 5.3 Long term: NR **Harms:** mild AEs similar rated in IG and CG (Acu: 4 AEs swelling of hands, bruising, pain and ulcer of the ear vs. placebo 2 Aes cepalea, and aggrevation of symptoms)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
White P (2004)[213] [214] Country: UK Quality score: 9/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 4 wks Fu duration (last assessment): 12 mos N screened: 202 N randomized: 135 N completed tx: 135 N attended last fu: 106 **Inclusion:** Pts aged 18-80 yrs with chronic mechanical NP (> 2 mo) and a pain score > 30 mm on VAS (0-100 mm) for 5 of 7 pre-Tx ds **Exclusion:** Pregnancy, history of fracture, surgery of the neck, cervical congenital abnormality, uncontrolled LBP, contraindication to acetaminophen, systemic illness, recent or current manual neck Tx or steroid use	Mean age (SD/range): IG = 53.9 (15.71) vs. CG = 52.8 (15.6) yrs % of male: IG = 34.28%, CG = 36.9% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Mechanical conditions Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP **Cause of Pain:** N-S, Majority had spoldylosis Duration of Pain, mean (SD/range): Chronic, IG = 4.81 (7.03) yrs; CG = 7.71 (11.4) yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: Acetaminophen	**Groups** IG (n = 70)– Acu: Single-use sterile needles without guide tubes with sizes 13, 25, or 40 mm x 0.25 mm point selection based on individualized western acu techniques; S points determined by pain distribution, palpation of the neck and thorax to find ah-shi points/local tender points. At least one distal point was used; 6 points on avg/ side if pain was bilateral and deqi was obtained; 20 min, twice/wk for 4 wks Drop outs: D = 16 CG (n = 65) – TENS-Placebo: The Noma FM-4 el-acu stimulator was used, the cables were severed at the output plug and no current was delivered to the pt; examination and point selection were the same as in IG; Same as IG Drop outs: D = 12	**Outcomes:** Pain: VAS Disability: NDI **Results:** Immediate post tx: Pain: IG = 24.34 (21.63), CG = 34.38 (22.33) Disability: NR Short term: NDI: IG = 11.78 (6.59), CG = 12.34 (7.35) VAS: IG = 20.39 (20.26), CG = 30.69 (22) Intermediate: NDI: IG = 8.89 (6.57), CG = 10.72 (9.11) VAS: IG = 20.91 (25.7), CG = 24.36 (26.7)	**Outcomes:** QoL/ well being: SF-36 (physical score)- no change at 8 wks post tx (data not shown) **Results- mean :** Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** increase in symptoms after tx (n = 1), faintness (n = 3), mild headache (n = 2), dizziness (n = 2), tiredness (n = 1), thumb tingling (n = 1), cold feeling (n = 1), nausea (n = 1), discomfort (n = 1), hand swelling (n = 1), bruise at LI 4 (n = 1), euphoria and enhanced vision (n = 1)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Witt CM (2006)[209] [210-212] Country: Germany Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 3 mos Fu duration (last assessment): immediate post-tx N screened: NR N randomized: 3451 N completed tx: 3162 N attended last fu: 3162 **Inclusion:** chronic NP (> 6 mo), age ≥ 18 yrs **Exclusion:** prolapse of at least one intervertebral discs with concurrent neurological symptoms, prior vertebral surgery, spondylopathy, NP caused by inflammatory, cancer or autoimmune disease, congenital deformation of spine except scoliosis lordosis, compression fracture caused by osteoporosis; spinal stenosis	Mean age (SD/range): IG = 49.8 (12.8) vs. CG = 51.4 (13) yrs % of male: IG = 31%; CG = 32% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, IG = 6 (6.9); CG = 6.1 (7.3) yrs Severity of pain (Grading): Current tx/ co-intervention common in all groups: Usual care	**Groups** IG (n = 1753) – Acu: only standard acu with disposable needles permitted; conventional Tx as needed;15 sessions over 3 mo Drop outs: B = 29 CG (n = 1698) – Control: conventional Tx as needed; NA Drop outs: B = 22	**Outcomes:** Pain: NPDS Disability: SF-36: physical functioning; physical component **Results:** Baseline: Pain: IG = 55 (15.8), CG = 53.9 (16) Disability: IG = 63.6 (21.6), CG = 63.9 (22.8); IG = 37.6 (8.4), CG = 38.1 (9.1) Immediate post tx: Pain: IG = 38.3 (16.1), CG = 50.5 (15.7) Disability: NR, only % increase reported Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: SF-36 (role physical)- % reduction, mean (95% CI) Immediate post tx: 24.5 (22.6, 26.5) vs. 5.1 (3.3, 7.0); CG vs. IG 9.4 (16.7, 22.1), p < 0.001 Short term: NR 23.2 (21.1, 25.2) vs. 20.6 (18.4, 22.8), CG vs. IG 2.5 (-0.5, 5.6), p = 0.097 Intermediate: NR Long term: NR **Harms: any AE, 1216 (n=1002)**57% minor local bleeding or hematoma, 10% pain, e.g., needling ain, 4% vegetative symptoms and 29% other). No ife-threatening side effects were reported.

Table 2.5 Neck Pain - Acupuncture - Mixed - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Bin, X (2007)[217] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 10 ds Fu duration (last assessment): NR N screened: NR N randomized: 57 N completed tx: 54 N attended last fu: NR **Inclusion:** age 18-70 yrs; diagnosed with cervical spondylopathy; abnormal findings in X-ray exam; excluding ocular or aural vertigo, cases caused by poor blood supply in basilare arterial due to pressure on the verebroartery section I and III; also cases due to neurosis and intracranial tumor) **Exclusion:** conditions caused by such diseases as Meniere's cerebral arterisclerosis, postural vetigo, drug intoxication of inner ear, neurosis, and sublavian steal syndrome	Mean age (SD/range): 35-68 yrs % of male: 73% total Racial composition: assume Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** **Cause of Pain:** Cervical spondylopathy of the vertebroarterial type Duration of Pain, mean (SD/range): Mixed (1 wk-10 yrs), NR Severity of pain (Grading): excluded mild; total: majority moderate (8 severe, and 49 moderate) Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 29) – Electro-acu:on acu points: GB 20; GV 20; GB 8; oblique insertion (75° angle) -gentle lifting thrusting and rotating manipulation was performed to induce the arrival of qi before and electric stimulator was connected to the needles; The points selected wer divided into two groups wich were used alternately; 20 min/session, once daily with a 10 d course Drop outs: 1 CG (n = 28) – simple acu: same acupoints and manipulation methods as IG; Same as IG Drop outs: 2	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: **Life and work-** mean (SD) Post tx: 3.38 (2.43) vs. 2.74 (2.39) **Cure rates** Immediate post tx: pts completely cured (n): 10 vs. 6; cured & markedly effective rate: 82.21 vs. 53.84; Effective rate: 92.86 vs. 84.62 Change of physica signs: data not shown Quality of life: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Chu J (1997)[221] Country: US Quality score: 1/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: NR Fu duration (last assessment): immediate post-tx N screened: 296 N randomized: 164 N completed tx: NR N attended last fu: NR **Inclusion:** Neck and arm pain, MPS due to cervical nerve root irritation **Exclusion:** Pts with peripheral neuropathy	Mean age (SD/range): NR % of male: IG = 41%, CG = 28.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: Cervical nerve root irritation Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Neck, shoulder **Cause of Pain:** S, NR Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 122) – Acu (dry needling) – tender points: Done bilaterally on levator scapulae C3, trapezus C4, anteroir deltoid C5, romboid major C5, infraspinatus C5, posterior deltoid C6, biceps brachii-short head C7, brachialis C6, teres major C6, triceps C7, extensor communis C7, and cervical muscles at C3-C7 level; NR Drop outs: NR CG (n = 42) – Acu (dry needling) – random points: Same as IG; NR Drop outs: NR	**Outcomes (describe instrument used):** Pain: ≥ 50% pain relief, n (%)] **Results:** Baseline: Pain: --- Immediate post tx: Pain: IG = 38 (31%), CG = 7 (16.6%) Average pain relief: 51.8% (21.9) vs. 39.0% (18.7%) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Huang, YF (2008)[226] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 20 ds Fu duration (last assessment): immediately post-tx N screened: NR N randomized: 107 N completed tx: 107 N attended last fu: 107 **Inclusion:** numbness, NP, and radiating pain towards upper limb; brachial plexus traction test (+), spurling's test (+); deformity of cervical vertebrae in CT; cervical vertebrae affected determined by clinical evaluation same as those indicated in CT **Exclusion:** other cervical disc or joint disease or musculoskeletal disease affect upper limb, such as spinal tuberculosis, tumor, scapulohumeral periarthritis, etc.	Mean age (SD/range): IG1 = 43 (13), IG2 = 41.5 (10), CG = 41.7 (11.7) yrs % of male: IG1 = 64.9%, IG2 = 61.1%, CG = 70.6% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical spondylosis of nerve root type Duration of Pain, mean (SD/range): Mixed: (up to 12 wks)/(>12 wks): IG1 = 4 (3.5), IG2 = 4 (3.5); Chronic (> 12 wks): CG = 4.6 (3.6) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 37)– Acu at Jiquan (HT1) with lifting thrusting manipulation: affected arm needled 25-40mm deep at 5cm below HT1 in abduction position and shoulder flx in 90°, needle stimulated by lifting-thrusting after "deqi" sensation reached; 1 session/2 d over 20 d Drop outs: A = 0, B = 0 IG2 (n = 36)– Acu at Jiquan (HT1) with twirling manipulation: same as IG1, stimulate needle site by twirling at freq. of 2 Hz till "deqi" sensation; as IG1 Drop outs: A = 0, B = 0 CG (n = 34) – Routine needling: needle 25-40 mm at LI 11, HT1, LI 4, PC6, PC3, manually stimulated till "deqi" sensation, retention time 30 min; as IG1 Drop outs: A = 0, B = 0	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: **Cure rate;** effective; ineffective; total efficacy (%) Immediate post tx: IG1 = 59.5, IG2 = 25, CG = 32.4; IG1 = IG1 = 32.4, IG2 = 33.3, CG = 44.1; IG1 = 8.1, IG2 = 41.7, CG = 23.5; IG1 = 91.9, IG2 = 58.3, CG = 76.5 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Ilbuldu E (2004)[223] Country: Turkey Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 4 wks Fu duration (last assessment): 6 mos N screened: NR N randomized: 60 N completed tx: 60 N attended last fu: 60 **Inclusion:** Women aged 18-50 yrs with MTP in the upper trapezius muscle **Exclusion:** Tumor, infectious diseases, osteoarthritis (stage 3-4), pregnancy, scoliosis, COLD	Mean age (SD/range): IG1 = 35.3 (9.18), IG2 = 33.9 (10.36), CG = 32.35 (6.88) yrs % of male: 0 (all female) Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Myofascial pain Duration of Pain, mean (SD/range): Mixed, IG = 38.48 (32) mo; IG2 = 32.95 (28.61) mo; CG = 36.95 (33.65) mo Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: paracetamol for pain	**Groups** IG1 (n = 20)– Acu dry needling: 0.25 x 25 size acu needles; once/wk for 4 wks Drop outs: NR IG2 (n = 20)– Laser therapy: He-Ne laser at 632.8 nm wavelength applied to the three TP in the upper trapezius muscles on both sides; 3 sessions/wk, 12 sessions over 4 wks Drop outs: NR CG (n = 20) – Laser-placebo: everything the same as in Laser group but no beam was applied; same as IG2 Drop outs: NR	**Outcomes:** Pain: NHP; VAS (at rest) **Results:** Baseline: Pain: IG1 = 70 (30.71), IG2 = 59.54 (19.47), CG = 60.42 (31.39); IG1 = 5.1 (1.97), IG2 = 5.5 (1.96), CG = 5.7 (1.81) Immediate post tx: Pain: NR Short term: IG1 = 33.9 (28.37), IG2 = 13.5 (14.07), CG = 32.2 (28.4); IG1 = 3.71 (2.33), IG2 = 2.05 (1.43), CG = 3.65 (2.03) Intermediate: IG1 = 32.66 (35.15), IG2 = 19.02 (23.02), CG = 27.89 (23.65); IG1 = 2.59 (2.18), IG2 = 2.12 (1.9), CG = 2.89 (2.63)	QoL/ well being: Nottingham Health profile inventory: laser grp was sig better than IG1 and CG at post tx but not at 6 mos **Cervical ROM:** sig increase in flexio at post tx in dry needling & laser grps, range of ext sig increased in laser grp vs. dry needling & placebo **Analgesic use:** Immediate post tx: analgesic use: 3.62 (4.41) vs. 0.85 (1.53) vs. 2.05 (3.38) Short term: NR Intermediate: NR Analgesic use: 2.53 (2.74) vs. 1.41 (3.43) vs. 2.5 (3.49) Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Jia, CS (2007)[225] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: one tx Fu duration (last assessment): immediate post-tx N screened: NR N randomized: 98 N completed tx: 98 N attended last fu: 98 **Inclusion:** diagnosed as cervical spondylosis according to "The diagnostic criteria for cervical spondylosis"; NP; informed consent obtained **Exclusion:** other spinal disease; pregnant and postnatal woman; cardio-cerebrovascular disease, hematransverse oscillatory rotoietic disease, psychosis; not complete tx sessions	Mean age (SD/range): NR % of male: 51% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Disc/joint disease Duration of Pain, mean (SD/range): Mixed (sub-acute/chronic) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: head movements (rot, flx, ext, etc.)	**Groups** IG1 (n = 49) – Otransverse oscillatory rotoint- penetrative needling: needles inserted at unilateral and bilateral (AH 13) otransverse oscillatory rotoints and subsequently crossed one otransverse oscillatory rotoint area to another between epidermis and cartilage of muscle, stimulate with twirling 5-7 times, retention time 30 min., twirling 2-3 times during retention; one 30 min. tx Drop outs: A = 0 IG2 (n = 49) – Otransverse oscillatory rotoint- straight needling: needles directly inserted at selected otransverse oscillatory rotoints, needle retention time and twirling times same as IG1; Same as IG1 Drop outs: A = 0	**Outcomes:** Pain: SF-MPQ (15 descriptors) Disability: NA **Results:** Baseline: Pain: IG1 = 28 (7.4), IG2 = 27.9 (7.3) Disability: NA Immediate post tx: Pain: IG1 = 12.6 (4.9), IG2 = 21.4 (6.4) Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Li, Xiang-hui (2004)[219] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 40 ds Fu duration (last assessment): 12 mos N screened: 780 N randomized: 780 N completed tx: 780 N attended last fu: 780 **Inclusion:** Pts diagnosed as cervical spondylosis using Chinese Medical Diagnostic and Effectivenes Standard **Exclusion:** NR	Mean age (SD/range): IG = 49.1, CG1 = 50.2, CG2 = 48.1 yrs % of male: IG1 = 47.3%, CG1 = 45.8%, CG2 = 46.2% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Spondylosis Duration of Pain, mean (SD/range): Mixed (1 mo-20 yrs, acute, sub-acute, chronic) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 260) – Acu centro-square needling Danzhui: Dazui point, supplement acupoints: jianyu, jianzhen, jianqian, quchi, hegu, fengchi, huantiao, yanglingquan, neiguan and zusanli Diameter 0.30-0.35mm, 25-125mm long needle; 1 tx/d, 20 tx/course, 2 courses Drop outs: B = 0, E = 0 CG1 (n = 260) – Acu needling cervical Jiaji point: Jiaji point, Diameter 0.30-0.40mm; Same as IG1 Drop outs: B = 0, E = 0 CG2 (n = 260) – Traction-massage: traction 2-10kg, retention 30min, 10-15 neck massage; Same as IG1 Drop outs: B = 0, E = 0	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Based on Chinese Medical Diagnostic n (%) **Results- mean :** Immediate post tx: IG = 254 (97.7), CG1 = 247 (95), CG2 = 224 (86.2) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** The therapeutic effect in IG1 was stable and better than that in the CGs. IG has the best therapeutic effect for cervical spondylosis and therapeutic effect of CG1 is better than that in CG2

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Lin, M (2004)[220] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 mos Fu duration (last assessment): 6 mos N screened: 100 N randomized: 100 N completed tx: NR N attended last fu: NR **Inclusion:** Cervical spondylopathy of nerve root type, aged 25-76 yrs **Exclusion:** NR	Mean age (SD/range): 46 (8.5) yrs total % of male: 65% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint:	**Region of pain:** NP & Vertebrae **Cause of Pain:** Cervical spondylopathy of nerve root type Duration of Pain, mean (SD/range): Mixed (Acute-Chronic: 15 d – 32 yrs), NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	IG (n = 50) – Acu (Needle Scalpel/ Massage Tx): no. 3 or no. 4 small needle scalpel, cut lines parallel to nerves, blood vessels, muscle fiber, inserted vertically, small hole made with Chuanketie after needle withdrawn, pressure applied until bleeding stransverse oscillatory rotped, every 7 d Massage therapy: digital acupoint pressure, poking channels, on-the-point pressing, rolling, rotating manipulation used to massage Fengchi, Dazhui acupoints and soft tissue focus in neck area, traction of cervical vertebrae and massage of pain areas, plucking and pressing, two-point and one-site reposition maneuver, once/d; 3 mo Drop outs: NR CG (n = 50) – Massage only: Same as IG; Drop outs: NR	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: TR Cure rate: Post tx: 16 vs. 10 Effective rate: Short term: NR (49/50) 98% vs. (41/50) 83%, p < 0.05 Intermediate: NR Long term: NR **Harms:** NR **Summary:** Dose and frequency of tx unclear

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Shang, Xiu-kui (2002)[218] Country: UK Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 54 ds Fu duration (last assessment): immediate post-tx N screened: NR N randomized: 80 N completed tx: 80 N attended last fu: 80 **Inclusion:** Diagnostic as nerve-toot cervical spondylopathy using Chinese Medical Diagnostic Standard **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Spondylosis Duration of Pain, mean (SD/range): Mixed (acute – chronic), NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 50)– Acu, acupoint Sitianxue: tianyong, tianrong, tianchuan, tianding, and liequan for major acupoints, all points on affected side for cold dampness, add dazhui and fengmen for qi stagnant, add xuehai add touzhui and houxi for headache add jianzhongshu and jianwaishu add shenmai for neck rot limitation add kenlun for pain in lumbar sacrum, 40-50mm, retention 30min; 1 tx/2 d, 9 tx/course, 3 courses Drop outs: A = NR, B =0 CG (n = 30) – Acu acupoint Jiajixue; retention 30 min; Same as IG Drop outs: A = NR, B =0	**Outcomes:** Pain: pain score instrument not mentioned (%) **Results:** Baseline: Pain: IG = 0.8 (0.03), CG = 0.79 (0.04) Immediate post tx: Pain: IG = 0.1 (0.02); CG = 0.32 (0.03) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: Score based on Chinese Medical Diagnostic and Effective Standard **Results- mean :** Baseline: IG = 0.62 (0.04), CG = 0.65 (0.03) Immediate post tx: IG = 3.31 (0.01), CG = 3.4 (0.05) N (%) improved: IG = 46 (92), CG = 21 (70) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** IG as main therapy has a marked effect on spondylopathy. This study found the effect of the tx is better with the younger 20 - 40 yr pts than the older pts > 40 yrs

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Wang, Xi-Lin (2008)[227] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 30 ds Fu duration (last assessment): immediately post-tx N screened: NR N randomized: 102 N completed tx: 102 N attended last fu: 102 **Inclusion:** NP, neck PPT and/or radiating pain towards chest, shoulder, back, and upper limb, upper limb and figure numb, neck stiff and ROM reduced; Lasègue sign (-); CT or MRT indicate deficits on cervical discs **Exclusion:** NR	Mean age (SD/range): IG = 43.3 (13.3) vs. CG = 45.2 (14.1) yrs % of male: IG = 49%, CG = 52.9% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Disc/joint disease, degenerative disease Duration of Pain, mean (SD/range): Unknown (mixed), IG = 2.8 (1.62) yrs; CG = 3.1 (1.71) yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 51)– Shu-needling + elecro-acu: GV14, S13, TE5, & EX-B2 were selected, needles were deeply inserted into the cervical vertebrae of corresponding Jiaji (EX-B2), until "deqi" sensation reached, connected with G 6805 electrical impulse device and stimulated at freq. of 3.3 Hz, needle retention for 30 min.; 30min/tx, 1 tx/d, 10 d/period, 30 d total Drop outs: A = 0, B = 0 CG (n = 51) – Routine needling + electro-acu: same acupoints as IG and routine needling applied, tx duration, needle retention and electrical impulse and freq. same as IG; saem as IG Drop outs: A = 0, B = 0	**Outcomes:** Disability: NR **Results:** Baseline: Disability: --- Immediate post tx: Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Efficacy of TCM diagnostic criteria:** Immediate post tx: cure rate IG = 68.6, CG = 47.1 ; effective IG = 29.4, CG =37.2; ineffective IG = 2, CG = 15.7 total efficacy (%)IG = 98, CG = 84.3 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zhang, B (2005)[228] Country: China Quality score: 0/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): 3 mos N screened: NR N randomized: 96 N completed tx: NR N attended last fu: NR **Inclusion:** NR (appears to include pts with cervical spondylosis only) **Exclusion:** NR	Mean age (SD/range): NR % of male: IG = 65.63%, CG = 56.25% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: 4 Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical spondylosis Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 64) – Acupuncture + Massage / Manipulation:. Acupoint injection - Fengchi (GB 20), bilaterally, Ashi points (spot of tenderness or node), 1 to 2; Drugs: VB12500ug (1 ml), Danshen injection 2 mL (1 g/mg), 2 % lidocaine 1 ml. The above drugs were drawn into a one-off 5ml syringe. the doctor inserted the needle into the points and injected the same amount of drugs into each point. If there was no bleeding, the needle was withdrawn with the arrival of qi; 3 tx/wk for 3 wks Drop outs: NR CG (n = 32) – Massage: As IG; Same as IG Drop outs: NR	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Cure rate: Immediate post tx: 81.25% vs. 56.25, $p < 0.05$ Total effective rate were similar in two grps Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zhang, Honglai (2003)[85] Country: China Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 45 ds Fu duration (last assessment): NR N screened: unknown N randomized: 120 N completed tx: 120 N attended last fu: NR **Inclusion:** diagnosed as Cervical Spondylosis using ref [1] 1993-chinese, Special attention (only those who were compliant with the tx, only those who responded to the surveys) **Exclusion:** acute external injury cause, not compliant	Mean age (SD/range): NR % of male: IG = 53.3%, CG = 55% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Spondylosis Duration of Pain, mean (SD/range): Chronic, IG = 81.9 mo, IG2 = 92.2 mo, CG = 91.1 mo Severity of pain (Grading): McGill, VAS Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 60)– Electro-acu: tianzhu, jinbailao and dashu (two sides) for major acu points dazhui, fengchi, fengmen, jianjin and waiguan for wind dampness quchi, pishu, fenglong, geshu for tanyuzhu type ganshu, pishu, and zusanli for qi stagnant type ganshu, pishu, zusanli for qi and blood stagnant type yanglao, ganshu, shenshu and taixi for liver and kidney debility. 1.5 Chinese inch, size 30 needle, freq. 120-250/min, retention 30min; 1 tx/d, 15 tx/course, 3 courses, 2 d rest between courses Drop outs: A = NR, B= 0 CG (n = 60) – Traction: 30 min, average traction = 7.5kg; Same as IG Drop outs: A = NR, B= 0	**Outcomes:** Pain: McGill PRI total; difference between baseline and fu on VAS **Results:** Baseline: Pain: IG = 8.57 (2.33), CG = 8.61 (2.42); NR Immediate post tx: Pain: IG = 6.73 (2.12), CG = 7.55 (2.28); IG = 4.87 (1.67), CG = 3.56 (1.26) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: Cure, improved, effective, no effect n (%) **Results- mean :** Baseline: Immediate post tx: IG = 56 (93.3%), CG = 47 (78.3%) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** IG in therapeutic effect and improvement of pain for cervical spondylosis is better than the CG. This study found that both tx have better effect with younger pts compared with older pts

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zhu, HZ (2006)[224] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 18-45 ds Fu duration (last assessment): 6 mos N screened: 221 N randomized: 221 N completed tx: 221 N attended last fu: 221 **Inclusion:** cervical sponsylosis, 18-75 yrs of age **Exclusion:** Operation; pregnant and breast-feeding women; Cervical TB, tumor and inflammation; Mental	Mean age (SD/range): IG = 46.04 (9.2) vs. CG = 46.5 (10.3) yrs % of male: IG = 48.7%, CG = 52.8% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical spondylosis Duration of Pain, mean (SD/range): Mixed, IG = 4.59 (3.06) yrs; CG = 4.82 (3.25) yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 115) – Needle-knife: needle-knife therapy at the apper and lower interspinal ligaments of the affected vertebaral body and bilateral pasterior joint capsules; 1 time/3-5 d x 3 times/3 course Drop outs: D = 0 CG (n = 106) – Acupuncture: acu at Luozhen, Ashi and Jiaji points; 1 time/2 d x 5 times/3 course Drop outs:	**Outcomes:** Pain: NR **Results:** Immediate post tx: Pain: NR Short term: NR Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: Therapeutic effect **Results- mean :** Baseline: NA Immediate post tx: NA Short term: IG = 91.3%, CG = 59.4% Intermediate: IG = 94.7%, CG = 56.6% Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zhuang, Li-Xing (2004) [222] Country: China Quality score: /13 Initial of reviewer: NH (Chinese extractions)	**Trial Design** RCT- Double blind/cross over Tx duration: 3 wks Fu duration (last assessment): N screened: NR N randomized: 34 N completed tx: 34 N attended last fu: 34 **Eligibility criteria:** - inclusion: diagnosed as vertebral artery type of cervical spondylosis by western medicine, age 36-72, duration 1mos-5yrs also diagnosed by chinese medicine - exclusion: diagnosed as shi zheng	Mean age: IG1 = 53.7 (11.9), IG2 = 53.3 (11.7) % of male: IG1 = 35.3%, IG2 = 23.5% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP- specific **Duration of Pain:** IG1 = 2.9 (1.12), IG2 = 2.78 (1.09) Duration of pain: 1mos-5yrs Severity of pain (Grading): NR	**Groups** IG1 (n=17) – pressed acu at the baihui acupoint + local electro-acupuncture , retention 30 min, by trained professionals 1tx/day, 7tx/course, total of 3 courses 0 dropouts IG2 (n=17) – local electro-acupuncture by trained professionals, 1tx/day, 7tx/course, total of 3 courses 0 dropouts	**Outcomes:** Pain: NR Disability: NR Results: Baseline: NA Short Term Follow Up: NA	**Outcomes:** Curative effect immediately pos- tx: Number of patients cured: 9/17 vs. 4/17 Number of patients with significant effect: 6/17 vs. 4/17 Number of patients with improvement: 2/17 vs. 7/17 Number of patients without effect: 0/17 vs. 2/17 Other outcomes: chages of contents of plasma thromboxane and 6-keto-prostaglandin 1 alpha and the ratio of these two Harms: NR

Table 2.6 Neck Pain - Acupuncture - Mixed Duration of Disorder - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Fu ZH (2007)[229] Country: China Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 24 hours Fu duration (last assessment): immediate post-tx N screened: NR N randomized: 47 N completed tx: 47 N attended last fu: 47 **Inclusion:** Presence of a tender spot associated with movement of a local muscle, reproduction of clinical symptoms by pressing the MTP, presence of palpable taut band peripheral to the MTP, restricted ROM in the related joint, 18 yrs ≤ age ≤ 80 yrs, TP in the neck/upper back 10 d < duration < 1 yr **Exclusion:** Pregnancy, history of fractures, surgery of the cervical spine, taking analgesic drug and accepting other txs within 1 wk	Mean age (SD/range): NR % of male: IG1 = 41%, IG2 = 24% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP/Upper back **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Mixed (Acute/Sub-acute) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 22)– acu insertion along the muscle fiber towards TPs needles moved smoothly and rhythmically from one side to another 200 times in 2 min horizontally, needle remained under skin for 8-24 hrs; one 24 hr tx Drop outs: NR IG2 (n = 25) – acu insertion across the muscle fibers towards TPs ; same as IG1 Drop outs: NR	**Outcomes (describe instrument used):** Pain: MRP (MRP); PUP (PUP) **Results:** Baseline: MRP IG1 = 6.05 (2.44), IG2 = 5.32 (2.14) PUP IG1 = 6.23 (1.69), IG2 = 6.16 (1.25) Immediate post tx: MRP IG1 = 3.59 (1.89), IG2 = 2.76 (1.88) PUP IG1 = 3.82 (1.33), IG2 = 3.28 (1.06) Short term: NR Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: NR Cervical ROM: Immediate post tx: 1.36 (0.90) vs. 1.12 (0.88), p = 0.38 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 2.7 Neck Pain - Acupuncture – Unknown duration of disorder - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Duann, J (2006) [231] Country: Taiwan Quality score: /13 Initial of reviewer: NH	**Trial Design** RCT- Double blind/cross over Tx duration: 1 treatment, 30 mins Fu duration (last assessment): 3 mo N screened: NR N randomized: 72 N completed tx: 72 N attended last fu: NR **Eligibility criteria:** - inclusion: Cervical myofascial pain syndrome - exclusion: NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Superior Trapezius **Cause of Pain:** % NS: NR % S: NR Duration of Pain, mean (SD/range): NR Severity of pain (Grading): Nr Current treatment/ co-intervention common in all groups: NR	**Groups** IG1 (n=36) – Miniscalpel-needle (MSN) treatment on most painful trP, provider NR, inserted for 30 sec, observed for 30 mins, 1 tx total IG2 (n=36) – Lidocaine trP treatment, provider NR, observed for 30 mins 1 tx total	**Outcomes:** Pain: VAS (0-10), reported as mean for 4 time points Disability: NR **Results:** Baseline: IG1 = 5.5, IG2 = 5.3 Immediate post tx: IG1 = 3.5, IG2 = 4.1 Short term: IG1 = 2.9, IG2 = 5.0 Intermediate: IG1 = 2.8, IG2 = 4.97 note**these results were not in the extraction form, they were taken (aug.4) directly from a graph	**Outcomes:** QoL/ well being: NR Other: NR **Results- mean : NR** Baseline: NA Immediate post tx: NA Short term: NA Intermediate: NA Long term: NA **Harms: NR**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Edwards J (2003)[235] Country: UK Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): 3 mos N screened: 66 N randomized: 40 N completed tx: 40 N attended last fu: 40 **Inclusion:** Pts aged ≥ 18 yrs with active MTPs, consent and compliance In place **Exclusion:** acute condition requiring Tx before 6 wks; skin lesion infection or inflammatory oedema at MTP site; needle phobia; previous adverse reaction to Acu or anaesthetic; serious neurological or systemic disease	Mean age (SD/range): IG = 57 (12), CG1 = 55 (17), CG2 = 57 (19) yrs % of male: IG = 29%, CG1 = 39%, CG2 = 24% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** S Duration of Pain, mean (SD/range): Unknown, IG1 = 16 (23) mo; IG2 = 10 (12) mo; CG = 16 (19) mo Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 14)– Acu + SDN + stretching EX: Before SDN was done, the MTPs were palpated and marked at each session, then needled in turn, working from proximal to distal, needles used: 25 x 0.30 mm with coiled copper handles and plastic guide tubes, needles inserted to depth of 4 mm, retained for avg of 3.4 min; stretching EXs 3 times/d, 3 wks Drop outs: 0 CG1 (n = 13)– Stretching EX: pts received instruction for stretching EXs recommended by Simons et al for involved muscles containing MTPs; 3 times/d, 3 wks Drop outs: 0 CG2 (n = 13) – No tx: NA; NA Drop outs: 0	**Outcomes:** Pain: SFMPQ; PPT **Results:** Baseline: Pain: IG = 24.3 (6.3), CG1 = 23.1 (7), CG2 = 20.2 (8); IG = 1.4 (0.9), CG1 = 1.7 (1), CG2 = 1.4 (1) Immediate post tx: Pain: IG = 13 (10.2), CG1 = 17.1 (9.4), CG2 = 16.5 (10.2); IG = 1.8 (1), CG1 = 1.8 (1), CG2 = 2 (1.4) Short term: IG = 9.1 (11.6), CG1 = 15.2 (8.8), CG2 = 14.9 (11); IG = 2.7 (1.4), CG1 = 1.8 (0.9), CG2 = 2 (1.6) Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** No AEs were reported by pts or observed by therapists in any grps

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Fu, W (2005)[234] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration:4 wks Fu duration (last assessment): immediate post-tx N screened: 178 N randomized: 158 N completed tx: 158 N attended last fu: 158 **Inclusion:** Using both Western Medical and Chinese Medical Diagnostic Standards to Diagnostic **Exclusion:** Caused by acute external injury; Spinal cord cervical spondylosis ; Pregnant; Heart, liver, or kidney disease	Mean age (SD/range): IG1 = 35.13 (8.88), IG2 = 35.24 (4.67), IG3 = 34.2 (6.67) yrs % of male: IG1 = 53.6%, IG2 = 55.3%, IG3 = 56.4% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Spondylosis Duration of Pain, mean (SD/range): Unknown, IG1 = 5.7 (4.67), IG2 = 6.05 (4.35), IG3 = 6.15 (5.35) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 56)– Needle picking acu: acupoints: bailao(two sides), dazhui, jianjing (two sides), xinshe (two sides), dashu (two sides) 0.1 ml anesthesia, pick skin 0.2 cm; 2 tx/wk, 4 wks Drop outs: B = 1, and 2 changed to other tx IG2 (n = 47) – Local anesthesia: under the acupoint, 0.1ml anesthesia; Same as IG1 Drop outs: B = 0 IG2 (n = 55) – Normal acu: acupoints as IG1, normal puncture; Same as IG1 Drop outs: B = 0	**Outcomes:** Pain: PRI **Results:** Baseline: Pain: IG1 = 8.91 (4.92), IG2 = 11.85 (2.77), IG3 = 11.64 (3.81) Immediate post tx: Pain: IG1 = 0.36 (0.55), IG2 = 6.91 (3.22), IG3 = 5.71 (2.49) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: Well being, scoring based on Chinese paper ref [1] n (%) Other: **Results- mean :** Baseline: --- Immediate post tx: IG1 = 53 (94.6%), IG2 = 47 (100%), IG3 = 55 (100%) Short term: NR Intermediate: NR Long term: NR **Harms:** CG: n = 1 too much to continue tx; n = 2 scarring after tx (switched tx groups-unknown which group) **Summary:** sign. difference between 3 groups

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Liang, ZH (2009)[230] Country: China Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: single 20 min session Fu duration (last assessment): NR N screened: NR N randomized: 106 N completed tx: NR N attended last fu: NR **Inclusion:** NP caused by cervical spondylosis **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical spondylosis Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 53)– Acupuncture: acu points at Daahui (GV14), Jingbailao (Ex HN15), and Jianzhongshu, + infrared; single session, 20 min needle retention Drop outs: NR CG (n = 53) – Sham-acu: sham acu at 1 cm lateral to Bailao and Jianzhongshu points + infrared; Same as IG Drop outs: NR	**Outcomes (describe instrument used):** Pain: NR Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Effective rates:** Immediate post tx: 75.5% vs. 52.8%, $p < 0.05$ Nordic Pain questionnaire:, mean SD: 19.16 (11.49) vs. 23.76 (12.15) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** acu had better therapeutic effects than sham acu in pts isth cervical spondylosis.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Wang, XL (2007)[233] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 30 ds Fu duration (last assessment): immediate post-tx N screened: NR N randomized: 120 N completed tx: 120 N attended last fu: 120 **Inclusion:** diagnosed as Cervical Spondylosis according to "Chinese medicine clinical research guiding principles" **Exclusion:** NR	Mean age (SD/range): IG1 = 46.3 (NR) vs. IG2 = 49.2 (NR) yrs % of male: IG1 = 60, IG2 = 48.3% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Disc/joint disease Duration of Pain, mean (SD/range): Unknown, IG = 3.9 yrs; CG = 4.2 yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 60)– Needle retention at GV 20 for 8 hrs and electro-acu at local points: GV 20 and 4 other acupoints selected, needles inserted until "deqi" sensation reached, needle at GV20 remained for 8 hrs, other needles connected with G6805 electrical impulse device, retention time 30 min.; 1 session/d, 30 sessions total Drop outs: A = 0, B = 0 IG2 (n = 60) – Needle retention at GV 20 for 30 min. and electro-acu at local points: GV 20 retention time is 30 min. rest of tx same as IG1; same as IG1 Drop outs: A = 0, B = 0	**Outcomes (describe instrument used):** Pain: NR Disability: NA **Results:** Baseline: Pain: NR Disability: NA Immediate post tx: Pain: NR Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: Other: Cure rate; sign. Effective; effective; ineffective; total efficacy (%) **Results- mean :** Baseline: Immediate post tx: IG = 70, CG = 45; IG = 18.3, CG = 26.7; IG = 10, CG = 15; IG = 1.7, CG = 13.3; IG = 98.3, CG = 86.7 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zheng, Ling (2005)[232] Country: China Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 30 ds Fu duration (last assessment): NR N screened: not mentioned N randomized: 60 N completed tx: 60 N attended last fu: NR **Inclusion:** Diagnostic as cervical spondylopathy by ref [1]-A Chinese paper; No surgery; coronary heart disease, rheumatism etc. **Exclusion:** NR	Mean age (SD/range): IG = 52.5 (11.9) vs. CG = 51.24 (11.5) yrs % of male: NR Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Spondylosis Duration of Pain, mean (SD/range): Unknown, IG = 5.2 (3.65), CG = 4.9 (2.34) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 30)– Point-through-point acu: acupoints: fengchi through fengfu, tianzhu through jiaji, neck jiaji through transverse oscillatory rot to bottom, dashu through breast, jiaji, houxi through laogong, xuanzhong through sanyinjiao 40-100mm long needle, retention 30 min; 1 tx/d, 15 tx/course, 2 courses, 3 ds rest between courses Drop outs: A = NR, B= 0 CG (n = 30) – General acu: acupoints: fengchi, fengfu, tianzhu, neck jiaji, dashu, houxi, juegu and sanyinjiao 40-100mm long needle, retention 30 min; Same as IG Drop outs: A = NR, B= 0	**Outcomes (describe instrument used):** Pain: N of pts who has pain (binary variable- not recorded) **Results:** Baseline: Pain: --- Immediate post tx: Pain: --- Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: Well being: scoring based on Ref[1] as well: Improved = cure + better; Cure n (%) Other: **Results- mean :** Baseline: Immediate post tx: IG = 30 (100%), CG 30 (100%); IG = 19 (63.3%, CG = 8 (26.7%) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** The effects were significantly better in IG

Table 2.8 Neck Pain - Acupuncture - Unknown - Non-Specific Pain – No studies
Table 2.9 Neck Pain - Manipulation & Mobilization Therapies - Acute - Specific Pain – No studies
Table 2.10 Neck Pain - Manipulation & Mobilization - Acute - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Buhmann, J (2005)[236] Country: Germany Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: NR Fu duration (last assessment): 24 hrs post last tx N screened: 60 N randomized: 26 N completed tx: 24 N attended last fu: NR **Inclusion:** 18-80 yrs, manually diagnosed dysfunction of one or both of the segments occiput/cervical 1 and cervical 1/cervical 2 **Exclusion:** previous surgery of cervical spinal column, arthrosis of cervical spinal column, spondylolisthesis, fracture, inflammation, previous disk herniations or cervical spinal column, any kind of cancer or planned surgery in throat, neck or head region; acute painful dysfunctions in locomotor system; currently undergoing chiropractic tx	Mean age (yrs) (SD/range): IG = 44 (22), IG2 = 46 (14), CG = 49 (7) % of male: IG = 60%; IG2 = 62%; CG = 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	Region of pain: NP Cause of Pain: NR Duration of Pain, mean (SD/range): Acute/Sub-acute NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 10) – SM: thrusting force on lateral aspects of occiput or C1 exerted for < 200 msec before and after anesthesia; NR Drop outs: A = 0, B = 2 IG2 (n = 8) – Post-isometric relaxation): applied to hypertonic muscle - isometric contraction by pts against manual resistance for 10 sec then stransverse oscillatory rotped and repeated after at least 20 sec rest with increasing anti-flx/ retro-flx or later flx; before and after anesthesia NR Drop outs: See IG1 CG (n = 8) – Placebo: Laying palms of clinician on sides of pt's neck without any side-different pressure or without having pt under tension; before and after anesthesia NR Drop outs: See IG1	**Outcomes:** Disability: N of found dysfunctions in motion segments O/C1 and C1/C2- no numerical data is reported (only p values) **Results:** Baseline: Disability: IG1 = 21, IG2 = 15, CG = 13 Immediate post tx: Disability: --- Short term: NR Intermediate: NR Long term: NA	**Outcomes:** QoL/ well being: NR **Results- mean :** Immediate post tx: Short term: NR Intermediate: NR Long term: NA **Harms:** 2 WDAE in IG1- complication arising from a surgical operation **Summary:** sig effect of IG1&2 vs. placebo, in restoring function (p< 0.01) In anesthesia: IG1 vs. placebo, p < 0.01. No sig difference between IG1 & 2 (P = 0.137). The tx effect postnarcotically was further sign in IG1 vs. placebo only (P = 0.011

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Gonzalez-Iglesias, J (2009)[239] Country: Spain Quality score: 9/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: 3 wks Fu duration (last assessment): 2 & 4 wks after last tx N screened: 60 N randomized: 55 N completed tx: 55 N attended last fu: 55 **Inclusion:** 18-45 yrs of age with mechanical NP less than 1 mo duration **Exclusion:** contraindication to manipulation; history of whiplash or cervical surgery; diagnosis of cervical radiculopathy or myelopathy; fibromyalgia; spinal manipulative therapy in prior 2 mo	Mean age (SD/range): IG = 34 (4) vs. CG = 35 (6) yrs % of male: IG = 52.2%; CG = 54.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Acute, IG = 18.7 (3.9) ds, CG = 19.5 (4.5) ds Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	IG (n = 23) – Electro/thermal therapy with thoracic spine thrust manipulation: superficial thermal and electrotherapy: infrared lamp (250W) 50cm from neck applied for 15 minutes; followed by trans-cutaneous electrical nerve stimulation at 100Hz for 20 min using two 4x6cm electrodes bilaterally on each side of spinous process of C7 vertebra + seated "distraction manipulation in upward motion, 2nd manipulation applied if no popping, Max of 2 attempts; 5 electro/thermal sessions over 3 wks, 3 min. sessions Drop outs: A = 0, B = 0, C = 0 CG (n = 22) – Electro/thermal therapy: As IG; 5 sessions, 3 wks Drop outs: A = 0, B = 0, C = 0	**Outcomes:** Pain: 100 mm VAS Disability: Northwick park questionnaire **Results:** Baseline: Pain: IG = 54.7 (8.2), CG = 52.7 (5.5) Disability: IG = 27.9 (3), CG = 27 (3.1) Immediate post tx: Pain: IG = 20.2 (7.8), CG = 44.7 (5.5) Disability: IG = 15.2 (3.9), CG = 23.1 (3.2) Short term: Pain: IG = 26.4 (11.8), CG = 41.2 (6.1) Disability: IG = 14.7 (2.8), CG = 21.8 (3.3) Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Pikula, J (1999)[237] Country: Canada Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: One session Fu duration (last assessment): Immed. Post-tx N screened: 36 N randomized: 36 N completed tx: NR N attended last fu: NR **Inclusion:** 1st acute (< 2 wks)unilateral NP, no hx of trauma, neurological deficit, or previous chiropractic tx of the cervical spine **Exclusion:** Radiculitis or pain into the arm or hand, neurological deficis of he brachial plexus roots, hx of fracture/ tumour/ infection/ spondyloarthropathy, px cervical SM tx pervious neck surgery, workers' compensation or disability insurance issues, conditions potentially aggravated by electrical devices (i.e. pacemaker)	Mean age (SD/range): IG1 = 39.5 (5.92), IG2 = 42.6 (7.78), CG = 44.2 (6.98) yrs % of male: IG1 = 33%, IG2 = 8%, CG = 25% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Acute, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 12)– SM applied to painful side (ipsilateral): supine position, open hand contact 2nd finger placed adjacent to the articular pillars of the mid cervical spine. Head rotated contra laterally & slightly extended passively to max ROM. HVLA thrust applied and an audible crack was heard; one tx Drop outs: NR IG2 (n = 12)– SMT applied to opposite of painful side (contra lateral): same as IG1; As IG1 Drop outs: NR CG (n = 12) – Placebo ultrasound therapy: Transducer head applied in gradual circular movement stimulating a tx; one 8 min tx Drop outs: NR	**Outcomes (describe instrument used):** Pain: VAS 100 mm (0-100) Disability: NR **Results:** Baseline: Pain: IG1 = 42.5 (19.8), IG2 = 44.1 (27.5), CG = 50.4 (22.5) Disability: NR Immediate post tx: Pain: IG1 = 23.6 (18.6), IG2 = 41.4 (28.4), CG = 46.5 (21.8) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR CROM-cervical ROM Immediate post tx: flx: 58.8 (15.6) vs. 49.8 (14.6) vs. 46.0 (11.4) Extension: 57.3 (11.3) vs. 46.0 (12.0) vs. 48.2 (15.9) Ipsilateral rot: 612 (9.7) vs. 53.8 (9.1) vs. 49.8 (19.7) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Yurkiw, D (1996)[238] Country: Canada Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: One session Fu duration (last assessment): Immed. Post-tx N screened: NR N randomized: 14 N completed tx: 14 N attended last fu: 14 **Inclusion:** Unilateral NP of at least 3 wks duration between ages of 18 and 55 yrs **Exclusion:** individuals with any SM during previous 90 ds; severe pathology, infection or suspected of malingering	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Acute/Sub-acute, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 7)– Diversified SM: area of tx restricted to lower cervical spine, Sally one vertebral level from the 3rd-7th vertebrae inclusive; tx performed according to accepted methods described by Haldeman and also Koes et al who allowed therapy to be at the discretion of provider, although choices limited to two types of procedure described by Haldeman; 1 tx Drop outs: NR CG (n = 7) – Mechanically assisted manipulation: As IG as described by Petterson, applied in prone position with instrument at "2 ring" position, one "click" application given; 1 tx Drop outs: NR	**Outcomes:** Pain: 10 cm VAS Disability: **Results:** Baseline: Pain: IG = 32.857 (25.777), CG = 32.857 (17.874) Immediate post tx: Pain: IG = 21.857 (21.459), CG = 20.427 (18.402) Disability: Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Other: ROM with Goniometer: Right lateral flx; left lateral flx Immediate post tx: Right lateral flx IG = 34.429 (3.599), CG = 44 (8.583); left lateral flx IG = 5.843 (5.5), CG = 10.25 (5.537) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 2.11 Neck Pain - Manipulation & Mobilization - Chronic - Specific Pain – No studies

Table 2.12Neck Pain - Manipulation & Mobilization - Chronic - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Bischoff, A (2003)[243] Abstract Country: NR Quality score: 1/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 10 wks Fu duration (last assessment): Immed. Post-tx N screened: 135 N randomized: 49 N completed tx: 42 N attended last fu: 42 **Inclusion:** Chronic N-S NP **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 24)– Sham ultrasound + Osteopathic intervention: 12 min session of sham ultrasound every wk for 10 wks + test-dependent osteopathic intervention every other wk; 1 tx/wk for 10 wks Drop outs: A = 0, B = 1 CG (n = 25) – Sham ultrasound: 12 min session of sham ultrasound; 1 tx/wk for avg of 10 wks Drop outs: A = 0, B = 6	**Outcomes (describe instrument used):** Pain: Avg pain intensity-NRS (0-10) **Results:** Baseline: Pain: IG = 4.7, CG = 4.8 Immediate post tx: Pain: IG = 2.2, CG = 4 Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results- mean :** Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** On the NRS, average pain intensity decreased significantly in the osteopathic group ($p<0.0005$) but not the sham group ($p=0.09$)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Chen, L (2007)[244] Country: China Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 20 ds Fu duration (last assessment): 3 mos N screened: 75 N randomized: 70 N completed tx: 70 N attended last fu: 70 **Inclusion:** Cervicogenic headache; Disease course > 6 mo; without drug therapy in 3 mo; X-ray has positive discover **Exclusion:** Other type of headache; after neck operation; Severe osteoporosis	Mean age (SD/range): IG = 41.32 (11.27) vs. CG = 43.68 (16.63) yrs % of male: IG = 44.4%, CG = 70.6% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic (>6 mo) IG = 24.34 (6.62); CG = 18.51 (8.43) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 36) – Spinal manipulation: NR; 20-30 min/2 ds, 10 tx, Drop outs: A = 2, C = 3 CG (n = 34) – TENS: Pre-medic electrotherapy machine (German); 100 Hz, 20 min/2 ds, 10 tx Drop outs: unclear	**Outcomes:** Pain: NRS Headache frequency, and lasting time- data not shown) **Results:** Baseline: Pain: IG = 7.45 (1.22), CG = 7.86 (1.34) Immediate post tx: Pain: NR Short term: IG = 2.81 (1.15), CG = 5.26 (1.83) Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Response rate (%) Immediate post tx: 94.5% vs. 64.5%, $p < 0.05$ Short term: NR Intermediate: NR Long term: NA **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Cleland, J (2005)[242] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: One session Fu duration (last assessment): Immed. Post.tx N screened: 68 N randomized: 36 N completed tx: 36 N attended last fu: 36 **Inclusion:** 18-60 yrs with primary complaint of mechanical NP, referred by primary care physician to outPt orthopaedic physical therapy clinic **Exclusion:** red flags; pregnancy; with positive neurologic signs or symptoms suggestive of nerve root involvement, history of cervical or thoracic surgery; hypermobility of thoracic spine; prior experience with spinal manipulative techniques	Mean age (SD/range): IG = 36 (8.5) vs. CG = 35 (11.3) yrs % of male: IG = 26.3%, CG = 23.5% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S, Mechanical Duration of Pain, mean (SD/range): Unknown or mixed, IG = 12.2 (3.5) wks, CG = 13.2 (4.2) wks Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: None	**Groups** IG (n = 19)– Thoracic spine manipulation: thoracic manipulation directed to identified segmental mobility restrictions (performed in positions of thoracic spine flx and ext); 1 tx Drop outs: A = 0, B = 0 CG (n = 17) – Placebo (manipulation): stabilizing open hand placed over inferior vertebrae of pre-determined segmental restriction; when pre-manipulative position achieved, pt instructed to take deep breath and exhale, with no intervention during exhalation; As IG Drop outs: A = 0, B = 0	**Outcomes:** Pain: 100 mm VAS to assess resting pain Disability: NDI to assess perceived disability due to NP **Results:** Baseline: Pain: IG = 41.6 (17.8), CG = 47.7 (18.4) Disability: IG = 28.4 (11.9), CG = 33.6 (14.2) Immediate post tx: Pain: IG = 26.1 (17.2), CG = 4.5 (19.5) Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** no reporting of any AEs by pts (pts were instructed to contact the investigators if experiencing any AE)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Giles, LG (2003)[25,26] Country: Australia Quality score: 5/13 Initial of reviewer: SG	**Trial Design-** RCT Tx duration: Max. of 9 wks Fu duration (last assessment): 12 mos N screened: 109 N randomized: 109 N completed tx: 109 N attended last fu: 62 **Inclusion:** pts at least 17 yrs old with uncomplicated mechanical spinal pain for minimum of 13 wks - for long-term fu (> 1 yr) **Exclusion:** pts with nerve root involvement, spinal anomalies (other than sacralization/lumbarization), pathology other than mild-moderate osteroarthrosis, spondylolisthesis of L5 or S1 > Grade 1, previous spinal surgery, and leg length inequality > 9 mm with postural scoliosis.	Mean age (SD/range): IG1 = 23.8 (4.8), IG2 = 25 (8.1), CG = 29.5 (2.07) yrs % of male: IG1 = 55.9%, IG2 = 51.4%, CG = 57.5% Racial composition: NR Work status: NR Other socio-demographics: Unemployed: 29 (25.7%) Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** LBP, NP, thorax **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic (> 13 wks), NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 34)– Acu: near and far techniques as chosen by clinician; 2 tx/wk, max. of 9 wks Drop outs: B = 12 IG2 (n = 35)– Spinal manipulation: 20 min-appointments. High-velocity, low-amplitude thrust SM to a joint (as judged to be safe and usual tx by the treating chiropractor for the spinal level of involvement to mobilize the spinal joints; same as IG1 Drop outs: B = 10 CG (n = 40) – Medication that have not been tried: Celecoxib/Celebrex (200 - 400 mg/d); Rofecoxib/Vioxx (12.5 - 25 mg/d); paracetamol/acetaminophen (500 mg tablest 2-6/dup to 4 g/d); NR Drop outs: B = 18	**Outcomes:** Pain: VAS (1-100) Disability: Oswestry Back **Results:** Baseline: Pain: IG1 = 6 (2.2), IG2 = 6 (2.9), CG = 5 (3.7) Disability: IG1 = 30 (17.03), IG2 = 22 (22.96), CG = 32 (19.3) Immediate post tx: Pain: IG1 = 4 (4.4), IG2 = 5 (3.7), CG = 6 (4.4) Disability: IG1 = 26 (20.74), IG2 = 14 (24.4), CG = 32 (23.7) Long term: OBD: IG1 = 13 (22.9), IG2 = 16 (17.8), CG = 24 (25.2) VAS: IG1 = 3.9 (3.2), IG2 = 3.7 (4), CG = 3.9 (3.3)	**Outcomes:** QoL/ well being: SF-36 (higher values better) Other: **Results- mean :** Baseline: IG1 = 46 (15.6), IG2 = 57 (22.9), CG = 37 (25.2) Immediate post tx: IG1 = 53 (22.2), IG2 = 70 (38.5), CG = 57 (33.3) Short term: NR Intermediate: NR Long term: IG1 = 55 (26.7), IG2 = 77 (23.7), CG = 66 (36.3) **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Giles, LGF (1999)[122] Country: Australia Quality score: 1/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3-4 wks Fu duration (last assessment): immediate post-tx N screened: 875 N randomized: 40 N completed tx: 40 N attended last fu: 40 **Inclusion:** pts suffering from spinal pain for at least 13 wks; age of at least 18 yrs **Exclusion:** Nerve root involvements; spinal anomalities; pathology other than mild to moderate osteoarthrosis; previous spinal surgery and leg length inequality of > 9 mm with postural scoliosis	Mean age (SD/range): IG1 = 46.5 (9.6), IG2 = 42.5 (9.6), CG = 35 (14.1) yrs % of male: 35.7% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 10)– Acu: using sterile HWATO Chinese disposable acu guide tube needles 50mm long with a gauge of 0.25 mm for 20 ?; 6 tx, 3-4 wks Drop outs: NR IG2 (n = 20) – Manipulation: A high-velocity, low-amplitude SM was performed as judged to be safe; 6 tx, 3-4 wks Drop outs: NR CG (n = 10) – Medication: tenoxican (20mg/d) and ranitidine (50mg x 2/ d); 15-20 min/ appointment, 3-4 wks Drop outs: NR	**Outcomes:** Pain: VAS Disability: ODI **Results:** Baseline: Pain: IG1 = 40 (31.8), IG2 = 32 (14.8), CG = 28 (21.9) Disability: IG1 = 3.5 (5.5), IG2 = 5 (3.5), CG = 2.7 (4.8) Immediate post tx: Pain-mean change: IG1 = - 6 (14.4), IG2 = -10 (10.4), CG = 0 (10.7) Disability-mean change: IG1 = -0.5 (4.8), IG2 = -2.3 (4.8), CG = -1 (1.3) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Haas, M (2004)[245] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design-RCT- dose response study** Tx duration: 3 wks Fu duration (last assessment): 12 wks N screened: 86 N randomized: 24 N completed tx: 23 N attended last fu: 23 **Inclusion:** 18 yrs of age or older with English literacy and uncomplicated, chronic cervicogenic headache; history of at least 5 cervicogenic headaches /mo for at least 3 mo **Exclusion:** contrain-dications to SM or complicating conditions potentially related to clinical outcomes: malignancy or history of cancer, spinal infection, vertebral tumors or fracture, lumbar instability, blood dyscrasia, severe trauma within last 3 months.	Mean age (SD/range): IG1 = 38.9 (11.9) vs. IG2 = 46.6 (6) vs. IG3 = 35.4 (9.9) yrs % of male: 27% Racial composition: 82.3% White/Non-Hispanic Work status: NR Other socio-demographics: 47.3% Married Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: Physical modalities; Massage/TP therapy; hot/cold packs	**Groups** IG1 (n = 8)– SM 3 office visits + massage and other tx: HVLA SM; discretional therapy included administration of up to 2 PM from: heat and soft tissue therapy including massage and TP therapy; recommend modification of daily activity; 1 tx/wk, 3 wks Drop outs: A = 0, B = 4, C = 0 IG2 (n = 8)– Manipulation 9 office visits + massage and other tx: As IG1; 3 tx/wk, 3 wks Drop outs: NR IG3 (n = 8) – Manipulation 12 office visits + massage and other tx: As IG1; 4 tx/wk, 3 wks Drop outs: NR	**Outcomes:** Pain: headache (HA); NP (NP) Disability: Modified Von Kroff (MVK) **Results:** Immediate post tx: HA: 40.5 (15.6) vs. 31.3 (15.6) vs. 18.7 (14.5) NP: 41.9 (11.7) vs. 29.6 (15.6) vs. 22.5 (14.9) MVK- HA: 25.2 (19.7) vs. 18.3 (13.7) vs. 7.9 (10.1) MVK-NP 31.4 (17.7) vs. 22.1 (24.4) vs. 9.8 (12.1) Short term: Pain: HA: 49 (19.8) vs. 34.2 (12.3) vs. 27.9 (30.3); NP: 14.7 (8.9) vs. 11.5 (11.9) vs. 7 (9.8) MVK-HA: 39 (25.8), vs. 17.5 (16.1) vs. 14.6 (27.3) MVK- NP 33.3 (9.6) vs. 14.2 (14.1) vs. 3.7 (20.0)	**Outcomes (describe instrument used):** QoL/ well being: NR Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** no AEs were reported by pts.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Jull, G (2005)[240] Country: US Quality score: 9/13 Initial of reviewer: FY	**Trial Design-**RCT Tx duration: Fu duration (last assessment): 1 week immediately post tx; 3, 6, and 12 months post tx N screened: NR N randomized: 200 N completed tx: N attended last fu: **Inclusion:** adults 18 – 60 years with unilateral or unilateral dominant side consistent cervicogenic headaches aggravated by neck postures or movement (presence of joint tenderness as detected by manual palpation)- frequency of headache at least1/week with history of 2 months and 10 years **Exclusion:** other causes of headache; bilateral headaches; migraine; contraindication for manipulative therapy, or current involvement in third party or workers compensation	Mean age range: 36 – 37 years % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NA	Cervicogenic headaches Duration of Pain, mean (SD/range): NR Severity of pain (Grading): NR Current treatment/ co-intervention common in all groups: NR	IG (n = 51)– manual therapy: not defined Drop outs: NR IG2 (52): combined manipulative tx and exercise Drop outs: NR CG1 (49): exercise therapy Drop outs: NR CG2 (n = 48)– control: not defined Drop outs: NR	**Outcomes:** **Pain:** 1- MPQ/ PRI 2- Headache specific locus of control scale (HSLC) 3- pain produced by active cervical movements by VAS **Pain and disability:** by Northwick Park Neck Pain questionnaire **Main objective:** predictors from variables in pts demographics and headache hx of achieving 50-79% or 80-100% reduction in headache immediately post and 12 months post-tx **Results:** Lightheadedness had higher odds of achieving 50-79% reduction in headache: OR = 5.45 or 80-80% OR = 5.7 at 12 months	**Outcomes (describe instrument used):** Daily medication intake were measured at baseline (over the counter: anti-inflammatory medications in short and owe doses)—analysed as defined daily does (DDD): data NR **Harms:** NR **Summary:** no consistent pattern of prediction of successful outcomes (all demographics including age, gender, family history, pain intensity/ frequency, medication use, associated symptoms, etc)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Nilsson, N (1997)[246] Country: Denmark Quality score: 7/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3 wks Fu duration (last assessment): 3 wks N screened: 450 N randomized: 53 N completed tx: 53 N attended last fu: 53 **Inclusion:** 20-60 yrs with headache ≥ 5 ds/mo for at least 3 mo; no prior SM in cervical spine; no effect of migraine Med if tried; headache in occipital region, with or without forward radiation; aggravated by neck postures **Exclusion:** NR	Mean age (SD/range): IG = 42 vs. CG = 35 yrs % of male: IG = 46%, CG = 40% Racial composition: NR Work status: Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): IG = 48, CG = 37 Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 28) – SM: toggle recoil for upper cervical region and diversified technique for mid and lower cervical, as determined on palpation; in each technique a HVLA thrust in line of drive at end point of normal passive; 2 wk observation period, 6 sessions over 3 wks Drop outs: A = 0, B = 0 CG (n = 25) – Massage: deep friction massage, including TP, of posterior muscles of shoulder girdle, the upper thoracic & lower cervical regions, plus tx with laser light in upper cervical region; laser light added to include an upper cervical intervention; Same as IG Drop outs: A = 0, B = 1	**Outcomes (describe instrument used):** Pain: 100 mm VAS-mean intensity of daily headache **Results:** Baseline: Pain: IG = 44, CG = 41 Immediate post tx: Pain: IG = 28, CG = 36 Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Number of analgesics/d (mean): Baseline: 1.5 vs. 1.0 Immediate post tx: 0.8 vs. 0.7 Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Sloop, P (1982)[241] Country: Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT-cross over Tx duration: One session Fu duration (last assessment): 3 wks N screened: NR N randomized: 39 N completed tx: NR N attended last fu: NR **Inclusion:** 19-68 yrs with cervical spondylosis or N-S NP of at least one mo duration; no symptoms suggestive of major systemic disease; no progressive neurlogic signs and no extraneous local cause of symptoms **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: 20mg diazepam intravenously	**Groups** IG (n = 21)– Manipulation: NR; one tx session, 3 wk fu to assess outcomes Drop outs: NR CG (n = 18) – Control: NR; As IG Drop outs: NR	**Outcomes (describe instrument used):** Pain: 100 mm VAS (0-100) **Results:** Baseline: Pain: NR Immediate post tx: Pain-mean change: IG = 18.0 (31), CG = 5.0 (32), p = 0.20 Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR General effective rate (did the tx help you?) Immediate post tx: pre cross over data 21 (57%) vs. 18 (28%) responded yes, p = 0.13 Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** local tenderness at baseline was the only item associated with VAS outcome (p = 0.013)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Sterling, M (2001)[248] Country: Canada Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: one session Fu duration (last assessment): post tx N screened: NR N randomized: 30 N completed tx: NR N attended last fu: NR **Inclusion:** Pts were included if they had a history of mid to lower cervical spine pain of insidious onset, greater than 3 mo duration and were assessed by a manipulative physiotherapist as having symptoms primarily originating from the C5/6 segment. **Exclusion:** a history of trauma or surgery to the cervical spine; evidence of referred arm pain or radiculopathy; headache, dizziness or other upper cervical spine symptoms; diabetes or peripheral vascular disease	Mean age (SD/range): 35.77 (14.92) yrs (total) % of male: IG = 47%, CG1 = 53%, CG2 = NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 10)– Spinal Mob: SMT tx (passive Mob) condition, researcher applied a grade III postero-anterior technique to the articular pillar of C5/6 on the subject's symptomatic side (Maitland 1986); one time in a crossover design Drop outs: NR CG1 (n = 10) – Placebo SM: Manual contact was applied over the articular pillar of C5/6 on the symptomatic side but with no movement of the vertebral segment; as IG Drop outs: NR CG2 (n = 10) – Control: no physical contact (no tx); as IG Drop outs: NR	**Outcomes (describe instrument used):** Pain: Pressure pain threshold (PPT); resting pain (VAS)- result of post hoc analysis reported as comparison if IG vs. CG1 or IG vs. CG2 Disability: NR **Results:** Immediate post tx: Pain at rest: IG vs. CG1 0.091 ; IG vs. CG2 0.044 Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Other: EMG activity (data not shown) Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Whittingham, W (2001)[247] Country: Australia Quality score: 8/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: 3 wks Fu duration (last assessment): cross over deign- data pre- crossover is shown N screened: NR N randomized: 105 N completed tx: 105 N attended last fu: 105 **Inclusion:** 16 yrs or older cervicogenic headache with 4 or more ds of headache in 1 mo for more than 6 mo; headache in occipital region, with/without forward projection; headache provoked by neck movements or positions or sub-occipital manual pressure **Exclusion:** NR -	Mean age (SD/range): 39.4 (12.5) yrs % of male: 40.8% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 55)– Manipulation: manipulation to the cervical spine: single toggle-coil thrust (a short-lever, high-velocity technique) to C1 or C2 as indicated; 3 tx/wk for 3 wks Drop outs: E = 3 CG (n = 50) – Sham manipulation: sham manipulation as IG delivered with deactivated Pettibon instrument; 3 tx/wk for 3 wks Drop outs: NR	**Outcomes (describe instrument used):** Pain: NR Disability: NR **Results:** Immediate post tx: (3 wks) Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: Active cervical ROM: Immediate post tx (3 wks): right rot: 57 (1.4) vs. 56 (1.6) Left rot: 55 (1.4) vs. 54 (1.6) Right lateral flextion:37 (1.2) vs. 39 (1.3) Left lateral flextion: 36 (1.4) vs. 38 (1.1) degress Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 2.13 Neck Pain - Manipulation & Mobilization – Mixed - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Coppieters, M (2003)[250] Country: Belgium Quality score: 5/13 Initial of reviewer: SG	**Trial Design**RCT- Tx duration: NR Fu duration (last assessment): NR N screened: 20 N randomized: 20 N completed tx: NR N attended last fu: NR **Inclusion:** Sub-acute (2 wks-6 mo) unilateral (15) or bilateral (5) peripheral neurogenic cervicobrachial pain, presence of a cervical segmental motion restriction related to a neurogenic disorder, adverse response to neural tissue provocation testing, painful nerve trunk palpation, or signs of a local musculoskeletal dysfunction such as cervical segmental motion restriction **Exclusion:** Neurogenic disorders, such as diabetic neuropathy, that are not amenable to manipulative therapy management	Mean age (SD/range): IG = 49.1 (14.1) vs. CG = 46.6 (12.1) yrs % of male: IG = 20%; CG = 0.2% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Brachial or Cervicobrachial neurogenic pain **Cause of Pain:** NR Duration of Pain, mean (SD/range): Mixed, IG = 2.7 mo, CG = 3.2 mo Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 10)**–** Experimental Mob: Cervical contralateral lateral glide Mob technique applied at 1 or more motion segments (C5-T1) with pt in supine position, most frequent treated spinal levels were C5, C6 and C7 at low frequency; NR Drop outs: NR CG (n = 10) – Control-Ultrasound: Pulsed ultrasound applied over the most painful area; applied for 5 min, dose of 0.5 W/cm², sonation time 20%, size of tx head 5 cm², freq. 1 MHz, sonopulse 590; NR Drop outs: NR	**Outcomes:** Pain: Pain intensity **Results:** Immediate post tx: Pain: 5.8 (2.1) vs. 7.4 (1.8) Short term: NR Intermediate: NR Long term: NA	**Outcomes:** QoL/ well being: NR Range of Motion (ROM) Baseline: 137.3 (15.4) vs. 130.2 (14.7) Immediate post tx: 156.7 (10.7) vs. 130.7 (16.0) Short term: NR Intermediate: NR Long term: NA **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Fernandez-de-las-Penas, C (2004)[249] Country: Spain Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 3 wks Fu duration (last assessment): immediately post-tx N screened: 88 N randomized: 88 N completed tx: NR N attended last fu: NR **Inclusion:** Suffering from neck and head pain due to whiplash injury of less than 3 mo and classified in grades II and III **Exclusion:** Whiplash injury since 3 mo ago, previous whiplash injury before the study, articular instability, and degenerative cervical alteration	Mean age (SD/range): 31.2 yrs total % of male: 45% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** Head and Neck **Cause of Pain:** Whiplash Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 44)– Dorsal manipulation + PT: active EXs, electro-therapy, ultrasound and manual therapy. Dorsal manipulation was performed once at the 5th and 10th sessions. Manual therapy was applied as HVLA technique. A cracking or popping sound accompanied the manipulation; 5 tx/wk, 15 tx, 3 wks Drop outs: NR CG (n = 44) – Physiotherapy: active EXs, electro-therapy, ultrasound and manual therapy, ultrasound in soft tissues of neck region, active EXs at home, muscle stretching and multimodal therapy; As IG Drop outs: NR	**Outcomes (describe instrument used):** Pain: VAS (0-100) **Results:** Immediate post tx: Pain reduction one wk after 1st dorsal manipulation cervical pain: 54 vs. 39; TP 143 vs. 32; head pain: NR After 2nd manipulation: cervical pain: 100 vs. 73; TP 238 vs. 59 head pain Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Dorsal manipulation favors the clinical improvement in whiplash pts. IG had more reduction of symptoms than the CG

Table 2.14 Neck Pain - Manipulation & Mobilization - Mixed - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Brodin (1983)[259] Country: Sweden Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): NR N screened: NR N randomized: 63 N completed tx: 55 N attended last fu: NR **Inclusion:** between 27-60 yrs of age; condition suitable for manual therapy (i.e. possible by means of manual technique to observe restricted movement in pain-producing segment) **Exclusion:** pain from segments with normal or increased mobility	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 23)– Medication: Premaspin 1.5 g + 0.5 g + 0.5 g daily for 3 wks Drop outs: NR CG1 (n = 17) – Information, Med + sham therapy: as IG + information on anatomy of cervical spine and patho-physiology, biomechanical problems and relaxation, related to practical problems + superficial massage, electric stimulation and slight relaxing traction; 3 hrs instruction, 3 tx/wk for 3 wks Drop outs: A = 8 CG2 (n = 23) – Information, Med + Manual Mob: CG1 + mobilizing technique comprised of passive movements directed to actual mobile segments; as CG1 Drop outs: NR	**Outcomes (describe instrument used):** Pain: VAS Disability: NR **Results:** Immediate post tx: Pain: NR Disability: NR Short term, one wk post tx: pts with no pain: j2 (22%) vs. 2 (12%) vs. 11 (48% Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: NR Increased mobility at the final tx: < 30 degrees: 16/23 vs. 11 vs. 17 vs. 8/23 > 30 degrees 7/23 vs. 6/17 vs. 15/23 Short term: NR Intermediate: NR Long term: NA **Harms:** pts with increased pain 5 (22%) vs. 2 (12%) vs. 1 (4%) In total, 16% of pts had some discomfort

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Cassidy, J (1992)[252] Country: Canada Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: one session Fu duration (last assessment): immed. Post-tx N screened: NR N randomized: 100 N completed tx: 100 N attended last fu: 100 **Inclusion:** outPts suffering from unilateral mechanical NP with radiation into the trapezius muscle; pain aggravated by movement and local cervcial paraspinal tenderness **Exclusion:** NR	Mean age (SD/range): IG = 34.5 (13) vs. CG = 37.7 (12.5) yrs % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: History of NP, n = 78; Involved in car accident, n = 31; other minor trauma to neck, n = 28 Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S, 100% with radiating pain Duration of Pain, mean (SD/range): Mixed Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 52)– Manipulation: contacting third finger over articular pillar on painful side of neck at level of tenderness and passively rotating neck away from painful side as far as possible; then applying a high-velocity, low-amplitude thrust in the same direction; one session Drop outs: A = 0, B = 0 CG (n = 48) – Mobilization: application of muscle energy technique (Bourdillon Day) to hypertonic muscles responsible for restricting joint movement, pt instructed to push against manual resistance, localized force to involved levels; isometric contraction held for 5 sec, repeated 4 times with increasing rot or lateral flx of the neck; As IG Drop outs: A = 0, B = 0	**Outcomes:** Pain: NRS (0-100) **Results:** Baseline: Pain: IG = 37.7 (25.9), CG = 31 (19.9) Immediate post tx: Pain: IG = 20.4 (21.2), CG = 20.5 (21) Short term: NR Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: NR Range of motion (ROM): Immediate post tx flx: 61.0 (10.1) vs. 59.6 (14.0) ext: 59.9 (11.0) vs. 54.7 (14.6) gain scores for all ROM data was NSly differenet between groups Short term: NR Intermediate: NR Long term: NA **Harms:** No complications repported

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Cleland JA (2007)[256] Country: US Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: NR Fu duration (last assessment): 3 mos N screened: 104 N randomized: 60 N completed tx: 60 N attended last fu: 60 **Inclusion:** Subjects aged 18-60 yrs with primary complaint of NP, and baseline NDI ≥ 10% **Exclusion:** Medical signs suggestive of non-musculoskeletal etiology, history of whiplash injury within 6 wks, spinal stenosis, CNS involvement, nerve root compression, previous cervico-thoracic surgery, or pending legal action	Mean age (SD/range): IG = 43.8 (11.5) vs. CG = 42.7 (13.9) yrs % of male: IG = 40%; CG = 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Mixed, IG = 55 (46) ds; CG = 56 (27.6) ds Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: N (%) NSAIDs: IG = 8 (27), CG = 16 (53); Pain meds IG = 2 (7), CG = 9 (30), muscle relaxant IG = 2 (7), CG = 3 (10)	**Groups** IG (n = 30) **–** Manipulation/ Mobilization with thrust: Pts received thrust M/M targeting the upper (T1 and T4) and middle (T5 and T8) thoracic spine; advice for EX; neck and head rot to both sides alternatively; advice for EX; neck and head rot to both sides alternatively**;** 3 min/session Drop outs: 0 CG (n = 30) – M/M without thrust: Prone position; 30-sec bout of grade 3-4 central posterior anterior-non thrust M/M at the T1 spinous process as described by Maitland et al; same technique applied to T2 and up to T6; advice for EX; neck and head rot to both sides alternatively; As IG Drop outs: 0	**Outcomes:** Pain: Numeric Pain Rating Scale Disability: Neck Disability Index **Results:** Baseline: Pain: IG = 4.5 (2.1), CG = 5.3 (1.4) Disability: IG = 29.6 (12.6), CG = 33.5 (11.2) Short term: Pain: IG = 3.9 (2.2), CG = 2.7 (1.4) Disability: IG = 24.0 (13.4), CG = 18.0 (10.9) Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** Aggravation of symptoms (n = 10); Muscle spasm (n = 2); Neck stiffness (n = 2); Headache (n = 3); Radiating symptoms (n = 2)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Haas, M (2003)[254] (phase 4 diagnostic trial) Country: US Quality score: 8/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: One session Fu duration (last assessment): 3 mos N screened: 108 N randomized: 104 N completed tx: 99 N attended last fu: 99 **Inclusion:** 18 yrs and older with min. pain level of 10 on 100mm VAS who had not received cervical manipulation in preceding 48 hrs **Exclusion:** cancer, blood dyscrasias, severe osteopenia, severe trauma or fracture, disc herniation or cervical radiculopathy, signs of vertebrobasilar insufficiency	Mean age (SD/range): IG = 42.2 (12.9) vs. CG = 42.9 (14.4) yrs % of male: IG = 41%, CG = 33% Racial composition: 92% White Work status: NR Other socio-demographics: NR Co morbidities: Prior episode of pain if acute: NA Prior CAM intervention: Prior surgery related to current complaint: NR	**Region of pain:** LBP, NP, thorax **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Mixed, > 30: IG = 51%, CG = 63% Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 47)– Manipulation: supine high-velocity, low-amplitude manipulation of cervical spine targeted to individual cervical vertebrae according to whether cervical endplay restriction noted by examining clinician; 1 tx Drop outs: A = 0, B = 0 CG (n = 52) – Control: manipulation according to sham endplay findings generated by a computer algorithm; 1 tx Drop outs: A = 0, B = 0	**Outcomes:** Pain: VAS for NP (100 mm)- 11-pt NRS Disability: 100 mm VAS-11-pt NRS **Results-**Baseline: Pain: IG = 42.3 (16.5), CG = 40.4 (20.9) Disability: IG = 44.5 (17.7), CG = 43.9 (20.4) Immediate post tx: Pain: IG = 26.6 (20.2), CG = 24.7 (19.5) Disability: IG = 26 (20.2), CG = 24.4 (19.4) Short term: Pain: IG = 31.9 (20.3), CG = 28.7 (19.6) Disability: IG = 34.6 (18.5), CG = 30.2 (22.3) Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** immediate pain exacerbation for examination-based SM was no different from that for computer-generated indication for SM (odds ratio, 1.05; 95% CI, 0.36–3.04; P 0.932).

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Hurwitz, E (2002)[251] Country: Korea Quality score: 7/13 Initial of reviewer: SG	**Trial Design** RCT- Tx duration: NR Fu duration (last assessment): 6 mos N screened: 1848 N randomized: 336 N completed tx: NR N attended last fu: NR **Inclusion:** 18-70 yrs belonging to a health maintenance organization, seeking care between Feb 9/98- June 30/00 presenting with NP, and not having received tx for NP in past mo **Exclusion:** NP due to fracture, tumor, infection, severe spondyloarthropathy, or other nonmechanical cause; progressive neurological deficit, myelopathy, herniated nucleus pulposus or severe incapacitating pain;	Mean age (SD/range): IG = 45.7 (11.8) vs. CG = 45.7 (12.2) yrs % of male: 31% Racial composition: 61.95% White Work status: 7.75% Unemployed Other socio-demographics: 65.6% Married Co morbidities: Head-ache, arm pain, arm numb Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** NR Duration of Pain, mean (SD/range): Unknown (mix) Severity of pain (Grading): NDI scores <5, >20 Current tx/ co-intervention common in all groups: Information about posture and body mechanics	**Groups** IG (n = 171) **–** Manipulation: at least one controlled dynamic thrust applied with high-velocity and low-amplitude force with minimal ext and rot directed at one or more restricted upper thoracic or cervical spine joint segments; with or without heat, with or without electrical muscle stimulation 4 wks Drop outs: NR CG (n = 165) – Mobilization: one or more low velocity, variable amplitude movements applied witin the passive ROM directed to 1 or ore restricted upper thoracic or cervical spine joint segments; with or without heat, with or without electrical muscle stimulation ; 4 wks Drop outs: NR	**Outcomes:** Pain: NRS Disability: NDI (0-50) **Results-**Baseline: Pain: IG = 6.4 (2.1), CG = 6.6 (2.1); IG = 4.7 (1.9), CG = 4.8 (1.9) Disability: IG = 13.1 (6.2), CG = 13.3 (6.3) Immediate post tx: Average pain: 0.97 ((95% CI: 0.77, 1.23) NDI: 1.05 (95% CI: 0.82, 1.35) Short term: Average pain: 0.93 (95% CI: 0.81, 1.17) NDI: 0.99 (95% CI: 0.79, 1.24) Intermediate: Average pain: 0.92 (95% CI: 0.74, 1.15) NDI: 0.85 (95% CI: 0.66, 1.08) Long term: NA	**Outcomes:** QoL/ well being: SF-36 physical function (all grps); SF-36 physical role (all grps) **Results- mean :** Baseline: 78.5 (20.57); 56.9 (38.57) Immediate post tx: Short term: NR Intermediate: NR Long term: NA **Harms:** pts in IG were more likely to experience transient AEs druign the initial 4 wks : 16% vs. 8.7%, p = 0.051

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Kanlayanaphotporn, R (2009)[258] Country: Thailand Quality score: 11/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: one session Fu duration (last assessment): immed. Post-tx N screened: 84 N randomized: 60 N completed tx: 60 N attended last fu: 60 **Inclusion:** mechanical NP, unilaterally distributed for at least 1-wk duration; symptoms primarily confined to area between superior nuchal line and tip of first thoracic spinous process and provoked by neck movements or by sustained neck postures; NP at rest > 20 on 100mm VAS **Exclusion:** contraindications to Mob; trauma/fracture of cervical spine; cervical spine surgery; SMwithin past mo; positive neurological examination	Mean age (SD/range): IG = 39.7 (10) vs. CG = 44.8 (13.6) yrs % of male: IG = 43.3%, CG = 36.7% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Mix, IG = 804.3 (149.4) ds; CG = 999.6 (182.5) ds Severity of pain (Grading): IG = 22.9 (10), CG = 26.5 (10) Current tx/ co-intervention common in all groups:	**Groups** IG (n = 30)– Ipsi-lateral uni-lateral postero-anterior Mob: over zygapophysial joint of cervical spine, on the side of the symptoms (ipsilateral); one tx Drop outs: A = 0, B = 0 CG (n = 30) – Random Mob: one of the following three Mob techniques that could be applied in a clinic as a placebo intervention: 1) central posteroanterior (PA) Mob; 2) ipsilateral unilateral PA; 3) contralateral unilateral PA pressure; one tx Drop outs: A = 0, B = 0	**Outcomes:** Pain: 100 mm VAS as rest; 100 mm VAS at most painful movement **Results:** Baseline: Pain: IG = 47.4 (15.9), CG = 48.3 (22.2); IG = 59.5 (16.6), CG = 61.6 (23) Immediate post tx: Pain-mean change: IG = 10.8 (11.4), CG = 12.3 (12.5); IG = 16.7 (17.6), CG = 16.9 (16) Short term: NR Intermediate: NR Long term: NR	QoL/ well being: GPE-immediately post tx:Completely recovered: 2/30 vs. 2/30 Immediate post tx: Cervical ROM, changre from baseline (degree): Flextion: 1.9 (4.1) vs. -0.7 (4.5) Extension: 1.8 (6.3) vs. 0.8 (4.6) On most painful movement: 2.7 (5.5) vs. 1.4 (4.3) Short term: NR Intermediate: NR Long term: NA **Harms:** No AE as result of Mob was reported.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Martinez-Segura, R (2006)[253] Country: Spain Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: One session Fu duration (last assessment): Immed. Post-tx N screened: NR N randomized: 71 N completed tx: 71 N attended last fu: 71 **Inclusion:** age >/= 18 yrs; mechanical NP >/= 1 mo in duration referred by primary care physician **Exclusion:** contraindication to manipulation; fibromyalgia; whiplash injury history; history of cervical spine surgery; diagnosis of cervical radiculopathy or myelopathy; SM tx within one mo prior to study; positive result in ext-rot test	Mean age (SD/range): IG = 35 (10) vs. CG = 39 (10) yrs % of male: IG = 38.2%, CG = 35.1% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP **Cause of Pain:** Duration of Pain, mean (SD/range): Mixed, IG = 4 (3.4) wks, CG = 4.5 (4.6) wks Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 34)– Cervical HVLA: directed at dysfunctional level, with Pt supine with cervical spine in neutral position, HVLA thrust directed upwards, S cracking/popping sound accompanied all manipulations; 1 tx Drop outs: NR CG (n = 37) – Control (manual Mob): Pt supine with cervical spine in neutral position, held for 30 sec without additional tension and HVLA thrust, side of manual contact was randomized; 1 tx Drop outs: NR	**Outcomes (describe instrument used):** Pain: VAS NP at rest (0-100 cm) **Results:** Baseline: Pain: IG = 5.7 (1.5), CG = 5.5 (1.7) Immediate post tx: Pain: IG = 2.2 (1.5), CG = 5.1 (1.9) Improvement of pain (pre-post IG vs. pre-post CG): 3.5 (3.9, 3.1) vs. 0.4 (95% CI: 0.5, 0.2) Short term: NR Intermediate: NR Long term: NR	QoL/ well being: NR Improvement of ROM (pre-post IG vs. pre-post CG): Immediate post tx: flx 7.0 (95% CI: 9.0, 5.0) vs. 1.5 (95% CI: 2.4, 0.7) Short term: NR Intermediate: NR Long term: NR **Harms:** NR -tive association between the improvement in NP at rest & improvement on each ROM: flx (r = -0.6, P < .001), ext (r = -0.6, P P< .001) [less pain with better ROM]

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Strunk, R (2007)[257] Country: U.S Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 2 wks Fu duration (last assessment): Post-tx N screened: 12 N randomized: 6 N completed tx: 6 N attended last fu: 5 **Inclusion:** Pts 20-65 yrs with primary complaint of mechanical NP for at least 4 wks. Pts who had secondary complaint of headache as long as their primary complaint was NP **Exclusion:** NP resulted from inflammatory joint disease, infection, tumor, fracture; comorbid disease that would contraindicate HVLA SM; currently receiving tx of NP by other health care providers; previous history of stroke, diagnosis of a bleeding disorder or currently undergoing anti-coagulation tx	Mean age (SD/range): IG = 42 (12) vs. CG = 54 (10) yrs % of male: IG = 0, CG = 16.7% Racial composition: 100% White/Non-Hispanic Work status: NR Other socio-demographics: 50% Married Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Mechanical Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): ptw with grade 3 or 4 on Quebec Task Force classification system were excluded Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 3)– Cervical spine HVLA SM: pts received HVLA SM to C0 through C7 vertebral levels at the discretion of the doctor; 4 tx sessions over 2 wks Drop outs: 0 CG (n = 3) – Combined therapeutic approach: Pts received HVLA SM to T1 through T12 vertebral levels and the sacroiliac joints at discretion of doctor. Muscle energy technique administered according to Lewit procedure, 2 sets of 3 reps; Same as IG Drop outs: 1	**Outcomes:** Median (range) Pain: VAS (0-100 mm) Disability: NDI (0-100) **Results:** Baseline: Pain: IG = 35.0 (12-34), CG = 29.0 (27-50) Disability: IG = 34.0 (12-34), CG = 24.0 (20-38) Immediate post tx: Pain: outcome by pts- data not shown Disability: outcome by pts- data not shown Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** Two indicated they experienced discomfort or an unpleasant reaction from study tx in post-tx response questionnaire

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Vernon, H (1990)[255] Country: Canada Quality score: 6/13 Initial of reviewer: SG	**Trial Design-** RCT Tx duration: One session Fu duration (last assessment): imm. Post-tx N screened: NR N randomized: 9 N completed tx: 9 N attended last fu: 9 **Inclusion:** Mechanical NP **Exclusion:** NR	Mean age (SD/range): 32.5 yrs % of male: 66.7% (total sample) Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Mixed, 2 wks-8 yrs [range] Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 5)– Rotational manipulation: high velocity, low amplitude thrust; one tx Drop outs: A = 0, B = 0 CG (n = 4) – Rotational Mob (sham): with gentle oscillations into the elastic barrier; one tx Drop outs: A = 0, B = 0	**Outcomes (describe instrument used):** Pain: Pessure pain threshold by a PPT meter, kg/cm² - avg for 4 tender pts **Results:** Baseline: Pain: IG = 3.375; CG = 2.45 Immediate post tx: Pain: IG = 4.95; CG = 2.525 Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary of results (if provided):** mean age males: 27 yrs; mean age females 38 yrs

Table 2.15 Neck Pain - Manipulation & Mobilization - Unknown - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Cilliers, K (1998)[260] Country: South Africa Quality score: 3/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: 4 wks Fu duration (last assessment): 1 mos N screened: NR N randomized: 30 N completed tx: 30 N attended last fu: 30 **Inclusion:** 14 yrs of age or older with diagnosis of cervical facet syndrome; physically fit individuals with a cause of NP related to cervical facet syndrome **Exclusion:** organic cause of cervical pain or who had surgery on cervical spine; positive Wallenberg test	Mean age (SD/range): IG = 33 vs. CG = 29.3 yrs % of male: IG = 53.3%; CG = 26.6% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Facet joint syndrome Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: Pts were requested to not take any Med or other tx that may have influenced outcome of the study	IG (n = 15) – Transverse oscillatory rot segment adjustment: of the fixation into the restriction of motion; fixated segment determined by Kemp's test, motion palpation findings and local tenderness; only the most restricted fixation was adjusted; adjustment used a HVLA thrust using S contacts and line of drive; only cervical rotary adjustments were used; adjustment was preceded by 5 min of massage with oil; 8 tx over 4 wks Drop outs: NR CG (n = 15) – Transverse oscillatory rot and bottom segment adjustment: of the fixation into the restriction of motion, and the bottom segment in the opposite direction; adjustment as IG, also preceded by 5 min of massage with oil; As IG Drop outs: NR	**Outcomes:** Pain: SF-MPQ Disability: NR No numeric data is reported-both grps improved sign. From baseline **Results:** Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR ROM: no numerica data is reported (IG vs. CG p< 0.05 for forward flx at mo fu) Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR Summary: bothe approaches to adjusting the cervical spine were effective in treating facet syndrome. IG2 was slightly more effective than IG1

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Egwu (2008)[261] Country: Nigeria Quality score: 1/13 Initial of reviewer: SG	**Trial Design-RCT** Tx duration: Max.4 wks Fu duration (last assessment): post tx N screened: NR N randomized: 96 N completed tx: 96 N attended last fu: NR **Inclusion:** Diagnosis of cervical spondylosis referred for manipulative therapy; severe NP, unilaterally distributed relative to the midline of the neck; positive skin rolling test; no previous manual therapy, onset within 6 wks of entry to study; no history of vertebro-basilar insufficiency; 40- 50 yrs old **Exclusion:** NR	Mean age (SD/range): IG1 = 43.9 (2.2), IG2 = 45.8 (3.23), IG3 = 42.7 (2.9), IG4 = 44.8 (3) yrs % of male: 100% Racial composition: 100% African Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NA Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical Spondylosis Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 24) – Posterior-anterior-unilateral pressure: NR; 3 tx/wk until cured – up to 4 wks Drop outs: 0 IG2 (n = 24) – Antero-posterior-unilateral pressure: NR; Same as IG1 Drop outs: 0 IG3 (n = 24) – Cervical oscillatory rot: NR; Same as IG1 Drop outs: 0 IG4 (n = 24) – Transverse oscillatory pressure: NR; Same as IG1 Drop outs: 0	**Outcomes:** Pain: N of pts reporting 100% pain free immediately Immediate post tx: Pain: IG1 = 11 (46%), IG2 = 15 (63%), IG3 = 4 (17%), IG4 = 6 (25%) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Short term: Number of pts returning for tx after 3 mos. IG12= 0; IG 3 3 (12%), IG4 2 (8%) Intermediate: NR Long term: NR **Harms:** none of the pts reported worse pain

Table 2.16 Neck Pain - Manipulation & Mobilization - Unknown - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Cleland, J (2004)[262] Abstract Country: US Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: One session Fu duration (last assessment): NR N screened: 68 N randomized: 68 N completed tx: NR N attended last fu: NR **Inclusion:** 18-60 yrs of age with complain of mechanical NP **Exclusion:** NR	Mean age (SD/range): NR % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 34) – Thoracic spine manipulation: treating clinician performed a segmental evaluation of thoracic spine and then performed a thoracic spine manipulation to identified segmental restriction; one tx Drop outs: NR CG (n = 34) – Placebo: NR; one tx Drop outs: NR	**Outcomes (describe instrument used):** Pain: VAS (0 – 100) **Results:** Immediate post tx: Pain-mean change (reduction in pain): IG = -15.5 (95% CI: 11.8, 19.2), CG = -4.2 (95% CI: 1.9, 6.6), $p < 0.001$ Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Other: **Results- mean :** Baseline: NA Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Krauss, J (2008)[264] Country: US Quality score: 9/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: One session Fu duration (last assessment): post tx N screened: 32 N randomized: 32 N completed tx: 32 N attended last fu: 32 **Inclusion:** 19 to 50 yrs with complaints of non-traumatic posterior mid-cervical pain of insidious onset in region of fourth to seventh cervical vertebral levels and aggravated with active cervical rot **Exclusion:** symptoms originating from thoracic spine, systemic disease or autoimmune disease affecting musculoskeletal system, positive radicular signs, myelopathy or previous surgery to cervical spine	Mean age (SD/range): IG = 35 (10.51) vs. CG = 34.2 (9.56) yrs % of male: IG = 14%; CG = 30% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**IG (n = 22) –** Translatoric SM**:** using short straight-lined high and low velocity movements directed parallel to or at a right angle to spinal joint surfaces; Sally a bilateral translatoric facet joint traction manipulation to hypomobile UT intervertebral segments, a short passive linear movement perforemed in a dorsal direction perpendicular to plane of facet joints and parallel to plane or UT intervertebral disc joints at each level; one tx Drop outs: A = 0, B = 0 **CG (n = 10)** – No tx: no intervention to minimize N-S effects of sham tx but remained seated on tx table for approx. the same amount of time it would take for TSM to be performed; As IG Drop outs: A = 0, B = 0	**Outcomes:** Pain: Faces pain scale to assess pain at end range of active cervical rot: right direction; left direction **Results:** Baseline: Pain: IG = 2.8 (2.7), CG = 2.8 (1.8); IG = 3.7 (2.7), CG = 2.5 (2.8) Immediate post tx change from baseline: right rot, 1.5 (2.88) vs. -1.0 (0.23) left rot: 0.69 (1.03) vs. 0.67 (1.2) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** sign. Between group differences in riht rot only

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Metcalfe, S (2006)[266] Country: Canada Quality score: 4/13 Initial of reviewer: SG	**Trial Design-** RCT Tx duration: One session Fu duration (last assessment): NR N screened: NR N randomized: 67 N completed tx: 67 N attended last fu: 67 **Inclusion:** with NP or headaches **Exclusion:** non-cervicogenic NP or headaches, over 65 yrs had previous neck surgery, unable to achieve adequate ROM for strength test position (80° rot) or displayed radicular signs such as loss of reflexes, decreased sensation or fatigable weakness, if strength testing limited by pain or the result of strength testing was 66 pounds	Mean age (SD/range): 37 (11) yrs (total) % of male: 23.9% (total) Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Unknown Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 41) – Manipulation: low amplitude, high-velocity thrusts with a primary movement of side bending to dysfunctional segments in upper (c0-c2) and lower (c2-c7) cervical spine; lower cervical dysfunctional segments received linear thrust along tri-planar motion in direction of restricted movement; 1 tx Drop outs: A = 0, B = 0 CG (n = 26) – Manipulation: manipulation to dysfunctional segments of lower cervical spine only; 1 tx Drop outs: A = 0, B = 0	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Mean strength (pounds): Immediate post tx: predicted weak: 19.6 (6.5) vs. 15.5 (6.4) predicted strong: 18.8 (5.4) vs. 15.8 (6.3) Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Parkin-Smith, G (1998)[265] Country: South Africa Quality score: 6/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 3 wks Fu duration (last assessment): Immed. Post-tx N screened: 30 N randomized: 30 N completed tx: 30 N attended last fu: 30 **Inclusion:** Mechanical NP without neurological or vascular deficit, unilateral or bilateral, possible discomfort with joint challenge/pressure, restriction of movement of at least one motion segment identified by motion palpation, between 16-60 yrs old, exhibit a negative Wallenberg's test **Exclusion:** Radiculopathy, contraindications to SM, history of cardiovascular disease, hypertension or dizziness, received manual therapy for at least 2 wks prior to study	Mean age (SD/range): IG = 33.8 vs. CG = 37 yrs % of male: IG = 54%, CG = 71% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: no Med was allowed during the study	**Groups** IG (n = 13) – Cervical SM: most fixated segment(s) were manipulated (no more than 2). Chiropractic adjustments were applied; S manipulative techniques were selected and given in the form of cervical breaks, combination movements, crossed bilateral ransvers pisiform, and anterior thoracic techniques. If required, pts received brief (no more than 20-30 min) of non-therapeutic pre-manipulative soft-tissue massage of cervical spine for muscle spasm; 2 tx/wk for 3 wks Drop outs: NR CG (n = 17) – Cervical and upper thoracic SM: most fixated cervical and thoracic segments were manipulated, not extending below T7; As IG Drop outs: NR	**Outcomes:** Pain: NPRS-101 (0-100) Disability: CMCC NDI (0-100) **Results:** Baseline: Pain: IG = 33.89 (12.47), CG = 33 (13.99) Disability: IG = 18.24 (9.66), CG = 17.64 (8.17) Immediate post tx: Pain: IG = 17.17 (18.41), CG = 13.18 (10.56) Disability: IG = 6.89 (8.17), CG = 4.71 (5.74) Short term: NR Intermediate: NR Long term: NA	**Outcomes (describe instrument used):** QoL/ well being: NR ROM, mean change from baseline: Immediate post tx: Flexion: 3.71 (3.9) vs. 1.4 (1.8) Extension: 2.7 (3.9) vs. 1.7 (2.8) Right lateral flx: 2.0 (3.2) vs. 2.6 (2.6) Right rot: 2.6 (3.2) vs. 3.5 (3.3) Left rot: 1.8 (3.6) vs. 3.6 (5.2) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** two tx were not different

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Van Schalkwyk, R (2000)[263] Country: South Africa Quality score: 1/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 4 wks Fu duration (last assessment): 3 mos N screened: NR N randomized: 30 N completed tx: 30 N attended last fu: 30 **Inclusion:** over 15 yrs of age with mechanical NP with lateral flx fixations in cervical spine, literate **Exclusion:** pathologic condition or disease; contraindications to manipulation, no form of analgesic or anti-inflammatory before or during tx	Mean age (SD/range): IG = 31.7 vs. CG = 27.7 yrs % of male: IG = 80%, CG = 53.3% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 15)– Manipulation on ipsilateral side: supine cervical rotary break manipulation with contact taken on ipsilateral side of lateral flx fixation; 10 tx over 4 wks Drop outs: NR CG (n = 15) – Manipulation on contralateral side: supine lateral break manipulation on contralateral side of lateral flx fixation; As IG Drop outs: NR	**Outcomes:** Pain: NPRS-level of pain intensity; SF-McGill-quality of pain Disability: CMCC (CANadian Memorial Chiropractic Colledge) NDI **Results-** Immediate post tx: Pain: IG = 9.4 (5.47), CG = 17.54 (12.47); IG = 4.27 (8.17), CG = 7.48 (13.47) Disability: IG = 6 (5.74), CG = 6.13 (18.41) Short term: Pain: IG = 11.83 (11.8), CG = 18.52 (14); IG = 6.18 (5.8), CG = 9.08 (10.7) Disability: IG = 6 (6.8), CG = 6.13 (8) Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NA Cervical ROM Immediate post tx, Flexion: 60.8 (12.9) vs. 60.9 (11.67) Extension: 53.4 (13.6) vs. 54.8 (12.2) Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** both txs were effective but there was no sign. Difference between the grps

Table 2.17 Neck Pain- Spinal Mobilization- Acute – Specific Pain – No studies
Table 2.18 Neck Pain- Spinal Mobilization- Acute – Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Buchmann, J (2005)[236] Country: Germany Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT- Tx duration: NR Fu duration (last assessment): 24 hrs post last tx N screened: 60 N randomized: 26 N completed tx: 24 N attended last fu: NR **Inclusion:** 18-80 yrs, manually diagnosed dysfunction of one or both of the segments occiput/cervical 1 and cervical 1/cervical 2 **Exclusion:** previous surgery of cervical spinal column, arthrosis of cervical spinal column, spondylolisthesis, fracture, inflammation, previous disk herniations or cervical spinal column, any kind of cancer or planned surgery in throat	Mean age (SD/range): IG = 44 (22), IG2 = 46 (14), CG = 49 (7) yrs % of male: IG = 60%; IG2 = 62%; CG = 50% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** NR Duration of Pain, mean (SD/range): Acute/Sub-acute NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 10) – SM: thrusting force on lateral aspects of occiput or C1 exerted for < 200 msec pre/post anesthesia; NR Drop outs: A = 0, B = 2 IG2 (n = 8) – Post-isometric relaxation): applied to hypertonic muscle - isometric contraction by pts against manual resistance for 10 sec then stransverse oscillatory rotped and repeated after at least 20 sec rest;pre/post anesthesia NR Drop outs: See IG1 CG (n = 8) – Placebo: Laying palms of clinician on sides of pt's neck without any side-different pressure or without having pt under tension; pre/post anesthesia NR Drop outs: See IG1	**Outcomes:** Disability: N of found dysfunctions in motion segments O/C1 and C1/C2- no numerical data is reported (only p values) **Results:** Baseline: Disability: IG1 = 21, IG2 = 15, CG = 13 Immediate post tx: Disability: --- Short term: NR Intermediate: NR Long term: NA	**Outcomes:** QoL/ well being: NR Short term: NR Intermediate: NR Long term: NA **Harms:** 2 WDAE in IG1- complication arising from a surgical operation **Summary:** sig effect of IG1&2 vs. placebo, in restoring function ($p< 0.01$) In anesthesia: IG1 vs. placebo, $p < 0.01$. No sig difference between IG1 & 2 ($P = 0.137$). The tx effect postnarcotically was further sign in IG1 vs. placebo only ($P = 0.01$)

Table 2.19 Neck Pain - Massage - Acute - Specific Pain – No studies
Table 2.20Neck Pain - Massage - Acute - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Blikstad, A (2007)[267] Country: England Quality score: 10/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: One session Fu duration (last assessment): post tx N screened: 45 N randomized: 45 N completed tx: NR N attended last fu: NR **Inclusion:** Between 18-55 yrs. N-S unilateral or bilateral NP of at least 4 wks, no longer than 12 wks and at least 4 on an 11-pt (NRS), an upper trapezius TP (TP) and decreased cervical lateral flx to the opposite side of the active upper trapezius TP. NP could extend to shoulder region and upper arms **Exclusion:** Specific NP; blood coagulation disorders, currently taking anticoagulants; long-term steroid use	Mean age (SD/range): IG1 = 23.9 (3.925), IG2 = 22.6 (2.384), CG = 24.9 (5.44) yrs % of male: IG1 = 27, IG2 = 60, CG = 47 Racial composition: NR \Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP and upper trapezius TPs **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Sub-acute, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 15)– Activator TP tx (ATPT): An force to TP = 170 Newton : One session, 10 thrusts at 1 thrust/sec Drop outs: NR IG2 (n = 15) – Myofascial band tx (MBT): Firm thumb pressure in a slow stroking motion from the lateral shoulder to the mastoid process along the upper trapezius muscle and through the active TP; One 1 min session Drop outs: NR CG (n = 15) – Sham Ultrasound (SUS): If subject felt any sensation of heat or pain, machine was turned down- same area as IG; One 2 min session Drop outs: NR	**Outcomes:** Pain: NRS (0-10); PPT (kg/cm²) Disability: CROM **Results:** Baseline: Pain: IG1 = 4.6 (0.6325), IG2 = 4.6 (0.5071), CG = 4.7 (0.9612); IG1 = 3.4 (1.803), IG2 = 3.2 (0.8367), CG = 3.8 (1.71) Disability: NR Immediate post tx: Pain: NR Disability: NR Short term: NR Intermediate: NR Long term: NA	**Outcomes:** QoL/ well being: NR Number of subjects improved based on reduced pain: Immediate post tx: 8 (53.3%) vs. 2 (13.3%) vs. 2 (13.3%) Based on right lateral cervical flx: 6 (40%) vs. 5 (33.3%) vs. 6 (40%) Short term: NR Intermediate: NR Long term: NA **Harms:** NR

Table 2.21 Neck Pain - Massage - Chronic- Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Cen, S (2003)[271] Country: Germany Quality score: 4/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 6 wks Fu duration (last assessment): Post-tx N screened: 31 N randomized: 31 N completed tx: 28 N attended last fu: 28 **Inclusion:** NP and loss in ROM, for more than 1 yr, noticeably daily NP and tightness, neck muscle pain and tightness associated with a mechanical disorder of the cervical spine (such as whiplash/trauma, chronic use, disc degeneration, post-herniated nucleus pulpous), no regular therapeutic tx (more than once/wk) in previous 3 mo for NP **Exclusion:** NR	Mean age (SD/range): IG1 = 47 (11), IG2 = 48 (13), CG = 51 (7) yrs % of male: IG1 = 20, IG2 = 30, CG = 27.3 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP **Cause of Pain:** Trauma (35.8%) Chronic use/stress (51.2%); Post-herniated nucleus pulposus (10%); Spinal malformation sue to arthritis (3.0%); Spinal malformation due to post-polio syndrome (3.3%) Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 10)– Traditional Chinese Massage (TCTM): one-finger meditation massage used to search and treat any perceived abnormal soft tissue sites; 30 min/ tx, 3 tx/wk, 6 wks Drop outs: A = 1 IG2 (n = 10)– Exercise program: Home-based, self-administrated. 2 steps: 1) application of moist heat on neck area followed by S stretching EX. Daily EX program included head tilt, trapezius stretch, neck flx, shoulder rolls, and neck rolls; moist heat for 10 min, stretching for 10 min Drop outs: A = 2 (personal family problems) CG (n = 11) – No tx: NA; NA Drop outs: NR	**Outcomes:** Pain: Northwick Park NP **Results-**Baseline: Pain: IG1 = 32.46 (8.59), IG2 = 27.81 (11.9), CG = 31.51 (12.11) Immediate post tx: Pain: IG1 = 13.24 (11.88), IG2 = 20.23 (12.06), CG = 35.64 (12.54) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** NR **Summary:** Exercise plus TCTM appeared equally effective as TCTM alone but better than just EX only, suggesting that TCTM may provide the initial major contribution to the tx effect. Also, improvements in ROM for TCTM group seemed more consistent than EX group

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Irnich D (2001)[269,270] Country: Germany Quality score: 4/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): 6 mos N screened: 182 N randomized: 177 N completed tx: 177 N attended last fu: 165 **Inclusion:** Pts with chronic NP (>1 mo) and painful restriction of cervical spine mobility who had not received any Tx in the two wks before the study **Exclusion:** Pts with dislocation, had surgery, fracture, neurological deficits, systemic disorders, or Tx contraindications	Mean age (SD/range): IG1 = 52.3 (13.3), IG2 = 52.7 (11.5), CG = 52.2 (13.2) yrs % of male: 33.97% total Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: (n) whiplash = 56; MPS = 129 Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP **Cause of Pain:** Myofascial pain and whiplash Duration of Pain, mean (SD/range): Chronic, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: None	**Groups** IG1 (n = 56)– Acu: according to traditional Chinese medicine rules, local MTPs treated with dry needling to elicit local twitch, common points S13, UB10, UB60, Liv3, GB20, GB34, TE5, and the ear point cervical spine; 5 tx, 3 wks Drop outs: D = 7 IG2 (n = 60)– Massage: Conventional Western massage (effleurage, petrissage, friction, tapotement, and vibration), SM not performed; Same as IG1 Drop outs: D = 1 CG (n = 61) – Sham-laser: Inactivated laser pen, every point treated for 2 min at 0.5-1 cm distance from the skin; Same as IG1 Drop outs: D = 4	**Outcomes:** Pain: VAS; PPT **Results-**Baseline: Pain: IG1 = 54.15 (21.91), IG2 = 54.71 (23.46), CG = 57.15 (26.71); IG1 = 1.07 (0.57), IG2 = 1.07 (0.58), CG = 1.05 (0.57) Immediate post tx: Pain-mean change: IG1 = 25.3 (22.6), IG2 = 12.7 (29.5), CG = 19.2 (26.5); IG1 = 0.06 (0.58), IG2 = 0.04 (0.5), CG = -0.03 (0.51) Short term: --- Intermediate: IG1 = 17.4 (29.7), IG2 = 14.4 (31.9), CG = 17.4 (26.4); IG1 = 0.19 (0.77), IG2 = 0.50 (0.59), CG = 0.03 (0.62) Long term: NR	**Outcomes:** QoL/ well being: SF-36: Physical role; Pain Index **Results- mean :** Immediate post tx: Short term: (P values)IG1 vs. IG2 = 0.797, IG1 vs. CG= 0.498; IG1 vs. IG2 = 0.843, IG1 vs. CG = 0.989 Intermediate: IG1 vs. IG2 = 0.865, IG1 vs. CG = 0.825; IG1 vs. IG2 = 0.971, IG1 vs. CG = 0.87 Long term: NR **Harms:** Mild reactions n = 17 (33%) in IG1, vs. 4 (7%) in IG2, and 12 (21%) in CG, no SAEs observed.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Yagci, N (2004)[268] Country: Turkey Quality score: 2/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 2-5 ds Fu duration (last assessment): post tx N screened: 40 N randomized: 40 N completed tx: NR N attended last fu: NR **Inclusion:** Diagnosis of MPS (MPS) with duration of symptoms of at least 6 mos **Exclusion:** NR	Mean age (SD/range): IG = 30.7, CG = 31, SD NR % of male: IG = 35%, CG = 15% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** LBP **Cause of Pain:** NR Duration of Pain, mean (SD/range): chronic, NR Severity of pain (Grading): VAS Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 20)– Vapo coolant spray + stretch technique: Ethylchloride spray for 4-5 s to each muscle, from 30 cm distance and 45 degree angle; spray stretch technique + active EXs (same for both grps), 10 reps, 3 tx/d- 6 sessions in total Drop outs: NR CG (n = 20) – Connective tissue massage: starts from sacral region and terminated to shoulder and cervical regions; CT massage + active EXs(same for both grps), 10 reps, 3 tx/d- 6 sessions in total Drop outs: NR	**Outcomes:** Pain: VAS(0-10); Pain threshold; Pain tolerance Disability: NR **Results:** Immediate post tx: Pain (VAS): IG = 2.88 (1.5), CG = 2.6 (1.73); PPT IG = 37.05 (4.52), CG = 21.7 (8.42); Pain tolerance IG = 94.85 (5.56), CG = 81.75 (5.65) Disability: NR	**Outcomes** QoL/ well being: *NA* *ROM* Immediate post tx:flx 42.2 (7.18) vs. 46.4 (5.7) Extension: 52.2 (8.4) vs. 50.4 (5.9) Short term: NR Intermediate: NR Long term: NR **Harms:** *NR* **Summary of results (if provided):** Spray Stretch technique seemed to be most effective on trigger points as they required less time (only 6 sessions vs 15 for CMT)

Table 2.7 Neck Pain - Massage - Chronic - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Cen, S (2009)[273] Country: US Quality score: 8/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 10 wks? Fu duration (last assessment): 6 mos N screened: 222 N randomized: 64 N completed tx: 59 N attended last fu: NR **Inclusion:** group health enrollees between 20 - 64 yrs who had received primary care for NP at least 3 mo prior **Exclusion:** NP likely due to a non-mechanical cause; complex NP or NP potentially inappropriate for massage, prior neck surgery, MVA in past 3 mo; unstable serious medical or psychiatric conditions or demetia; minimal NP or NP lasting less than 12 wks; currently receiving other tx for NP apart from Meds; had used massage for NP within the last yr	Mean age (SD/range): IG = 47.4 (12.3) vs. CG = 46.4 (11.3) yrs % of male: 31.2 Racial composition: Majority White (87.1 vs. 81.3%) Work status: Employed: 84.4% Other socio-demographics: Family income > $35 K: 78.7% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, (pts with > 1 yr: 80.6%) Severity of pain (Grading): rating of < 3 on 0 - 10 point bothersome scale Current tx/ co-intervention common in all groups: all pts were advised on stretching and were allowed to take Med for NP: 56.3 vs. 62.5%; NSAIDs: 456.9 vs. 53.1%; narcotic analgesics: 6.3%	**Groups** IG1 (n = 32)– Massage: median of 7 techniques with a range of 4 to 15 per visit, most common technique: kneading, clinical gliding; At least 1 tx, (1-10 tx) Drop outs: 1 CG (n = 32) – Self-care book: NR; NA Drop outs: 4	**Outcomes:** Pain: symptom bothersome: numerical 0-10 scales Disability: NDI **Results-**Baseline: Pain: IG = 4.8 (2.3), CG = 4.9 (1.8) Disability: NR Immediate post tx: Pain: improvement (% of pts): 55% vs. 25%, RR=2.2; 95% CI, 1.04, 4.2) Disability: improvement (% of pts): 39% vs. 14% (RR=2.7, 95% CI: 0.99, 7.5) Short term: NR Intermediate: Pain: RR = 1.1 (95% CI: 0.6, 2.0) NDI: RR = 1.8 (95% CI: 0.97, 3.5) Long term: NR	**Outcomes:** Global rating of improvement (%) Better or much better: at 4 wks: 58% vs. 7% At 10 wks: 55% vs. 25% At 6 mos: 43% vs. 25% **Medication usage,** (similar at baseline), did not change in the IG but increased by 14% in CG at 6 monhts Long term: NR **Harms:** IG: n = 9 with mild AEs; n = 5 with discomfort or pain during massage tx; n = 3 increased soreness after tx; n = 1 migraines and nausea one d after tx; one pt withdrew from tx; no SAEs observed

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zaproudina, N (2007)[272] Country: Finland Quality score: /13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: Not clear, 5-10 wks? Fu duration (last assessment): 1 yr N screened: NR N randomized: 102 N completed tx: 102 N attended last fu: NR **Inclusion:** Pts with chronic N-S NP aged 28-50 yrs **Exclusion:** Previous neck surgery; current nerve root entrapment; spinal cord compression; severe neurologic, metabolic, psychiatric or CVD diseases; any therapy or sick leave previous mo	Mean age (SD/range): IG1 = 41.2 (5.7), IG2 = 40.9 (5.9), CG = 42.4 (5.9) yrs % of male: IG1 = 31, IG2 = 38.2, CG = 33.3 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: None	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Chronic, IG1 = 11.7 (6.2), IG2 = 10.6 (6.5), CG = 11.2 (7.3) yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: None	**Groups** IG1 (n = 35)– Traditional bone setting: 5 sessions (each 1.5 hrs) per pt provided with 1-2 wk intervals Drop outs: D = 0 IG2 (n = 34)– Physiotherapy: Included massage, therapeutic stretching, and EX therapy; 5 sessions; session duration: 45 min Drop outs: D = 1 CG (n = 33) – Massage: 5 sessions (each 1 hr) per pt Drop outs: D = 2	**Outcomes:** Pain: VAS (100 mm) Disability: NDI (0-100) **Results-**Baseline: Pain: IG1 = 49.5 (21.3), IG2 = 46.8 (19.8), CG = 46.6 (22.2) Disability: IG1 = 24.11 (8.2), IG2 = 27.41 (8.8), CG = 26.0 (10.9) Immediate post tx: Pain: IG1 = 17.9 (18), IG2 = 29.6 (23), CG = 25.4 (22) Disability: IG1 = 11.7 (9), IG2 = 18.4 (10), CG = 15.3 (10) Short term: NR Intermediate: NR Long term: NR	**Outcomes:** QoL/ well being: NR Numer of sick-leave ds: 0.61/peroperson in IG1, 2.6 in IG2, and 3.9 in CG Decrease in use of painkillers: 65.7% vs. 50.0% vs. 56.2% Immediate post tx: NA Short term: NR Intermediate: NR Long term: NR **Harms:** None of the pts in IG1 had any negative effects.

Table 2.23 Neck Pain - Massage - Mixed - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Fernandez-de-las-Penas (2005)[275] Country: Spain Quality score: 7/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: NR Fu duration (last assessment): Post-tx N screened: 40 N randomized: 40 N completed tx: NR N attended last fu: NR **Inclusion:** At least 18 yrs old, with mechanical NP for at least 2 wks, diagnosed with MTPs either latent or active in the upper trapezius muscle. Mech NP defined as: generalized neck and/or shoulder paint with mechanical characteristics **Exclusion:** diagnosis of fibromyalgia syndrome; history of whiplash injury, cervical spine surgery; diagnosis of radiculopathy or myelopathy determined by their physician; having undergone myofascial pain therapy within the past mo before study	Mean age (SD/range): IG1 = 27.7 (5.5), IG2 = 29.7 (6.2) yrs % of male: IG1 = 40, IG2 = 45 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP & Upper Trapezius **Cause of Pain:** Mechanical Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 20)– Ischemic compression technique: Patient lays supine with cervical spine in neutral position. Therapist applies gradually increasing pressure to MTP until sensation of pressure becomes pressure and pain. Pressure maintained until discomfort and/or pain eased by around 50%, then pressure was increased until discomfort appeared again. Repeated for 90sec ; NR Drop outs: NR IG2 (n = 20) – Transverse friction massage: Applied with forefinger and reinforced with middle finger. Executed with relaxed muscle applied for 3 min. Frictions applied slowly with a pressure slightly painful. Approx at PPT level of each pt; NR Drop outs: NR	**Outcomes:** Pain: PPT; VAS (2.5 kg/cm^2) Disability: NA **Results:** Baseline: Pain: IG = 1.8 (0.5), CG = 2 (0.4); IG = 4.6 (1.2), CG = 4.9 (1.5) Immediate post tx: Pain: IG = 2.2 (0.6), CG = 2.35 (0.4); IG = 3.8 (0.9), CG = 4.2 (0.09) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Lin, M (2004)[220] Country: China Quality score: 3/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 mos Fu duration (last assessment): post tx N screened: 100 N randomized: 100 N completed tx: NR N attended last fu: NR **Inclusion:** Cervical spondylopathy of nerve root type, aged 25-76 **Exclusion:** NR	Mean age (SD/range): IG = 46(8.5) , CG = NR % of male: IG= 65% CG= NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP and vertebrae **Cause of Pain: NR** Duration of Pain, mean (SD/range): Acute to chronic(15 ds – 32 yrs) Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 50)– Needle scalpel combined with massage therapy; every 7 ds, tx course was 3 times, each course 7 times Drop outs: NR CG (n = 50) – Simple massage therapy once a d, and 7 times. Three courses were performed continuously and interval of each course was 3 ds Drop outs: NR	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: NA Pain: Disability: Immediate post tx: NA Pain: Disability: Short term: NR Intermediate: NR Long term: NR	QoL/ well being: NR Cure effect measured by% of pts who were completely cured Immediate post tx: 16(32%) vs. 10(20%) Effective rate: 98% (49/50) vs. 82% (41/50), p < 0.05 Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Xi-zhen (2005)[274] Country: China Quality score: 1/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 5-10 ds Fu duration (last assessment): Post-tx N screened: NR N randomized: 52 N completed tx: 52 N attended last fu: 52 **Inclusion:** diagnosis of cervical spondylopathy owing to first attack or repeated attacks; meeting criteria for non-operation therapy **Exclusion:** operation owing for spondylopathy; mental disease; liver and kidney disease, blood disease, carcinoma; respiratory system and cerebrovascular or cardiovascular system complications; autoimmune disease or the weakest health Pts; equipped with cardiac pacemaker and prosthetic value; pregnancy or breast feeding	Mean age (SD/range): NR % of male: 55.8 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical spondylopathy Duration of Pain, mean (SD/range): Mixed, 5 ds-8 yrs Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 26)– Traction and Massage: of cervical vertebrae: traction by 5% of body mass increased by 2.5-5.0 N every 2-3 times; massage was given in prone position with methods consisting of grasping, pressing, pushing, kneading, rolling, tapping and traction and counter traction etc; Traction: 30 min/tx, Massage: 8-10 min/tx, 5 tx/course, 1-2 courses, Drop outs: A = 0, B = 0 CG (n = 26) – Traction only: traction of cervical vertebrae and massage: traction was done by special band on traction shelf with Pt sitting, first traction force was given by 5% of body mass and then tractio force increased by 2.5-5.0 N every 2-3 times; As IG Drop outs: A = 0, B = 0	**Outcomes:** Pain: Cervical Spondylopathy Treatment Effect Rating Scale-3 items Disability: NA **Results:** Baseline: NA Pain: IG = 8.132 (2.534), CG = 8.304 (2.71) Immediate post tx: Pain: IG = 16.431 (3.212), CG = 13.147 (3.036) Short term: NR Intermediate: NR Long term: NR	**Outcomes :** QoL/ well being: NR Effect rate, post tx (obviously effective): 80.8% vs. 46.2% **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Zhang, B (2005)[228] Country: China Quality score: 0/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: 3 wks Fu duration (last assessment): 3 mos N screened: NR N randomized: 96 N completed tx: NR N attended last fu: NR **Inclusion:** NR (appears to include pts with cervical spondylosis only) **Exclusion:** NR	Mean age (SD/range): NR % of male: IG = 65.63%, CG = 56.25% Racial composition: Asian Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: 4? Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Cervical spondylosis Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 64) – Acupuncture + Massage / Manipulation:. Acupoint injection - Fengchi (GB 20), bilaterally, Ashi points (spot of tenderness or node), 1 to 2; Drugs: VB12500ug (1 ml), Danshen injection 2 mL (1 g/mg), 2 % lidocaine 1 ml. The above drugs were drawn into a one-off 5ml syringe. the doctor inserted the needle into the points and injected the same amount of drugs into each point. If there was no bleeding, the needle was withdrawn with the arrival of qi; 3 tx/wk for 3 wks Drop outs: NR CG (n = 32) – Massage: As IG; Same as IG Drop outs: NR	**Outcomes (describe instrument used):** Pain: NA Disability: NA **Results:** Baseline: Pain: NA Disability: NA Immediate post tx: Pain: NA Disability: NA Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR Cure rate: Immediate post tx: 81.25% vs. 56.25, $p < 0.05$ Total effective rate were similar in two grps Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Table 2.24 Neck Pain - Massage - Mixed - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Gemmell, H (2007)[276] Country: England Quality score: 9/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: One session Fu duration (last assessment): post-tx N screened: 55 N randomized: 45 N completed tx: 45 N attended last fu: 45 **Inclusion:** Between ages 18 and 55 with N-S NP of at least 30 mm on a VAS, and upper trapezius TP and decreased cervical lateral flx to the opposite side of the active upper trapezius TP **Exclusion:** Those taking anticoagulants or using long-term corticosteroid therapy, and those with S causes for their NP	Mean age (SD/range): (median) IG1 = 24, IG2 = 24, CG = 23 yrs % of male: NR Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP and Upper Trapezius TPs **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Mixed, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 15)– Ischemic compression (IC): Sustained deep pressure with the thumb to the upper trapezius trigger pt (TP).; one tx session, sustained deep pressure for 30 s-1min Drop outs: NR IG2 (n = 15)– Trigger Point Pressure Release (TPPR): Non painful slowly increasing/ maintaining pressure with thumb over TP until tissue resistance barrier felt. Process repeated until no TP tension/tenderness of 90s had elapsed; one session Drop outs: NR CG (n = 15) – Sham Ultrasound (SUS): Ultrasound lotion applied over TP and ultrasound head was moved slowly over the upper trapezius muscle; one 2 min session, Drop outs: NR	**Outcomes:** Pain: VAS (0-100); PPT (kg/cm²) **Results:** Baseline: Pain: IG1 = 41.3 (43.6), IG2 = 43.6 (8.8), CG = 38.1 (8.8); IG1 = 3.39 (1.16), IG2 = 2.8 (1.2), CG = 2.6 (0.83) Immediate post tx: Pain: IG1 = 22.93 (12.76), IG2 = 27.13 (16.4), CG = 22.67 (8.21); IG1 = 4.45 (1.69), IG2 = 3.77 (1.76), CG = 3.37 (1.62) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms:** NR

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Hemmila, H (2005)[277] Country: Finland Quality score: 5/13 Initial of reviewer: SG	**Trial Design-**RCT Tx duration: 5 wks Fu duration (last assessment): 1 yr N screened: 59 N randomized: 42 N completed tx: 38-40 N attended last fu: 38 **Inclusion:** 18-64 yrs; diagnosis of tension neck syndrome with N-S pain between the shoulders and occiput for at least one mo **Exclusion:** any tx during preceding mo; any contraindication to manual therapy; NP < 25/100mm on VAS	Mean age (SD/range): IG = 47.5 (8.5) vs. CG = 44.9 (9.7) yrs % of male: IG = 40.1%, CG = 20% Racial composition: NR Work status: NR Other socio-demographics: Used folk medicine: 66.5% Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** N-S Duration of Pain, mean (SD/range): Unknown (mix), IG = 4.3 (4.7) yrs, CG = 8.4 (6.8) yrs Severity of pain (Grading): ≥ 25 mm Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 22)– Bone setting: pt asked to bend neck forward and backward while healer presses thumbs on both side of net distal vertebrae OR make careful rotating bending movements of pt's head with one hand while pt's neck is stabilized by other hand, some soft tissue massage; Five 30 min sessions over 5 wks Drop outs: E = 4 CG (n = 20) – Control: neither offered nor denied any therapy by the study protocol; as requested by the pt Drop outs: See IG	**Outcomes:** Pain: Million scale (0-100 mm); Pain drawings (Pain area; Numbness area) **Results-** Immediate post tx: Pain-mean change: IG = 18.5, CG = 4; IG = 3.5, CG = 2.1; IG = 0.8, CG = 1.2 Short term-mean change: IG = 21.2, CG = 6.2; IG = 4.9, CG = 1.5; IG = 1.3, CG = 1.5 Intermediate-mean change: IG = 22.9, CG = 5.4; IG = 2.9, CG = -0.4; IG = 1.6, CG = 0.5 Long term-mean change: IG = 14.2, CG = 5.5; IG = 4.4, CG = -1.3; IG = 1.5, CG = 1.9	**Outcomes:** QoL/ well being: NR Medication use, and sick leaves . Immediate post tx: NR Short term: NR Intermediate: NR Long term: NA Pain Med The mean annual N of doses: IG= 63 (146) vs. CG= 188 (332) Sick leaves prescribed for NP :IG= 3 vs. CG = 5 for mean of 4.5 (20.0) and 16.9 (53.0) ds **Harms:** NR

Table 2.25 Neck Pain - Massage - Unknown - Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Fryer (2005)[280,281] Country: Australia Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: One session Fu duration (last assessment): post tx N screened: NR N randomized: 37 N completed tx: NR N attended last fu: NR **Inclusion:** Presence of latent MTPs in the upper trapezius muscle **Exclusion:** Generalized primary fibromyalgia syndrome, taken analgesic Med in the past 24 hours, had no identifyable myofascial MTPs in the upper trapezius muscle	Mean age (SD/range): 23.1 (3.2) yrs % of male: 32.4 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Myofascial TP Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 20)– Massage: Myofascial manual pressure release; one tx Drop outs: NR CG (n = 17) – Sham myofascial release: extremely light pressure; same as IG Drop outs: NR	**Outcomes:** Pain: PPT **Results:** Immediate post tx: Pain-mean change: IG = -2.05 (1.7), CG = 0.083 (1.7) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Hanten, W (1997)[278] Country: US Quality score: 5/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: One session Fu duration (last assessment): Post-tx N screened: NR N randomized: 60 N completed tx: 60 N attended last fu: 60 **Inclusion:** Pts with one or more active or latent cervical and or scapular TPs **Exclusion:** Known orthopedic cardiovascular or neurological conditions. Not received clinical tx for the TP	Mean age (SD/range): 29.9 (9.2) yrs % of male: 30 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Myofascial TP Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 20)– Occipital Release: traction; One tx Drop outs: 0 IG2 (n = 20)– Retraction/Retraction-Extension: head traction and retraction/ext EXs; Same as IG1 Drop outs: 0 CG (n = 20) – No Tx: 5 min sitting upright; Same as IG1 Drop outs: 0	**Outcomes (describe instrument used):** Pain: Pain threshold (kg/cm²) (pressure algometer) **Results:** Baseline: Pain: IG1 = 2.1 (1), IG2 = 2.2 (1), CG = 2.2 (1.2) Immediate post tx: Pain: IG1 = 2.5 (1.1), IG2 = 2.8 (1.3), CG = 2.6 (1.5) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Hou CR (2002)[279] Country: Taiwan Quality score: 2/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: One session Fu duration (last assessment): N screened: NR N randomized: 119 N completed tx: N attended last fu: **Inclusion:** Clinically active, palpable MTPs in a single side or both sides **Exclusion:** Neck or shoulder surgery within past yr, radiculopthy or myelopethy, history of disc disease, degenerative joint disease, fracture or dislocation in the cervical vertebrae, cognitive deficits, unwillingness to participate	Mean age (SD/range): 46.2 (13.4) yrs % of male: 8.6 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** Myofascial TP Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1-3 (n = 8 in each grp)– ischemic compression (IC) to pain threshold (P1), 30, 60, 90 sec for grps respectively; single tx; no drop outs IG4- 6 (n = 8 in each grp)– IC to Average of Pain Threshold and Pain Tolerance (P2), 30, 60, 90 sec for grps respectively IG7 (n = 21)– Hot Pack + Active ROM IG8 (n = 13)– Hot Pack + Active ROM and IC to average Pain,(30, 60 or 90 sec) IG9 (n = 9)– IG7 + TENS(30, 60 or 90 sec) IG10 (n = 10)– IG7 + stretch with spray(30, 60 or 90 sec) IG11 (n = 9)– Hot Pack + Active ROM and stretch with spray, and TENS(30, 60 or 90 sec) IG12 (n = 9)– IG7 + interferrential current and myofascial release technique (30, 60 or 90 sec)	**Outcomes:** Pain: Pain threshold (data not shown); pain toleranc (data not shown) e; 10 cm VAS **Results-** Immediate post tx: Pain (VAS) IG1 = 4.59 (0.85), IG2 = 4.72 (0.96), IG3 = 3.44 (1.14), IG4 = 3.67 (1.34), IG5 = 3.46 (1.03), IG6 = 3.57 (1.03), IG7 = 4.33 (1.82), IG8 = 3.35 (1.66), IG9 = 2.46 (1.33), IG10 = 3.26 (1.39), IG11 = 2.43 (0.65), IG12 = 2.34 (0.9) Short term: NR Intermediate: NR Long term: NR	**Outcomes** QoL/ well being: NR ROM- data not shown- see summary **Harms: NR** **Summary:** PPT, pain intensity, and pain tolearance were improved better in ICP1-90sec, and ICP2, 60& 90 sec vs. ICP1 30, & 60 sec or ICP2 30 sec Addition of PM such as interferential current, myofascial release, spray & stretch, or TENSE resulted in better improvement also.

Table 2.26 Neck Pain - Massage - Unknown - Non-Specific Pain

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other outcomes; Harms
Meseguer, A.A. (2006)[282] Country: Spain Quality score: 6/13 Initial of reviewer: SG	**Trial Design** RCT Tx duration: one session Fu duration (last assessment): Post-tx N screened: NR N randomized: 54 N completed tx: 54 N attended last fu: 54 **Inclusion:** 19-41 yrs old with mechanical NP, tender point in the upper trapezius muscle **Exclusion:** widespread pain and or other symptom concomitant with fibromyalgia syndrome; whiplash injury, cervical spine surgery, radiculopathy or myelopathy determined by GP, presence of refered pain provoked by the compression of the tender spot that is diagnosis of myofascial TPs, or having undergone any tx in the cranio-cervical region.	Mean age (SD/range): IG1 = 38 (11) vs. IG2 = 43 (15) vs. CG = 39 (10) yrs % of male: 30 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior episode of pain if acute: NR Prior CAM intervention: NR Prior surgery related to current complaint: NR	**Region of pain:** NP **Cause of Pain:** **N-S** Duration of Pain, mean (SD/range): Unknown, NR Severity of pain (Grading): NR Current tx/ co-intervention common in all groups: NR	**Groups** IG1 (n = 18) – Manipulation (stain/counter strain): gradually increasing pressure to the tender point until the sensation of pressure became one of pressure and pain, pts positioned so the palpatable tension relieved to pain reduction of 70%; one session Drop outs: NR IG2 (n = 18) – Modified manipulation (stain/ counter strain): modified version with pts arm placed in abduction; As IG1 Drop outs: NR CG (n = 18) – No Tx: after pre-intervention data pts lay supine with the cervical spine in neutral position for 5 minutes until post-intervention data were again assessed; As IG1 Drop outs: NR	**Outcomes:** Pain: VAS on pressure point (0-10 cm) assessed by application of 4.5 kg/cm² with algometer **Results:** Baseline: Pain: IG1 = 5.9 (2.1), IG2 = 5.1 (2.5), CG = 5.7 (2) Immediate post tx: Pain: IG1 = 3.3 (2.4), IG2 = 2.5 (1.2), CG = 5.7 (2.1) Short term: NR Intermediate: NR Long term: NR	**Outcomes (describe instrument used):** QoL/ well being: NR **Results- mean :** Baseline: NA Immediate post tx: Short term: NR Intermediate: NR Long term: NR **Harms: NR**

Outcomes: ODQ=Oswestry disability questionnaire; RMQ=Roland Morris Questionnaire; NPQ=Northwick Neck Pain Questionnaire; MPQ=McGill Pain Questionnaire; ODI=Oswestry Disability Index; NDI=Neck Disability Index; NHP=Nottingham Health Profile; HFAC=Hanover Functional Ability Questionnaire PDI=pain disability index; GWBS=global well-being scale; SLR=straight leg raising; GPE=global perceived effect; FTF=finger-to-floor; PPI=present pain intensity; PRI=pain rating index; PUP=pain under pressure; MRP=motion related pain; NPAD=Neck Pain and Disability Scale; QoL=Quality of Life; MVEE=maximum voluntary extension effort; PQ=pain questionnaire; MPQ=Short Form McGill Pain Questionnaire; RMAS=Roland Morris Activity Scale; QBPDS=Quebec Back Pain Disability Scale; mRDQ=modified Roland Morris Questionnarie NRS=numeric pain rating scale; PPT= pressure pain VAS=visual analogue scale;; SF= short form threshold; **Special terms:**HVLA=high velocity low amplitude; ETOIMS=electrical twitch-obtaining intramuscular stimulation; IMS=intramuscular stimulation; FDT= flexion distraction technique; TrP=trigger point; GP=general practitioner; CAM=complementary and alternative medicine; NSAIDs=non-steroidal anti-inflammatory drugs; NP=neck pain; N-S=non-specific; S=specific; Med=medication; PT= physiotherapy; ST=standard therapy; E-acu=electro acupuncture; MR= muscle relaxation; EX=exercise CLBP=chronic low back pain; A=baseline evaluation; B=immediately post treatment; C= short term follow up (up to 3 months post treatment); D=intermediate follow up (up to 6 months post treatment); E=long term follow up (over 6 months post treatment); acu=acupuncture; SM=spinal manipulation; LBP= low back pain; NP=neck pain; TP=thoracic pain TENS/TNS= transcutaneous electrical nerve stimulation; ROM=range of motion; MPS=myofascial pain syndrome; Mob=mobilization; ext=extension; flx=flexion; rot=rotation; MS=MS; PM=physical modalities; mA=milli Amp; **Statistical:** NS=statistically non-significant; SD=standard deviation; SE=standard error; WMD=weighted mean difference ; p=p-value; 95% CI= 95% Confidence Interval; SS= statistically significant; **General terms:** NA=not available/applicable; NR=not reported; Pt(s)=patient(s); d=day(s); mo(s)=month(s); yr(s)=year(s); wk(s)=week(s); N=number NS= not significant; pt/s= patient/s; tx=treatment/intervention Fu=follow up; ITT=intention to treat; IG=intervention group; CG=control group; RCT=randomized controlled trial; AE(s)=adverse event(s); SAE= serious adverse events; WDAE= withdrawal due to adverse events

Table 3-1 – CAM Back Pain II- RCTs evaluating cost effectiveness of CAM txs

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Low Back Pain					
Hollinghurst, S ATEAM study (2008)[178,283] Country: UK	**Treatment duration:** 3 mos **Last assessment:** 1 yr N screened: 810 N randomized (total): 579 N completed tx (total): 464 **Inclusion:** chronic or recurrent non S LBP from primary care **Exclusion:** previous experience of Alexander technique ; pts under 18 and over 65; clinical indicators of seriuos spinal disease; current nerve root pain (below knee in dermatomal distribution), previous spinal surgery, pending litigation (outcome maybe different, group too small to analyze); history of psychosis or major alcohol misuse (difficulty completing outcome); perceived inability to walk 100 m (EX difficult)	**Mean age (SD/range):** 45 yrs **% of male:** range 22% to 37% **Racial composition:** NR Work status employed, n (%): reported for combined grps (no EX and EX) massage 76%; Alexander technique 6 lessons 76%; 24 lessons 73%; GP care 73% Other socio-demographics married, n (%): 59% vs. 63% vs. 56% vs. 59% Co morbidities: NR Pain grading: NR Current tx/ co-intervention common in all groups: NR	**Groups** **IG (n = 75) –** Massage- not described. Therapists: NR Drop outs: at 3 mos 10, at 12 mos = 11 **CG1-3 (no EX)** – CG1 (n = 72)- GP care CG2 (n = 73), 6 lessons Alexander technique (AT) CG3 (n=73)- 24 lessons Alexander technique **CG4-7 (with EX)** CG4 (n = 71)- 6 lessons AT + EX CG5 (n = 71) - 24 lessons AT+ EX CG6 (n = 72) - Massage + EX CG7 (n = 72) - GP care + EX - prescription by GP, and up to 3 sessions of behavioral counseling with practice nurse Therapists: GP, and physiotherapists Drop outs: at 3, 12 mos CG1 = 17, 23; CG2 = 13, 15; CG3 = 13, 14; CG4 = 8, 11; CG5 16, 22; CG6 19, 22; CG7 = 19, 21	**Results:** **Pain:** Days with back pain and troublesomeness was reported (not used for this report) **Disability:** Exercise & lessons in Alexander technique,but not massage, remained effective at 1 yr (compared with control Roland disability score 8.1: massage −0.58, 95% confidence interval −1.94 to 0.77, six lessons −1.40, −2.77 to −0.03, 24 lessons −3.4, −4.76 to −2.03, and EX −1.29, −2.25 to −0.34). Exercise after six lessons achieved 72% of the effect of 24 lessons alone (Roland disability score −2.98 and −4.14, respectively). **Conventional care::** hours of informal care (mean) range from 4.4 in CG3 to 45.8 in IG; and from 17.8 in CG7 to 44.3 in CG7	***Base yr:*** *2005 (1 £ UK = 1.78 USD)* ***Reported Results:*** *Total NHS cost over 1 yr (intervention, GP visits, other primary/ secondary care, and Med) :* *IG (n=64) $459.7 (363.9)* *CG1 (n=60) $96.9 (178.7)* *CG2 (n=53) $387.9 (259.8)* *CG3 (n=61) $1,086.5 (467.1)* *CG4 (n=57) $427.2 (190.3)* *CG5 (n=56) $1,177.4 (584.6)* *CG6 (n=56) $475.9 (647.1)* *CG7 (n=51) $274.8 (931.7)* *Total Personal cost (35% imputed) also reported.* ***Conclusion:*** *study suggests that at £20 000/ QALY there is > 85% chance that a GP EX prescription with a nurse fu, or a short series of lessons in the AT, will be cost effective for pts with chronic or recurrent nonS back pain.*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Kominski, GF (2005)[157,284-291] Country: U.S.	**Treatment duration:** 6 wks (?) **Last assessment:** efficacy = 6 mos; cost = 18 mos N screened: 2355 N randomized (total): 681 N completed tx (total): 654 **Inclusion:** members of various HMOs who chose the 200-physicain medical groups as their primary care provider between October 1995, and Nov 1998, presented with acute to chronic non S LBP (with or without leg symptoms) **Exclusion:** LBP of non mechanical cause, sever coexisting conditions that threatened their 18 mos survival; blood coagulation disorder; use of anti coagulants; signs or symptoms of cauda equina syndrome; involved with third party liability or workers' compensation as a result of their LB problem	**Mean age:** Mean range from 49.2 to 53.6 yrs **% of male:** range from 42 to 53 **Racial composition (%):** White: 53 – 66; Black: 1.0 – 3.6; Asian/Pacific Islander: 3.1 – 6.8; Hispanic: 25.2 – 34.1; Other: 1.2 – 3.6 Work status: NR Other socio-demographics: reported education (no difference between grps) Co morbidities: NR Pain grading: NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 162)– chiropractic- SM or another spinal-adjusting technique and instruction on proper back care and EXs- mean no of visits = 6.9 Therapists: chiropractor CG1 (n = 163)- chiropractic + PM- mean no of visits = 7.5 CG2 (n = 162) – medical care- mean no of visits = 4.4 Therapists: primary care physician CG3 (n = 167)- medical care + PT- mean no of visits = 6.6 Therapist: GPs Dropouts for total sample: n=37 (4 pts in IG and 9 in CG1 dropped out at 6 mos)	**Results: reported** at 6 wks and 6 mos **Pain:** % of pts improved from baseline (2+ points) on numerical rating scales (0-10) to 2, 6-wk, and 6-mos(IG vs. CG1): - most severe pain:38%, 49%, 59% vs. 39%, 64%, 56% - average pain: 25%, 34%, 50% vs. 35%, 45%, 51% **Disability:** Roland Morris Disability scores (24 items) in all pts (unadjusted): reduction of about 2 points at 2 wks, 3 points at 6 wks and 4 points at 6 mos **Conventional care::** NR	***Base yr:*** *1995 - 1998* ***Reported Results:*** *Average LBP outPt costs in 18 mos* *chiropractic: $550.0 (834.0)* *chiropractic + PM: $565.0 (547.0)* *medical care: $463.0 (1255.0)* *medical care + PT: $765.0 (1040.0)* *Adjusted mean outPt costs per tx group:* *chiropractic: $560.0* *chiropractic + PM: $579.0* *medical care: $369.0* *medical care + PT: $760.0* ***Conclusion:*** *higher costs for chiro care without producing better clinical outcomes, The cost of medical care might have been understated due to lack of pharmaceutical data.*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Niemisto, L (2003)[292] Country: Finland	**Treatment duration:** 4 wks **Last assessment:** 1 yr N screened: NR N randomized (total): 204 N completed tx (total): 196 **Inclusion:** 24-46 yr old employed with chronic nonS LBP ≥ 3 mos duration and Oswestry LBP Disability Index score ≥ 16%; with or without radiating pain above or below knee (76% vs. 80% had radiating pain) **Exclusion:** malignancies, ankylosing spondylitis, sever osteoporosis, sever osteoarthritis, paralysis, progressive neurologic disease, hemophilia, spinal infection, previous spinal operation, vertebral fracture in last 6 mos, sever psychiatric disease or severe sciatic with a SLR < 35° or with ≥ 1 recent motor deficit	**Mean age (SD/range):** 37 yrs **% of male:** 46% **Racial composition:** NR Work status: sick leave during the period of 1 yr, ds mean (SD): 14 (28) vs. 20 (35); employed (%) 99% vs. 91% Other socio-demographics: NR Co morbidities: NR Pain grading: NR Current tx/ co-intervention common in all groups: pts using analgesics for back pain (%): 30% vs. 35%	**Groups** IG (n = 102) – Manipulation + education booklet=- muscle energy technique and stabilizing EXs aiming to correct the lumbo-pelvic rhythm- 60 minutes- 4 times in 4 wks Therapists: experienced manual therapist Drop outs: 6 CG (n = 102) – Physician consultation + education booklet- education, instruction for postural EXs- advice on daily activities (static work, lifting, etc.)- information were reinforced at 5 mos Fu- self selected frequency of EX- Therapists: physician Drop outs: 2	**Results:** **Pain:** VAS (mm) at 5 mos: 25.2 (23.3) vs. 36.1 (23.3) At 1 yr: 25.7 (23.3) vs. 32.2 (23.3) **Disability:** Oswestry Disability Index at 5 mos 14.7 (11.6) vs. 18.6 (11.6) At 1 yr: 13.7 (11.6) vs. 16.5 (11.6) **Health related QoL:** 5 mos: 0.88 (0.071) vs. 0.90 (0.074) 1 yr: 0.89 (0.071) vs. 0.90 (0.074) **Conventional care::** NR No AEs in any of the groups occurred	**Base yr: 2002** **Reported Results:** study provided data for baseline cost (not shown); &1 yr: Total healthcare cost, mean: Manipulation (n=96) $470.0 (cost to pt= $139.0) Physician consultation (n=100) $431.0 (cost to pt= $154.0) Productivity loss -full d / half d salary: Manipulation $1,848.0 (3543.0) / $924 (1772.0) Physician consultation $2,450.0 (5163.0) / $1,229.0 (2582.0) Total cost full d / half d salary Manipulation $2,457.0 / $1,533.0 Physician consultation $3,035.0 / $1,814.0 **Conclusion:** the manipulative tx with stabilizing EX was more effective in reducing pain intensity and disability than the physician consultation alone.

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Seferlis, T (2000)[293,294] Country: Sweden	**Treatment duration:** 8 wks **Last assessment:** 1 yr N screened: NR N randomized (total): 180 N completed tx (total): 180 **Inclusion:** pts with acute LBP with or without sciatica requiring sick-leave; and a sick leave period for acute LBP < 2 wks **before entering the study** **Exclusion:** spine trauma or surgery, inflammatory disease, tumors of the spine, symptoms from cervical spine, thoracic spine or upper extremities, clinical symptoms or severe LB disease requiring surgery, severe/major medical disease, pregnancy, drug and or alcohol addiction, psychiatric disease/disorder and unsatisfactory knowledge of the Swedish language.	**Mean age (SD): 38 yrs** **% of male:** 53% **Racial composition:** NR Work status: all on sick leave < 2 wks at baseline Other socio-demographics: NR Co morbidities: NR Pain grading: NR Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 60)– Manual therapy- auto traction, manipulation, general Mob, auto-Mob, muscle energy technique, stretching and training co-ordination/ stability Therapists: private physical therapist Drop outs: 20 CG1 (n =60) – GP care - rest, sick leave, drug prescription like analgesics, anti-inflammatory drugs, advice/information about posture, self curing nature of the disease- -PT were often prescribed later. Therapists: physicians Drop outs: 19 CG2 (n =60) –intensive therapy- information, muscle training (EX to ↓muscle fatigue & ↑ muscle strength & co-ordination in abdominal gluteal, para-spinal , shoulder and lower extremity muscles), &general condition training- 3 x wk for 8 wks Therapists: GPs/ PT Drop outs: 18	**Results:** **Pain:** NA **Disability:** NA **Conventional care::** NA	***Base yr: 1996 ($I USD = 6.80 SEK)*** ***Reported Results:*** ***Cost per Pt:*** *Direct cost per Pt-* *Manual therapy: $1,054.26* *GP care: $403.53* *Intensive therapy: $1,123.24* *Indirect cost per Pt-* *Manual therapy: $6,162.79* *GP care: $7,072.06* *Intensive therapy: $5,556.62* *Total cost per Pt:* *Manual therapy: $7,217.06* *GP care:.$7,475.59* *Intensive therapy: $6,679.85* ***Total costs:*** *Manual therapy $433,018.53* *GP care $448,529.71* *intensive therapy $400,790.74* ***Conclusion:*** *the direct costs for tx were lowest in the GP group*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Ratcliffe, (2006)[95,295-303] Country: UK	**Treatment duration:** 10 wks **Last assessment:** 1, and 2 yrs N screened: 289 N randomized (total): 239 N completed tx (total): 149 (group with complete data- also used for cost effectiveness analysis) **Inclusion:** Patients aged 18 – 65 yrs with N-S LBP of 4 – 52 wk duration (sub acute – chronic) **Exclusion:** Possible spinal pathology, carcinoma, motor weakness, disc prolapse, past spinal surgery, bleeding disorders, or current Acu Tx	**Mean age (SD/range):** 43 yrs **% of male: 40%** **Racial composition:** majority White Work status: 51.6, and 56.3% of pts were on full time work; off work due to BP n=11 in acu care, no data for usual care grp Other socio-demographics: NR Co morbidities: NR Pain grading: based on mean values, majority had mild to moderate pain at baseline Current tx/ co-intervention common in all groups: Moxibustion (17.7%), massage (42.2%), acupressure (12.8%), cupping (4.5%), Chinese herbs (4.5%), diet (11.3%), yoga EX (3.3%), relaxation (3.0%)- drugs for LBP prior to tx 88% vs. 90%	**Groups** IG (n = 159) – acu- 177 different bilateral & unilateral acu points (BL23, BL26, BL53, BL54, and GB30 as well as lumbar points); 25 – 40 mm long needles, 0.20 – 0.30 mm in diameter- 1285 tx were provided; the mean (range) of 8.1 (0 – 10) tx per Pt, max no. of tx was 10 for duration of 3 mos Therapists: physicians with a German diploma, 140 hrs of certified acu education Drop outs: 3 mo n=13; 1 yr n=12; 2 yrs n=36 CG (n = 80) – Usual care - Mix of PT, Med, and back EXs Therapists: NR Drop outs: 3 mos n=9; 1 yr n=12 mos; 24 mos n=21	**Results:** **Pain:** mean Present Pain Index (McGill) at 1 yr : 1.43 (1.1) vs. 1.53 (0.9) 2 yrs: 1.42 (1.1) vs. 1.71 (1.1) Oswestry PDI (0 – 100) 1 yr: 20.6 (19.3) vs. 19.6 (15.4) 2 yrs: 18.3 (16.5) vs**.** 21.0 (14.2) SF-36 Bodily Pain score (0 – 100) 1 yr: 64.0 (25.6) vs. 58.3 (22.2) 2 yrs: 67.8 (24.1) vs. 59.5 (23.4) **Disability:** NR **Conventional care:** use of meds. In past 2 yrs: 40% vs. 59%; other variables also reported	***Base yr: 2002-2003*** ***Reported Results:*** *Total NHS cost, mean (SD):* *Acupuncture $744.34 (539.74)* *Usual care 524.94(673.87)* ***Conclusion:*** *short course of traditional acu for persistent N-S LBP in primary care confers a modest heath benefit for minor extra cost to NHS compared with usual care.*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
UK BEAM trial team (UK beam study[119,304,305] Country: U.K.	**Treatment duration:** 12 wks **Last assessment:** 3 mos and 1 yr N screened: 3535 N randomized (total): 1334 N completed tx (total): 1287 **Inclusion:** Pts aged 18-65 yrs with LBP (RMDQ => 4) who had experienced the pain daily for the past mo Exclusion: Serious spinal disorder (malignancy, OP, AS, cauda-equina, infection, or compression), previous spinal surgery, severe mental disorder, CVD, hypertension (systolic blood pressure > 180 mm Hg and diastolic > 105 mm Hg), anticoagulant Tx, steroids, RMDQ <= 3, illiterate in English	**Mean age :** 43 yrs **% of male:** 37 – 47% **Racial composition:** majority White (> 92%) Work status: 27 – 33% off work in past 4 wks due to LBP, or leg pain; 7 – 12% not doing work due to pain in last 4 wks Other socio-demographics: NR Co morbidities: NR Pain grading: mean values on VAS 0 – 100 reported; mean < 4.0 for all grps Current tx/ co-intervention common in all groups: NR	**Groups** IG (n = 342)– manipulation + best care- HVTT develop by multi-disciplinary group- 8 tx in 12 wks Therapists: chiropractors, osteopathic practitioners and physiotherapist Drop outs: CG1 (n= 322)- manipulation + EX + best care Therapists: as IG CG2 (n = 328) – best care in GP Therapists: 12 wks Drop outs: CG3 (n = 297) – best care in GP + EX Therapists: 9 classes of EX in 12 wks + GP Drop outs:	**Results:** **Utility EQ-5D** (estimated by analysis of covariance with adjustment for baseline score), mean (SD): **Baseline/ 3 mo/1 yr:** IG: 0.59 (0.25)/ 0.68 (0.26)/ 0.66 (0.28) CG1: 0.59 (0.24)/ 0.66 (0.24)/ 0.68 (0.27) CG2: 0.59 (0.23)/ 0.63 (0.26)/ 0.63 (0.26) **Quality adjusted life yr (QALY)s – 1 yr, mean (SD)** IG: 0.66 (0.24) CG1: 0.65 (0.24) CG2: 0.62 (0.23) CG3: 0.64 (0.25) Note: other efficacy data is presented in table UK Beam Trial Team (2004)[119]	***Base yr: 2000-2001*** ***Reported Results:*** *Total cost of health care over 12 mos (included: EX class within UK BEAM, hospital inPt stay, outPt attendance, GP consultation):* *Manipulation $998.69 (1417.73)* *Manipulation + EX $869.47 (904.54)* *Best care in GP $638.72 (1111.29)* *Best care in GP + EX $897.16 (1674.32)* ***Conclusion:*** *SM showed to be cost effective addition to best care by GP for back pain. Manipulation alone might give better value vs. manipulation vs. EX*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Witt, CM (2006)[49,306,307] Country: Germany	**Treatment duration:** 3 mos **Last assessment:** 6 mos N screened: 11630 N randomized (total): 2841 with consent form N completed tx/fu (total): 2385 **Inclusion:** clinical diagnosis of CLBP> 6 mos; age 18 or over, provision of written informed consent **Exclusion:** protrusion or prolapse > 1 intervertebral discs with concurrent neurologic symptoms; prior vertebral column surgery, infectious spondylopathy, LBP caused by inflammatory, malignant or autoimmune disease; congenital deformation of the spine, except for slight lordosis or scoliosis; compression fracture caused by osteoporosis; spinal stenosis; and spondylolysis or spondylolisthesis.	**Mean age (SD/range):** 53.1 (13.5) vs. 52.6 (13.2) yrs **% of male: 43%** **Racial composition:** NR Work status: NR Other socio-demographics: education (>10 yrs schooling) 25.8% vs. 29.2% Co morbidities: NR Pain grading: NR Current tx/ co-intervention common in all groups: usual care	**Groups** IG (n = 1451)– acu - disposable needles- at acu points decided by the treating physician- 3 mos tx phase with a maximum of 15 acu tx- 74% received 5- 10 sessions; 21% received > 10 sessions; 5% received < 5 sessions Therapists: physicians with A-diploma, a German diploma representing 140 hrs of certified acu education Drop outs: CG (n = 1390) – Delayed acu- 3 mos phase Therapists: as acu Drop outs:	**Results:** **Pain: Back pain los (LBP rating scale) change in 3 and 6 mos from baseline- mean (95% CI) IG vs. CG:** Baseline to 3 mos: 37.0 (35.2, 38.9) vs. 9.8 (7.9, 11.7) Baseline to 6 mos: 33.5 (31.4, 35.7) vs. 30.8 (28.7, 33.0) **Disability- Back function loss (HFAQ), mean (95% CI) IG vs. CG:** Baseline to 3 mos: 33.3 (31.4, 35.3) vs. 11.3 (9.5, 13.1) Baseline to 6 mos: 32.4 (30.3, 34.4) vs. 28.6 (26.5, 30.8) **Conventional care::** NR	***Base yr: 2001-2004 (1 € = 1.45364 USD)*** ***Reported Results:*** *QALY mean (SD):* *Baseline: 0.60 (0.11) vs. 0.61 (0.11)* *3 mos: 0.69 (0.12) vs. 063 (0.11)* *Over the duration of study (baseline – 3 mos /2)* *0.65 (0.10) vs. 0.62 (0.10)* *Overall cost at 3 mos post randomization, mean (SD):* *Acupuncture (n = 1231) $1,544.43 (3,253.57)* *Conventional care (n = 1157) $1,137.27 (2,513.05)* *Diagnostic S cost at 3 mos, mean (SD):* *Acupuncture (n = 1231) $809.90 (1,268.94)* *Conventional care (n = 1157) $366.19 (1,548.72)* ***Conclusion:*** *acu + routine care was associated with marked clinical improvement and was relatively cost-effective.*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
			Neck Pain		
Willich, SN (2006)[209,210] Country: Germany	**Treatment duration:** 3 mos **Last assessment:** 6 mos N screened: 14161 N randomized (total): 3766 N completed tx (total): 3715 **Inclusion:** adults age ≥ 18 yrs of age with chronic N-S NP (> 6 mos in duration) **Exclusion:** prolapse of at least one intervertebral discs with concurrent neurological symptoms, prior vertebral surgery, spondylopathy, NP caused by inflammatory, cancer or autoimmune disease, congenital deformation of spine except scoliosis lordosis, compression fracture caused by osteoporosis; spinal stenosis	**Mean age (SD/range):** 49.8 (12.8) vs. 51.4 (13.0) yrs **% of male:** 30.1% vs. 32.1% **Racial composition:** NR Work status: NR Other socio-demographics: > 10 yrs of schooling 31.4% vs. 30.1% Co morbidities: NR Pain grading: NR Current tx/ co-intervention common in all groups: usual care	**Groups** IG (n = 1753)– acu-standard acu with disposable needles permitted; 15 sessions during 3 mo Therapists: Physicians held A-diploma based on 140 h certified acu education Drop outs: 29 CG (n = 1698) – GP care-conventional Tx as needed Therapists: GP Drop outs: 22	**Results:** %, mean changes from baseline (95% CI) **Pain and disability:** bodily pain reduction 3 mos: 28.9 (27.6; 30.2) vs. 5.8 (4.5;7.1) 6 mos: 28.0 (26.5; 29.4) vs. 25.1 (23.6; 26.5) **QoL, SF-36 (increase from baseline):** Physical functioning: 8.4 (7.6; 9.2) vs. 0.9 (0.2; 1.7) Role physical: 24.5 (22.6; 26.5) vs. 5.1 (3.3; 7.0) Bodily pain: 21.0 (20.0; 22.0) vs. 5.3 (4.3; 6.3) Physical component score: 5.8 (5.5; 6.2) vs. 1.2 (0.8; 1.5)	***Base yr: 2004*** ***Reported Results:*** *Total cost, mean (SD): $1165.42 (1953.09) vs. $816.04 (1837.34)* *- Total diagnostic S cost: $556.40 (688.54) vs. $145.80 (930.36)* *- Difference in total overall cost in 6 mo: $471.61 (2106.2) vs. 36.41 (1581.28)* *- Difference in total diagnosis-S cost in 6 mos: $399.17 (465.88) vs. $7.41 (525.76)* ***Conclusion:*** *In the acu group 0.024 ± 0.004 additional QALYs were gained compared to the CG (associated with additional costs (overall: $370.03 ± 65.20; diagnosis-S: $404.16 ± 30.69). The (ICER) was $15,698.47 (overall) and $17,145.06 (diagnosis- S) per QALY gained. Therefore, for the assumed threshold value of $62,950 the additional acu intervention was cost-effective.*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Lewis, M (2005)[308,309] Country: UK	**Treatment duration:** 6 wks **Last assessment:** 6 mos N screened: 735 N randomized (total): 350 N completed tx (total): **Inclusion:** pts at least 18 yrs with clinical diagnosis of nonS NP; referred to PT by a GP with a new episode of non- S NP; no consultations other than primary health care team for NP in previous 6 mo **Exclusion:** weight loss, fever, progressive neurologic disorder, evidence of muscle weakness or disturbance in normal sensation, history of malignancy, inflammatory arthritis, polymyalgia rheumatica, osteoporosis, or gross structural or neurologic abnormality affecting the neck; pregnancy; participants with contraindications to the study tx	**Mean age:** 51 yrs **% of male:** 37% **Racial composition:** NR **Work status (%):** Employed 58;Unemployed 42; Pts off work in px 3 mo due to NP 29; Routine and manual occupations 49 Other socio-demographics: NR Co morbidities: NR Pain grading: higher mean NPQ scores and lower mean EQ-5D scores for MT group Current tx/ co-intervention common in all groups: non-steroidal anti-inflammatory drugs continued at a stable dose; advise and EX (A&E) delivered by study therapist; consultation/prescription from GP, extra PT; OTC Med, consult other health prof.	**Groups** IG (n = 114)– manual therapy (MT)- hands-on, passive or active assisted movements, Mobs or manipulations to the joints and soft tissues – max of 8, 20 min session over 6 wks Therapists: experienced senior musculoskeletal therapist Drop outs: 4 CG (n = 115) – A&E only (control) Therapists: as IG Drop outs: 13 CG (n =121) –MT + shortwave diathermy (PSWD) Therapists: as IG Drop outs: 8 advice and EX and manual therapy (SM)	**Pain:** Northwick Park Scores (NPQ, 0 - 100) , mean (SD): 6 wks: 29.6 (15.5) 25.6 (17.6) vs. 28.9 (15.5) 6 mos: 27.8 (19.4) vs. 24.2 (18.6) vs. 26.9 (18.7) Global assessment of overall change (%): **Much better** 6 wks: 31 vs. 27 vs. 22; 6 mos: 33 vs. 31 vs. 28 **Much worse:** 6 wks: 0 vs. 0 vs. 1; 6 mos: 1 vs. 2 vs. 3 **Conventional care::** % taking painkillers in past 48 hrs 6 wks: 55 vs. 31 vs. 43 6 mos: 54 vs. 32 vs. 52	***Base yr: 2003*** ***Reported Results:*** *Total healthcare resources cost at 6 mos MT(n=87): $190.69 (1742.41)* *A&E (n = 77): $169.10 (1735.23)* *PSWD (n = 94): $598.22 (10427.93)* *Total Societal costs (total costs of health-care resources + pts resources + productivity loss)* *MT(n=87): $486.81 (7321.56)* *A&E (n = 77): $197(1714.75)* *PSWD (n = 94): $543.13 (8921.38)* ***Conclusion:** the cost-effective intervention is likely to be A&E or MT, depending on the economic perspective and preferred outcome*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
Kothals de Bos (2005)[310] Country: the Netherlands	**Treatment duration:** 6 wks **Last assessment:** 1 yr N screened: NR N randomized (total): 183 N completed tx (total): 178 **Inclusion:** non S NP for at least 14 ds,18-70 yrs old **Exclusion:** manual therapy or PT during previous 6 mos; operative surgeries in neck area or S reasons for complaints (e.g. malignant disease)	**Mean age (SD/range):** 45 yrs **% of male:** 30 – 44% **Racial composition:** NR Work status: n (%) pts employed ranged 71-78% Other socio-demographics: NR Co morbidities: NR **Cause/duration of Pain:** Pain grading: NR Current tx/ co-intervention common in all groups: home EX, Med such as paracetamol or non-steroidal antiphlogistica as usual if these not replaced by others during tx	**Groups** IG (n = 60)– manual therapy – Mob (muscular and spinal) , co-ordination, stabilization-45 min per session; 1 x wk Therapists: 6 registered manual therapists with min 3 yrs training Drop outs: 2 at 1 yr CG1 (n = 59) – PT-individual build-up EXs, active relaxation & relieving EXs, stretching & functional EXs- 30 min per tx; 2 x wk Therapists: 5 physiotherapists Drop outs: 0 at 1 yr CG2 (n = 64) – standard tx- heat application, EXs, paracetamol, non-steroidal antiphlogistica-10 min visits, 2 x wk Therapists: 42 GPs Drop outs: 3 at 1 yr	**Results:** **Pain:** intensity (0-10) at 1 yr 42 (2.4) vs. 3.1 (2.9) vs. 4.1 (2.9) **Disability:** different of mean effects within each tx between baseline and 52 wks 7.2 (7.5) vs. 6.3 (8.0) vs. 8.5 (7.4) **Conventional care::** N of visits to GP, manual tx sessions, PT sessions, medical specialist care; professional home care, during one yr Other: absenteeism from paid work ; or unpaid work in one yr	***Base yr: 1997-1998*** ***Reported Results:*** *Average LBP outPt costs in 18 mos* *IG = 402.0* *CG = 1,166.4* *CG2 = $ 1,240.2* ***Conclusion:*** *manual therapy is more effective and less costly for treating NP than PT*

Author ID Country	Study Characteristics	Population Characteristics Pain Characteristics	Intervention Detail (method, frequency, tx provider)	Efficacy/Harms Outcomes (summary data)	*Economic Outcomes (summary data)*
ID = identification; RCT = randomized clinical trial; SD = SD; LBP = LBP; NP = NP:TP = TP; NS = non S; NR = NR; Acu = acu; AP = acu points; TENSE = ; fu = Fu; wk/s = wk/s; mth/s = mo/s; Tx = tx; IG = IG (only CAM interventions would use this acronym); CG = CG (used for all comparisons including CAM used in conjunction with another intervention) ES= ES; TP = TP; PP = pressure point; GP= GP; PT= physical therapy *HFAQ: Hannover Functional Ability Questionnaire; HVTT= high velocity thrust technique; QALY= quality adjusted life yr* *All cost are reported as USD as reported in the study or converted using historic data (rates) for the yr/s indicated by authors.*					

Table 4-1 – CAM Back Pain II- Observational Studies Reporting Harms

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Group / Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Cassidy, D (2008) [311] Country: Canada Quality score: 8/27	Trial Design: Case control and case-crrosover Cases n = 818 Matched controls n= 3164 Inclusion: All incident vertebrobasilar occlusion and stenosis strokes resulting in acute care hospital admission from April 1, 1993 – March 31, 2002. Exclusion: Cases that had an acute care hospital admission for any type of stroke, transient cerebral ischemia or late effects of cerebrovascular diseases before their VBA stroke admission or since April 1, 1991.	Mean age: Cases: 63.1 Control: 62.6 % of male: Cases: 63.3 Control: 63.9 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior CAM intervention: NRs Prior surgery related to current complaint: NR	Cause of Pain: Headache / Neck Pain Duration of Pain: NA Severity of pain (Grading): NA Co-interventions: NA	Groups: Separated by age categories and doctor visit type Patients over 45 years old Patients 45 years old and younger Primary Care Physician Visits Chiropractic Visits	Outcome instruments: Pain: NA Disability: NA Results: Baseline: Pain: NA Disability: NA	Harms: Chiropractic visit in the month before the index date: Patients 45 years of age and under: (OR=3.13, 95% CI: 1.48, 6.63). Primary care physician visits in the month before the index date: Patients 45 years of age and under (OR= 3.57, 95% CI: 2.17, 5.86) Patients over 45 years of age (OR= 2.67, 95%CI: 2.25, 3.17).

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Group / Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Cook, C (2008)[314] Country: USA Quality score: 6/27	Trial Design: Retrosepctive cohort Group with PT: n = 75 Group without PT: n = 75 Inclusion: All patients with a primary diagnosis of mechanical low back pain, hospitalized and documented in NIS databases from 1988 to 2005 with additional codes for PT MSK manipultion, non-operative manipulation of the spine, mobilization of the spone, Exclusion: Patients younger than 18 years with any form of surgical procedure and withany form of pathlogic fracture,tumor or other mechanical low back diagnosis.	Mean age: Group with PT: 53.62 Group without PT: 50.93 % of male: Group with PT: 23% Group without PT: 22% Racial composition: Group with PT: White: 66.7% Black: 4.00% Hispanic: 2.67% Other: 3.00% Missing: 22.67% Group without PT: White: 69.33% Black: 5.33% Hispanic: 2.67% Other: 0% Missing: 22.67% Work status: NR	Cause of Pain:NA Duration of Pain: NA Severity of pain (Grading): NA Co-interventions: NA	Groups: Group with PT: Diagnosis of of mechanical LBP who received PT manual therapy Group without PT: Diagnosis of mechanical LBP who did not receive PT manual therapy	Outcome instruments: Pain: NA Disability: NA Results: Baseline:NA Pain: NA Disability: NA	Harms: Complication variables between two groups: No difference. No further description of adverse events was provided in this study.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Group / Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Kohlbeck, F (2005) [315] Country: USA Quality score: 12/27	Trial Design: Prospective cohort N screened = 314 N included = 68 Inclusion: Patients that sought care at private chiro practices from Aug. 20, 2000 – Feb. 5, 2002; presented with chronic nonspecific LBP; reduced lumbopelvic flexibility; btwn 18-60 years. Exclusion: BP caused by fracture, tumor, infection, severe spondyloarthropathy; active rheumatoid disease; any active infectious disease; current history of smoking & drug/alcohol abuse; severe coexisting disease; blood coagulation disorder; any medication that would conflict with sedating meds; any conditions that would preclude the use of manipulation; lacked ability to read English; current LBP involving third-party liability or worker's comp.	Mean age: 41.2 % of male: 61.8% Racial composition: White: 83.8 Black: 1.5% Hispanic: 7.4% Asian: 2.9% Other: 4.4% Work status: Currenly working: 92.6 Unemployed/retired: 7.4	Cause of Pain:Nonspecific Low Back Pain Duration of Pain: Chronic Severity of pain (Grading): 100 point scale 0-100 (most pain to least) Co-interventions: NA	Interventions: Spinal manipulation therapy only: Patients continued to receive SMT similar to initial phase of treatment. It involved a controlled dynamic thrust applied with high velocity and low amplitude, directed at 1 or more joints of the spine using short-lever contacts. Medication-assisted manipulation: MAM incorpoates the intravenous administration of sedative and analgesic medication – reducing pain and muscle spasm that hinder the effectivenss of tradition al SMT.	Outcome instruments: Pain: 0-100 point scale (most pain to least) Disability: 0-100 point scale (most disability to least) Results: Baseline: Mean Pain/Disability: 61.2 MAM vs. 71.2 SMT 6wk: 75.7 vs. 79.2 3 mo: 84.8 vs. 80.4 6 mo: 85.6 vs. 83.4 1 year: 81.3 vs. 81.0	Harms: Treatment with medication-assisted manipulation or spinal manipulation alone for at least 4 – 6 weeks resulted in no complications. In this study spinal manipulation had been delivered by two chiropractors. In addition to the intervention treatment, participants received advice for exercise.

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Group / Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Rothwell, DM (2001) [313] Country: Canada Quality score: 8/27	Trial Design: Population-based nested case-control Cases n = 582 Matched controls n = 2328 Inclusion: All persons admitted to an Ontario acute care facility with a diagnosis of vertrebrobasilar dissection or occlusion from January 1993-December 1998. Exclusion: Cases who were not eligible for OHIP in the year before the reference date; Patients in chronic care facilities with prior stroke treated within the chronic care facility.	Mean age: All subjects: 60 years % of male: All subjects: 61% Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior CAM intervention: NRs Prior surgery related to current complaint: NR	Cause of Pain:NA Duration of Pain: NA Severity of pain (Grading): NA Co-interventions: NA	Groups: Cases and control Cases: Diagnosis of vertebrobasilar dissection or occlusion Control: matched by sex and age with no history of hospital admission of stroke The groups were also categorized by age into two groups 45 years and younger and over 45 years old.	Outcome instruments: Pain: NA Disability: NA Results: Baseline:NA Pain: NA Disability: NA	Harms: Case group: (Patients aged 45 years and younger) Chiroparctic visits by a week before a vertebro-basilar accident: (OR= 5.03, 95% CI: 1.3, 43.8) 3 or more vists to a chiropractic care in the month before vetrebro-basilar accident (OR= 4.98, 95% CI: 1.3, 18.6)

Author ID Country	Study Characteristics	Population Characteristics	Pain Characteristics	Group / Intervention Detail	Outcome results: Pain, Disability	Outcome results: Other Outcomes/ Harms
Smith, W.S. (2003) [312] Country: USA Quality score: 10/27	Trial Design: Nested case-control Cases n = 51 Matched controls n= 100 Inclusion: All patients evaluated for ischemic stroke or TIA from 1995 – 20000 who were aged 60 years or less at the time of the event. Exclusion: Vascular events not caused by arterial dissection	Mean age: Cases: 40.6 Control: 44.0 % of male: Cases: 41 Control: 42 Racial composition: NR Work status: NR Other socio-demographics: NR Co morbidities: NR Prior CAM intervention: NRs Prior surgery related to current complaint: NR	Cause of Pain: NA Duration of Pain: NA Severity of pain (Grading): NA Co-interventions: NA	Groups: Cases and control Cases: Had vascular event casued by arterial dissection Control: matched by sex and within 10-year age stata.	Outcome instruments: Pain: NA Disability: NA Results: Baseline:NA Pain: NA Disability: NA	Harms: % of patients with arterial dissection had SMT within 30 days = 14.0 % % of controls had SMT within 30 days = 3.0%, SMT within 30 days (Vertebral Dissection group) (OR = 6.6, 95% CI: 1.4 to 30.0).

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Appendix D. Excluded Studies

Non-RCT; 1- Not a Comparative Study of CAM Intervention.

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Appendix E. Additional Acknowledgements

The UO-EPC gratefully acknowledges the following individuals who served on our Technical Expert Panel (TEP). Acknowledgment does not reflect endorsement of this report.

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Appendix F

Quality Assessment Tools and Questionnaires

Table 1. Updated Method Guidelines for Systematic Reviews in the Cochrane Collaboration Back Review Group – A 12 Item tool.

Item	Rating
Was the method of randomization adequate?	Yes / No / Unsure
Was the treatment allocation concealed?	Yes / No / Unsure
Were the groups similar at baseline regarding the most important prognostic indicators?	Yes / No / Unsure
Was the patient blinded to the intervention?	Yes / No / Unsure
Was the care provider blinded to the intervention?	Yes / No / Unsure
Was the outcome assessor blinded to the intervention?	Yes / No / Unsure
Were co-interventions avoided or similar?	Yes / No / Unsure
Was the compliance acceptable in all groups?	Yes / No / Unsure
Was the drop-out rate described and acceptable?	Yes / No / Unsure
Was the timing of the outcome assessment in all groups similar?	Yes / No / Unsure
Did the analysis include an intention-to-treat analysis?	Yes / No / Unsure
Are reports of the study free of suggestion of selective outcome reporting?	Yes / No / Unsure

Maurits van Tulder, PhD, Andrea Furlan, MD, Claire Bombardier, MD, FRCP, Lex Bouter, PhD, and the Editorial Board of the Cochrane Collaboration Back Review Group

Table 2. Acupuncture for Chronic Low-back pain a systematic review of the literature – A 13 item tool

Item	Rating
Adequate sequence generation?	Yes / No / Unsure
Allocation concealment?	Yes / No / Unsure
Blinding? (All outcomes - patients?)	Yes / No / Unsure
Blinding? (All outcomes - providers?)	Yes / No / Unsure
Blinding? (All outcomes - outcome assessors?)	Yes / No / Unsure
Incomplete outcome data addressed? (All outcomes - drop-outs?)	Yes / No / Unsure

Incomplete outcome data addressed? (All outcomes - ITT analysis?)	**Yes / No / Unsure**
Free of selective reporting?	**Yes / No / Unsure**
Free of other bias?	**Yes / No / Unsure**
Similarity of baseline characteristics?	**Yes / No / Unsure**
Co-interventions avoided or similar?	**Yes / No / Unsure**
Compliance acceptable?	**Yes / No / Unsure**
Timing outcome assessments similar?	**Yes / No / Unsure**

Table 3. CHEC List- 19 item Quality assessment tool for economic studies

Item	Rating
Is the study population clearly described?	**Yes / No**
Are competing alternatives clearly described?	**Yes / No**
Is a well-defined research question posed in answerable from?	**Yes / No**
Is the economic study design appropriate?	**Yes / No**
Is the chosen time horizon appropriate in order to include?	**Yes / No**
Is the actual perspective chosen appropriate?	**Yes / No**
Are all important and relevant costs for each alternative identified?	**Yes / No**
Are all costs measured appropriately in physical units?	**Yes / No**
Are costs valued appropriately?	**Yes / No**
Are all important and relevant outcomes for each alternative identified?	**Yes / No**
Are all outcomes measured appropriately?	**Yes / No**
Are outcomes valued appropriately?	**Yes / No**
Is an incremental analysis of costs and outcomes of alternatives performed?	**Yes / No**
Are all future costs and outcomes discounted appropriately?	**Yes / No**
Are all important variables shoes values are uncertain appropriately subjected to sensitivity analysis?	**Yes / No**
Do the conclusions follow from the data reported?	**Yes / No**
Does the study discuss the generalizability of the results to other setting and patient groups?	**Yes / No**
Does the article indicate that there is no potential conflict of interest of study researcher(s) and funder(s)?	**Yes / No**
Are ethical and distributional issues discussed appropriately?	**Yes / No**

Table 4. The McGill Pain Questionnaire

Overview: The McGill Pain Questionnaire can be used to evaluate a person experiencing significant pain. It can be used to monitor the pain over time and to determine the effectiveness of any intervention. It was developed at by Dr. Melzack at McGill University in Montreal Canada and has been translated into several languages.

Sections:

(1) What Does Your Pain Feel Like?

(2) How Does Your Pain Change with Time?

(3) How Strong is Your Pain?

1- What Does Your Pain Feel Like?

Statement: Some of the following words below describe your present pain. Circle ONLY those words that best describe it. Leave out any category that is not suitable. Use only a single word in each appropriate category - the one that applies best.

Group	Descriptor	Points
1 (temporal)	Flickering	1
	Quivering	2
	Pulsing	3
	Throbbing	4
	Beating	5
	Pounding	6
2 (spatial)	Jumping	1
	Flashing	2
	Shooting	3
3 (punctate pressure)	Pricking	1
	Boring	2
	Drilling	3
	Stabbing	4
	Lancinating	5
4 (incisive pressure)	Sharp	1
	Cutting	2
	lacerating	3
5 (constrictive pressure)	Pinching	1
	Pressing	2
	Gnawing	3
	Cramping	4
	Crushing	5
6 (traction pressure)	Tugging	1
	Pulling	2
	Wrenching	3
7 (thermal)	Hot	1

	Boring	**2**
	Scalding	**3**
	Searing	**4**
8 (brightness)	**Tingling**	**1**
	Itchy	**2**
	Smarting	**3**
	Stinging	**4**
9 (dullness)	**Dull**	**1**
	Sore	**2**
	Hurting	**3**
	Aching	**4**
	Heavy	**5**
10 (sensory miscellaneous)	**Tender**	**1**
	Taut	**2**
	Rasping	**3**
	Splitting	**4**
11 (tension)	**Tiring**	**1**
	Exhausting	**2**
	Sickening	**1**
	Suffocating	**2**
14 (punishment)	**punishing**	**1**
	gruelling	**2**
	cruel	**3**
	vicious	**4**
	killing	**5**
15 (affective-evaluative-sensory: miscellaneous)	**wretched**	**1**
	blinding	**2**
16 (evaluative)	**annoying**	**1**
	troublesome	**2**
	miserable	**3**
	intense	**4**

	unbearable	**5**
17 (sensory: miscellaneous)	**spreading**	**1**
	radiating	**2**
	penetrating	**3**
	piercing	**4**
18 (sensory: miscellaneous)	**tight**	**1**
	numb	**2**
	drawing	**3**
	squeezing	**4**
	tearing	**5**
19 (sensory)	**cool**	**1**
	cold	**2**
	freezing	**3**
20 (affective-evaluative: miscellaneous)	**nagging**	**1**
	nauseating	**2**
	agonizing	**3**
	dreadful	**4**
	torturing	**5**

pain score = SUM(points for applicable descriptors)

2 - How Does Your Pain Change with Time?

Question	Response	Points
Which word or words would you use to describe the pattern of your pain?	**continuous steady constant**	**1**
	rhythmic periodic intermittent	**2**
	brief momentary transient	**3**

Do the following items increase or decrease your pain?

(1) liquor

(2) stimulants such as coffee

(3) eating

(4) heat

(5) cold

(6) damp

(7) weather changes

(8) massage or use of a vibrator

(9) pressure

(10) no movement

(11) movement

(12) sleep or rest

(13) lying down

(14) distraction (TV reading etc.)

(15) urination or defecation

(16) tension

(17) bright lights

(18) loud noises

(19) going to work

(20) intercourse

(21) mild exercise

(22) fatigue

3 -How Strong is Your Pain?

Statement: People agree that the following 5 words (mild discomforting distressing horrible excruciating) represent pain of increasing intensity. To answer each question below write the number of the most appropriate word in the space beside the question.

Question	Response	Points
Which word describes your pain right now?	**Mild**	**1**
	Discomforting	**2**

	Distressing	**3**
	Horrible	**4**
	Excruciating	**5**
Which word describes it at its worst?	**Mild**	**1**
	Discomforting	**2**
	Distressing	**3**
	Horrible	**4**
	Excruciating	**5**
Which word describes it when it is least?	**Mild**	**1**
	Discomforting	**2**
	Distressing	**3**
	Horrible	**4**
	Excruciating	**5**
Which word describes the worst toothache you ever had?	**Mild**	**1**
	Discomforting	**2**
	Distressing	**3**
	Horrible	**4**
	Excruciating	**5**
Which word describes the worst headache you ever had?	**Mild**	**1**
	Discomforting	**2**
	Distressing	**3**
	Horrible	**4**
	Excruciating	**5**

Which word describes the worst stomach-ache you ever had?	**Mild**	**1**
	Discomforting	**2**
	Distressing	**3**
	Horrible	**4**
	Excruciating	**5**

Interpretation:

• Maximum pain score: 78

• The higher the pain score the greater the pain.

References:

Melzack R. The McGill Pain Questionnaire: Major properties and scoring methods. Pain. 1975; 1: 277-299.

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• Minimum pain score: 0 (would not be seen in a person with true pain)

Table 5. Downs and Black Quality Assessment – A 27 item tool.

Item	Rating
Reporting	
Is the hypothesis/aim/objective of the study clearly described?	**Yes / No**
Are the main outcomes to be measured clearly described in the Introduction or Methods section?	**Yes / No**
Are the characteristics of the patients included in the study clearly described?	**Yes / No**
Are the interventions of interest clearly described?	**Yes / No**
Are the distributions of principal cofounders in each group of subjects to be compared clearly described?	**Yes / No**
Are the main findings of the study clearly described?	**Yes / No**
Does the study provide estimates of the random variability in the data for the main outcome?	**Yes / No**
Have all the important adverse events that may be a consequence of the intervention been reported?	**Yes / No**
Have the characteristics of patients lost to follow-ups been described?	**Yes / No**
Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	**Yes / No**
External validity	

Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	**Yes / No / Unable to determine**
Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	**Yes / No / Unable to determine**
Were the staff, places and facilities where the patients were treated, representative of the treatment the majority of patients receive?	**Yes / No / Unable to determine**
Internal validity - bias	
Was an attempt made to blind study subjects to the intervention they have received?	**Yes / No / Unable to determine**
Was an attempt made to blind those measuring the main outcomes of the intervention?	**Yes / No / Unable to determine**
If any of the results of the study were based on "data dredging", was this made clear?	**Yes / No / Unable to determine**
In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between intervention and outcome the same for cases and control?	**Yes / No / Unable to determine**
Were the statistical tests used to assess the main outcomes appropriate?	**Yes / No / Unable to determine**
Was compliance with the intervention/s reliable?	**Yes / No / Unable to determine**
Were the main outcome measures used accurate (valid and reliable)?	**Yes / No / Unable to determine**
Internal validity – confounding (selection bias)	
Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?	**Yes / No / Unable to determine**
Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	**Yes / No / Unable to determine**
Were study subjects randomized to intervention groups?	**Yes / No / Unable to determine**
Was the randomized intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	**Yes / No / Unable to determine**
Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	**Yes / No / Unable to determine**
Were loses of patients to follow-up taken into account?	**Yes / No / Unable to determine**
Power	
Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?	**Yes / No**

Appendix G. Quality Assessment Data

Table 1.1 Low Back Pain - Acupuncture

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Araki 2001 [1]	Yes	Yes	Yes	Yes	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	10
Brinkhaus 2006 [2]	Yes	Yes	Yes	Yes	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	8
Cao 2001 [3]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	No	Not clear	Not clear	Not clear	Not clear	0
Carlsson 2001 [4]	Not clear	Not clear	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Not clear	6
Ceccherelli 2002 [5]	Yes	Yes	Yes	Not clear	Yes	No	Yes	Not clear	Yes	Yes	Yes	Yes	Not clear	9
Ceccherelli 2003 [6]	Not clear	Not clear	Not clear	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	7
Chen 1998 [7]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	2
Chen 2005 [8]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Chen 2007 [9]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Cherkin 2001 [10]	Yes	No	Yes	No	No	No	Not clear	Yes	Yes	Yes	Yes	No	Not clear	6
Cherkin 2009 [11]	Not clear	Not clear	Not clear	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Not clear	6

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Chu 2004 [12]	No	No	Yes	Yes	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	No	7
Coan 1980 [13]	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Yes	Yes	Not clear	Not clear	Yes	Not clear	3
Cui 2004 [14]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Ding 1998 [15]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Ding 2002 [16]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Edelist 1976 [17]	Not clear	Not clear	Not clear	Yes	No	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	No	Not clear	2
Eisenberg 2007 [18]	Yes	Yes	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	8
Fu 2006 [19]	Not clear	Yes	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	3
Garvey 1989 [20]	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Not clear	No	Not clear	7
Giles 1999 [21]	Not clear	Not clear	No	No	No	Not clear	Not clear	No	No	Not clear	No	Yes	No	1
Giles 2003 [22]	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	Not clear	5
Grant 1999 [23]	Yes	Yes	No	No	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	No	6
Gunn 1980 [24]	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	No	Not clear	Yes	Not clear	4

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Guo 2005 [25]	No	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Yes	Not clear	Not clear	4
Haake 2007 [26]	Yes	Yes	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	10
He 1997 [27]	Not clear	No	Not clear	Yes	No	No	Not clear	Not clear	No	Yes	Yes	Yes	Not clear	4
He 2007 [28]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Hirota 2006 [29]	Yes	Not clear	Not clear	Yes	No	Not clear	No	Yes	Not clear	Yes	Not clear	Yes	No	5
Hodgson 2006 [30]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	
Hollisaz 2006 [31]	Not clear	Not clear	Yes	Not clear	No	Not clear	Not clear	No	No	Yes	Not clear	No	Not clear	2
Huang 2006 [32]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	Yes	Not clear	Not clear	6
Huang 2006 [33]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	No	Not clear	No	4
Inoue 2000 [34]	Yes	Yes	Not clear	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	10
Inoue 2001 [35]	Yes	Yes	Not clear	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	10
Inoue 2006 [36]	Yes	Yes	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	9
Itoh 2004 [37]	Yes	Not clear	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	No	7

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Itoh 2006 [38]	Yes	Yes	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	No	8
Itoh 2009 [39]	Not clear	Not clear	Yes	No	No	Not clear	Yes	Yes	Yes	Yes	Not clear	Yes	Not clear	6
Jia 2004 [40]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Yes	Not clear	Not clear	5
Kawase 2006 [41]	Yes	Yes	Yes	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	10
Kennedy 2008 [42]	Yes	Yes	No	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	8
Kerr 2003 [43]	No	No	Yes	Yes	No	Not clear	Yes	No	No	Yes	Not clear	Not clear	Not clear	4
Kittang 2001 [44]	No	Not clear	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	7
Kurosu 1979 [45]	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	Yes	Not clear	Yes	Not clear	Yes	Not clear	3
Kwon 2007 [46]	Yes	No	Yes	Yes	No	Not clear	Not clear	Yes	Yes	Yes	Yes	No	Not clear	7
Lai 2004 [47]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Lee 2007 [48]	Not clear	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Yes	Yes	Not clear	No	Not clear	3
Lehmann 1983 [49]	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	No	No	Yes	Not clear	No	Not clear	1
Leibing 2002 [50]	Not clear	Not clear	Yes	Not clear	No	Not clear	No	No	No	Yes	Not clear	No	Not clear	2

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Li 1997 [51]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Li 2005 [52]	Not clear	Not clear	Yes	Yes	No	No	Yes	Not clear	No	Yes	No	Not clear	Not clear	4
Li 2006 [53]	Yes	Not clear	Yes	Not clear	Not clear	No	Yes	Not clear	Yes	Yes	Yes	Not clear	Not clear	6
Lian 2005 [54]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Not clear	No	Not clear	3
Liang 2008 [55]	Not clear	Not clear	Yes	No	Not clear	Yes	Not clear	Not clear	Yes	Yes	Not clear	Yes	Not clear	5
Long 2000 [56]	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	No	2
Luo 2007 [57]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	0
Macdonald 1983 [58]	Not clear	Not clear	Not clear	No	No	Yes	Not clear	Not clear	Not clear	Not clear	No	Yes	Not clear	2
Mencke 1988 [59]	Yes	Not clear	Yes	Yes	Not clear	Yes	Yes	Not clear	Yes	Yes	No	Yes	Yes	9
Mendelson 1978 [60]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	No	No	Yes	Not clear	No	Not clear	1
Mendelson 1983 [61]	Not clear	Not clear	Yes	Yes	Not clear	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	6
Meng 2003 [62]	Yes	Yes	Yes	No	No	Not clear	Yes	Not clear	Yes	Yes	Yes	No	Not clear	7
Molsberger 2002 [63]	Not clear	No	Yes	No	No	No	Not clear	No	No	Yes	Yes	Not clear	Not clear	3

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Mu 2007 [64]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	Not clear	Not clear	Not clear	5
Peng 2006 [65]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	No	Not clear	No	3
Qu 2006 [66]	No	No	Yes	No	No	No	Not clear	Not clear	Not clear	Yes	No	Not clear	Not clear	2
Sakai 1998 [67]	Not clear	Not clear	No	No	No	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	0
Sakai 2001 [68]	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Not clear	Not clear	8
Sator-Katzenschlager 2004 [69]	Yes	Yes	No	Yes	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	9
She 2008 [70]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Takeda 2001 [71]	Yes	Not clear	Not clear	Yes	No	No	Not clear	Yes	Yes	Yes	Not clear	Not clear	Not clear	5
Tang 2008 [72]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	No	Not clear	No	3
Thomas 1994 [73]	Not clear	Not clear	Yes	No	No	No	Not clear	Yes	Yes	Yes	Not clear	No	Not clear	4
Thomas 2005 [74]	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Not clear	9
Tsui 2004 [75]	Not clear	Not clear	Yes	Yes	Not clear	Yes	Not clear	Not clear	Yes	Yes	Not clear	Yes	Not clear	6
Tsukayama 2002 [76]	Yes	No	Yes	Not clear	No	Not clear	Yes	Yes	Yes	Yes	Not clear	Yes	Not clear	7

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Wang 2004 [77]	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Yes	No	Yes	Not clear	2
Wang 2004 [78]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Not clear	Not clear	Not clear	Not clear	2
Wang 2005 [79]	Yes	Not clear	Yes	Not clear	Not clear	Yes	Yes	Not clear	No	Yes	Yes	Not clear	Not clear	6
Wang 2007 [80]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	Yes	Not clear	Not clear	6
Witt 2006 [81]	Yes	Yes	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	7
Wu 2004 [82]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	No	4
Wu 2004 [83]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Wu 2007 [84]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Xia 1997 [85]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Yao 2007 [86]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Ye 2002 [87]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Ye 2004 [88]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Yeung 2003 [89]	Not clear	Not clear	Yes	No	No	Not clear	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	7

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Yu 1997 [90]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Yuan 2006 [91]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	0
Yuan 2009 [92]	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Not clear	9
Zeng 2007 [93]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Zhang 2002 [94]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	No	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Zhang 2002 [95]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	No	Not clear	No	Yes	Not clear	Not clear	Not clear	1
Zhang 2007 [96]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Zhang 2008 [97]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	No	Not clear	Not clear	4
Zhong 2006 [98]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Zhou 1998 [99]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Zhou 2004 [100]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Zhou 2005 [101]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Zhou 2006 [102]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	Not clear	Not clear	No	5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Zhu 2003 [103]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4

Table 1.2 Low Back Pain - Manipulation

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Alaksiev 1996 [104]	Not clear	Not clear	Yes	No	No	No	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	3
Alaksiev 1996 [104]	Not clear	Not clear	Yes	No	No	No	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	3
Bronfort 1989 [105]	Not clear	Not clear	No	No	No	No	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	2
Bronfort 1989 [105]	Not clear	Not clear	No	No	No	No	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	2
Buerger 1980 [106]	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	3
Buerger 1980 [106]	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	3

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Cherkin 1998 [107]	Not clear	No	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	No	Not clear	5
Childs 2004 [108]	Yes	Yes	Yes	No	No	Yes	Yes	Not clear	No	Yes	Yes	Yes	No	8
Cote 1994 [109]	Yes	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	No	4
Dai 2006 [110]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Yes	No	Not clear	No	3
Evans 1978 [111]	Not clear	Not clear	Yes	No	No	Not clear	Yes	Yes	Yes	Yes	Yes	No	Not clear	6
Giles 1999 [21]	Not clear	Not clear	No	No	No	Not clear	Not clear	No	No	Not clear	No	Yes	No	1
Haas 2004 [112]	Yes	Yes	No	No	No	Not clear	No	Yes	Yes	Yes	Yes	Yes	Not clear	7
Hadler 1987 [113]	Not clear	No	Yes	Yes	No	Yes	Not clear	Yes	Yes	Yes	No	Yes	Not clear	7
Herzog 1991 [114]	Not clear	Not clear	Not clear	No	No	Yes	Yes	Yes	No	Yes	No	Yes	Not clear	5
Hoehler 1981 [115]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Not clear	Not clear	Not clear	No	Yes	Not clear	3
Hoehler 1981 [115]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	3
Hoiriis 1999 [116]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	0
Hoiriis 2004 [117]	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Not clear	8
Hondras 2009 [118]	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	11

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Hsieh 2002 [119]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	No	Yes	Yes	Yes	No	Not clear	4
Lalanne 2009 [120]	Not clear	Not clear	Yes	No	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	1
Mathews 1988 [121]	Not clear	Not clear	Not clear	No	No	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Not clear	2
Mohseni-Bandpei 2006 [122]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Not clear	No	Yes	Not clear	No	Not clear	2
Morton 1999 [123]	Yes	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	4
Pope 1994 [124]	Not clear	Yes	Yes	No	No	Yes	Not clear	No	Not clear	Yes	No	Yes	Not clear	5
Postacchini 1988 [125]	Not clear	Not clear	Yes	No	No	Not clear	Yes	Yes	Yes	Yes	Not clear	Yes	Not clear	6
Rasmussen 1979 [126]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Not clear	Not clear	No	Not clear	2
Rasmussen 2008 [127]	Not clear	Not clear	Not clear	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Not clear	6
Rupert 1985 [128]	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	No	Not clear	2
Sanders 1990 [129]	Not clear	No	Yes	Not clear	Not clear	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	7
Shearar 2004 [130]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	1
Triano 1995 [131]	Yes	No	Yes	No	No	Yes	Yes	No	No	Yes	No	Yes	Not clear	6

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Drop out rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
UK BEAM Trial Team 2004 [132]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	5
Waagen 1986 [133]	No	Not clear	Not clear	Yes	No	Yes	Yes	No	No	Yes	Not clear	Yes	Not clear	5
Zhang 2008 [134]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	No	Not clear	Not clear	4

Table 1.3 Low Back Pain - Mobilization

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Aleksiev 1995 [135]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	No	Not clear	2
Chiradejnant 2002 [136]	Not clear	Not clear	Not clear	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Not clear	Not clear	5
Chiradejnant 2003 [137]	Yes	Yes	Not clear	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	9
Cote 1994 [109]	Yes	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	No	4

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Goodsell 2000 [138]	No	Not clear	Not clear	No	No	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	3
Hadler 1987 [113]	Not clear	No	Yes	Yes	No	Yes	Not clear	Yes	Yes	Yes	No	Yes	Not clear	7
Hanrahan 2005 [139]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	2
Hemmila 1997 [140]	Yes	Not clear	Yes	No	No	Not clear	Yes	No	No	Yes	Not clear	Yes	Not clear	6
Hemmila 2002 [141]	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Not clear	8
Konstantinou 2007 [142]	Yes	Not clear	Not clear	No	No	Yes	Not clear	Not clear	Yes	Yes	Not clear	Yes	No	5
Li 2006 [143]	Yes	Yes	Yes	Yes	Not clear	Yes	Yes	Not clear	Yes	Yes	Yes	Not clear	Yes	10
Lopez 2007 [144]	Yes	Not clear	No	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Yes	8
Mackawan 2007 [145]	Not clear	Not clear	No	No	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	5
Powers 2008 [146]	Not clear	No	Yes	No	No	Yes	Not clear	Not clear	No	Yes	Not clear	Yes	No	4
Ritvanen 2007 [147]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	5
Timm 1994 [148]	Not clear	Not clear	Yes	No	No	Yes	No	Not clear	Yes	Yes	Not clear	Yes	No	4

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Wreje 1992 [149]	Not clear	Not clear	Not clear	Not clear	No	Not clear	Yes	Yes	Yes	Yes	Not clear	No	Not clear	4
Zaproudina 2009 [150]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Yes	Yes	Yes	Not clear	Not clear	Not clear	5

Table 1.4 Low Back Pain - Massage

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Chatchawan 2005 [151]	Yes	Not clear	Yes	Not clear	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	Not clear	6
Cherkin 2001 [10]	Yes	No	Yes	No	No	No	Not clear	Yes	Yes	Yes	Yes	No	Not clear	6
Farasyn 2006 [152]	Not clear	Not clear	Yes	No	No	Not clear	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	7
Field 2007 [153]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	2
Franke 2000 [154]	Yes	Not clear	Yes	No	Not clear	Not clear	Yes	Yes	Yes	Yes	No	Yes	Yes	8

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Geisser 2005 [155]	Don't know	Don't know	Yes	Don't know	No	Yes	Don't Know	No	No	Don't know	Don't know	Yes	Don't Know	
Hernandez-Reif 2001 [156]	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Yes	No	Yes	No	2
Hoehler 1981 [115]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	3
Hsieh 2004 [157]	Yes	No	Yes	Not clear	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	9
Hsieh 2006 [158]	Yes	Yes	Yes	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	9
Konrad 1992 [159]	Not clear	Not clear	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Not clear	6
Li 2006 [143]	Yes	Yes	Yes	Yes	Not clear	Yes	Yes	Not clear	Yes	Yes	Yes	Not clear	Yes	10
Little 2008 [160]	Yes	Yes	Yes	Not clear	Not clear	Yes	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	8
Mackawan 2007 [145]	Not clear	Not clear	No	No	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	5
Poole 2007 [161]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	5
Pope 1994 [124]	Not clear	Yes	Yes	No	No	Yes	Not clear	No	Not clear	Yes	No	Yes	Not clear	5
Preyde 2000 [162]	Yes	Not clear	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	No	6

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Quinn 2008 [163]	Yes	No	Yes	Yes	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	9
Yip 2004 [164]	No	No	Yes	Not clear	No	No	Yes	Yes	Yes	Yes	Not clear	No	Not clear	5
Zhang 2004 [165]	Yes	Not clear	Yes	Yes	Not clear	Not clear	Yes	Yes	No	Not clear	Yes	Not clear	Not clear	6

Low Back Pain - Manual Treatment

Table 1.5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Aure 2003 [166]	Yes	Yes	Yes	No	No	Not clear	Yes	Yes	Yes	Yes	Yes	No	Not clear	8
Farrell 1982 [167]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Yes	Not clear	4
Ferreira 2007 [168]	Yes	Yes	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	7
Hancock 2007 [169]	Yes	Yes	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	Not clear	Yes	Yes	9

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Hurley 2004 [170]	Yes	No	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	Not clear	6
Hurwitz 2006 [171]	Yes	Yes	Yes	No	No	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	Not clear	6
Koes 1992 [172]	Yes	Not clear	Yes	No	No	Yes	Not clear	No	Yes	Yes	Not clear	No	No	5
MacDonald 1990 [173]	Not clear	Not clear	Yes	No	No	Not clear	Yes	Yes	Yes	Yes	Not clear	No	Not clear	5
Meade 1991 [174]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	5
Sims-Williams 1979 [175]	Not clear	Not clear	No	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	4

Table 1.6 Low Back Pain – Flexion Distraction

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Beyerman 2006 [176]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	4
Cambron 2006 [177]	Not clear	Not clear	No	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	3
Hawk 1999 [178]	Not clear	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Not clear	No	Not clear	4
Hawk 2005 [179]	Yes	Yes	Yes	Yes	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	8

Table 2.1 Neck Pain - Acupuncture

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Abernethy 2008 [180]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	0
Aigner 1999 [181]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Yes	No	Yes	Yes	6
Allison 2002 [182]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Not clear	Not clear	Yes	Yes	Yes	Not clear	5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Bin 2007 [183]	Not clear	Not clear	Yes	Not clear	Not clear	Yes	Yes	No	No	Not clear	Not clear	Yes	Not clear	5
Birch 1998 [184]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	No	No	Yes	Not clear	No	Not clear	2
Ceccherelli 2006 [185]	Yes	Not clear	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	Not clear	Yes	Not clear	6
Chu 1997 [186]	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	No	No	Yes	Not clear	No	Not clear	1
Coan 1981 [187]	Yes	Yes	No	Not clear	Not clear	Not clear	Not clear	Yes	Yes	No	Not clear	No	Not clear	4
David 1998 [188]	Not clear	No	Yes	No	No	Not clear	Not clear	Yes	Yes	Yes	Not clear	No	Not clear	4
Edwards 2003 [189]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	6
Fu 2005 [190]	Not clear	No	Yes	No	Not clear	Not clear	Yes	Not clear	No	Yes	No	Not clear	No	3
Fu 2007 [191]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	4
Ga 2007 [192]	Not clear	Not clear	Yes	No	Not clear	Yes	Not clear	Not clear	Yes	Yes	Not clear	Yes	Not clear	4
Gallacchi 1983 [193]	Not clear	Not clear	Yes	No	Not clear	Not clear	Not clear	Not clear	Yes	Yes	No	Yes	Yes	5
Giles 1999 [21]	Not clear	Not clear	No	No	No	Not clear	Not clear	No	No	Not clear	No	Yes	No	1
Giles 2003 [22]	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	Not clear	5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Hoehler 1981 [115]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	3
Huang 2008 [194]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Ilbuldu 2004 [195]	Not clear	Not clear	Yes	No	No	Yes	Yes	Not clear	Not clear	Yes	Not clear	Yes	Not clear	5
Irnich 2001 [196]	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	No	Not clear	4
Itoh 2007 [197]	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	6
Jia 2007 [198]	Yes	Not clear	Yes	Yes	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	5
Li 2004 [199]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Yes	Not clear	Not clear	4
Li 2006 [200]	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	Yes	Not clear	Not clear	5
Liang 2009 [201]	Yes	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	6
Lin 2004 [202]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Not clear	No	Yes	No	Yes	Not clear	3
Lu 2006 [203]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Lundeberg 1991 [204]	Not clear	Not clear	Not clear	Not clear	No	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	1
Nabeta 2002 [205]	Not clear	Not clear	Not clear	Yes	No	Not clear	Not clear	Yes	Yes	Yes	Yes	No	Not clear	5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Petrie 1983 [206]	Not clear	Not clear	Yes	No	No	Not clear	No	Yes	Yes	Yes	Yes	Yes	Not clear	6
Petrie 1986 [207]	Not clear	Not clear	No	Yes	No	Not clear	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	5
Salter 2006 [208]	Yes	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	6
Sator-Katzenschlager 2003 [209]	No	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	Not clear	No	Not clear	4
Seidel 2002 [210]	Yes	Not clear	Yes	Yes	Yes	Not clear	Yes	Yes	Yes	Yes	No	Yes	Yes	10
Shang 2002 [211]	Yes	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	6
Vas 2006 [212]	Not clear	Yes	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	7
Venancio 2008 [213]	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Yes	Not clear	2
Wang 2007 [214]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Wang 2007 [215]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	No	Yes	Not clear	Not clear	Not clear	2
Wang 2008 [216]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
White 2000 [217]	Not clear	Not clear	Not clear	No	No	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
White 2004 [218]	Yes	Yes	Yes	Yes	No	Not clear	Yes	Yes	Yes	Yes	Yes	No	Not clear	9
Witt 2006 [219]	Yes	Yes	Yes	No	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	7
Yang 2009 [220]	Yes	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	6
Zeng 2005 [221]	Not clear	Not clear	Yes	Yes	Not clear	Not clear	Yes	Not clear	No	Yes	Yes	Not clear	Not clear	5
Zhang 2003 [222]	Yes	Yes	Yes	Not clear	Not clear	Not clear	Yes	Yes	No	Yes	No	Not clear	No	6
Zhang 2005 [223]	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	0
Zhao 2004 [224]	Yes	Not clear	Yes	No	Not clear	Not clear	Not clear	Not clear	No	Yes	Not clear	Not clear	Not clear	3
Zhu 2002 [225]	Not clear	Yes	Yes	No	No	Yes	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	7
Zhu 2006 [226]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Not clear	Not clear	Not clear	4
Zhuang 2004 [227]	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Not clear	No	Yes	Yes	Not clear	Not clear	4

Table 2.2 Neck Pain - Manipulation

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Bischoff 2003 [228]	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Not clear	Not clear	1
Buchmann 2005 [229]	Yes	Not clear	Not clear	No	No	Yes	Yes	Yes	Yes	Yes	Not clear	Yes	Not clear	7
Cassidy 1992 [230]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	6
Chen 2007 [231]	Yes	Not clear	Yes	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	Yes	Not clear	7
Cilliers 1998 [232]	Not clear	Not clear	Yes	No	No	Not clear	Yes	Not clear	Not clear	Yes	Not clear	No	Not clear	3
Cleland 2004 [233]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Not clear	Not clear	Not clear	Not clear	No	Not clear	2
Cleland 2005 [234]	Yes	Yes	Yes	No	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	7
Cleland 2007 [235]	Yes	Yes	Yes	No	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	7
Egwu 2008 [236]	No	Not clear	Yes	Not clear	No	No	Yes	Yes	Yes	Yes	No	Yes	Not clear	6
Fernandez-de-Las-Penas 2004 [237]	Yes	Not clear	Yes	Not clear	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	Not clear	6
Giles 1999 [21]	Not clear	Not clear	No	No	No	Not clear	Not clear	No	No	Not clear	No	Yes	No	1
Giles 2003 [22]	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	Not clear	5
Giles 2003 [22]	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	Not clear	5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Gonzalez-Iglesias 2009 [238]	Yes	Yes	Yes	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	9
Haas 2003 [239]	No	No	Yes	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	8
Haas 2004 [240]	Not clear	Yes	Yes	No	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	7
Hurwitz 2002 [241]	Not clear	Yes	Yes	No	No	Not clear	Not clear	Not clear	Not clear	Yes	No	Yes	Not clear	4
Krauss 2008 [242]	Yes	Not clear	Yes	No	No	Yes	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	9
Martinez-Segura 2006 [243]	Yes	Yes	Yes	No	No	Yes	Not clear	Not clear	No	Yes	Not clear	Yes	No	6
Metcalfe 2006 [244]	Not clear	Not clear	No	No	No	Not clear	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	4
Nilsson 1997 [245]	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Not clear	Not clear	Not clear	7
Parkin-Smith 1998 [246]	Yes	Yes	Yes	No	No	No	Yes	Not clear	Not clear	Yes	Not clear	Yes	Not clear	6
Pikula 1999 [247]	Yes	Not clear	Not clear	No	No	No	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Yes	4
Sloop 1982 [248]	Not clear	Not clear	Yes	Yes	No	Yes	No	Not clear	Yes	Yes	Not clear	No	Not clear	5
Strunk 2008 [249]	Yes	Yes	Not clear	No	No	Not clear	Yes	Yes	Yes	Yes	Not clear	Not clear	No	6

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
van Schalkwyk 2000 [250]	No	No	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	No	1
Vernon 1990 [251]	Not clear	No	No	Not clear	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	6
Whittingham 2001 [252]	Yes	Yes	Yes	Yes	No	Not clear	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	8
Yurkiw 1996 [253]	Yes	Not clear	Not clear	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	7

Table 2.3 Neck Pain - Mobilization

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Brodin 1983 [254]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Yes	Yes	Not clear	No	Not clear	3
Buchmann 2005 [229]	Yes	Not clear	Not clear	No	No	Yes	Yes	Yes	Yes	Yes	Not clear	Yes	Not clear	7
Cassidy 1992 [230]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	6
Coppieters 2003 [255]	Not clear	Yes	Yes	No	No	Yes	Not clear	Not clear	Not clear	Yes	Not clear	Yes	Not clear	5

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Hemmila 2005 [256]	Not clear	Not clear	No	No	No	Yes	Not clear	Not clear	Yes	Yes	Yes	Yes	Not clear	5
Hoving 2006 [257]	Yes	Yes	Not clear	No	No	Yes	No	Not clear	Yes	Yes	Yes	Yes	Not clear	7
Hurwitz 2002 [241]	Not clear	Yes	Yes	No	No	Not clear	Not clear	Not clear	Not clear	Yes	No	Yes	Not clear	4
Kanlayanaphotporn 2009 [258]	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	11
Martinez-Segura 2006 [243]	Yes	Yes	Yes	No	No	Yes	Not clear	Not clear	No	Yes	Not clear	Yes	No	6
Martinez-Segura 2006 [243]	Yes	Yes	Yes	No	No	Yes	Not clear	Not clear	No	Yes	Not clear	Yes	No	6
Sterling 2001 [259]	Yes	Yes	Not clear	Not clear	Yes	Yes	Not clear	Yes	Yes	Yes	Not clear	No	Not clear	7
Zaproudina 2007 [260]	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	6

Table 2.4 Neck Pain - Massage

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Blikstad 2008 [261]	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not clear	10
Cen 2003 [262]	Yes	Not clear	No	No	No	Not clear	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	4
Fernandez-de-Las-Penas 2006 [263]	Not clear	Not clear	Yes	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	7
Gemmell 2008 [264]	Yes	Yes	Yes	No	No	Yes	Not clear	Yes	Yes	Yes	Yes	Yes	No	9
Hanten 1997 [265]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Yes	Yes	Yes	Yes	Yes	Not clear	6
Irnich 2001 [196]	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Yes	Yes	Yes	Yes	No	Not clear	4
Lin 2004 [202]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Not clear	No	Yes	No	Yes	Not clear	3
Meseguer 2006 [266]	Yes	Not clear	Yes	No	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	6
Sherman 2009 [267]	Yes	Yes	Not clear	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Not clear	8
Yagci 2004 [268]	Not clear	Not clear	No	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Yes	No	Yes	Not clear	2
Zaproudina 2007 [260]	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	Not clear	Yes	Yes	No	Yes	Not clear	6
Zhang 2005 [269]	Not clear	Not clear	Yes	No	No	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	No	Not clear	1

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Zhang 2005 [223]	Not clear	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	0

Table 3.1 Headache - Acupuncture

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Carlsson 1990 [270]	Not clear	Not clear	Yes	No	No	Yes	Yes	Yes	Yes	No	Not clear	Yes	Not clear	6
Venancio 2008 [213]	Not clear	Not clear	No	No	Not clear	Not clear	Not clear	Not clear	Yes	Not clear	Not clear	Yes	Not clear	2

Table 3.2 Headache - Manipulation

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Nilsson 1997 [245]	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Not clear	Not clear	Not clear	7
Whittingham 2001 [252]	Yes	Yes	Yes	Yes	No	Not clear	Not clear	Yes	Yes	Yes	Not clear	Yes	Not clear	8

Table 4.1 Thoracic Pain

Study ID	Q1. Randomization Adequate?	Q2. Treatment Allocation Concealed?	Q3. Groups similar at baseline re: prognostic indicators	Q4. Patient blinded to the intervention?	Q5. Care provider blinded to the intervention?	Q6. Outcome assessor blinded to the intervention?	Q7. Co-interventions avoided or similar?	Q8. Compliance acceptable in all groups	Q9. Dropout rate described and acceptable?	Q10. Timing of the outcome assessment in all groups similar?	Q11. Analysis includes an intention-to-treat analysis?	Q12. Reports of the study free of suggestion of selective outcome reporting?	Q13. Is this study free of any other bias?	Total "Yes"
Schiller 2001 [271]	Not clear	Not clear	Not clear	Not clear	No	No	Yes	Not clear	Not clear	Yes	Not clear	No	Not clear	2

Table 5.1 Methodological quality of economic evaluations on back pain using the CHEC-list.

	Hollinghurst et al[160,272]	Kominski et al[171,273-280]	Seferlis et al [281,282]	Niemisto et al [283]	Ratcliffe et al[74,284-29226]	Witt et al 2006[81,293,294]	UK BEAM Trial Team[132,295,296]
Study population described	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Competing alternatives described	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Research question posed in answerable form	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Appropriate study design	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Appropriate time horizon	Yes	Yes	Yes	Yes	Yes	No	Yes
Appropriate perspective	Yes	No	No	Yes	Yes	Yes	No
All costs identified	Yes	No	Yes	Yes	Yes	No	Yes
All costs measured appropriately	Yes	Yes	No	Yes	Yes	Not clear	Yes
Costs valued appropriately	Yes	Yes	No	Yes	Yes	No	Yes
All outcomes identified	Yes	NA	NA	Yes	Yes	Yes	Yes
All outcomes measured appropriately	Yes	NA	NA	Yes	Yes	Yes	Yes
Outcomes valued appropriately	Yes	NA	NA	Yes	Yes	Yes	Yes
Incremental analysis of costs and outcomes performed	Yes	NA	NA	Yes	Yes	Yes	Yes
Discounting	NA	No	NA	No	Yes	NA	NA
Sensitivity analysis	Yes	No	No	No	Yes	No	Yes
Conclusions follow from the data reported	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	Hollinghurst et al[160,272]	Kominski et al[171,273-280]	Seferlis et al[281,282]	Niemisto et al[283]	Ratcliffe et al[74,284-29226]	Witt et al 2006[81,293,294]	UK BEAM Trial Team[132,295,296]
Generalisability discussed	No	Yes	No	Yes	Yes	Yes	Yes
No potential conflict of interest	Yes	Yes	No	Yes	Yes	Yes	Yes
Ethical and distributional issues discussed appropriately	Yes	Yes	No	No	Yes	Yes	Yes

Table 5.2 Methodological quality of economic evaluations on neck pain using the CHEC-list.

	Korthals-de Bos et al[297]	Lewis et al[298,299]	Willich et al[219,300]
Study population described	Yes	Yes	No
Competing alternatives described	Yes	Yes	No
Research question posed in answerable form	Yes	Yes	Yes
Appropriate study design	Yes	Yes	Yes
Appropriate time horizon	Yes	Yes	No
Appropriate perspective	Yes	Yes	Yes
All costs identified	Yes	Yes	Yes
All costs measured appropriately	Yes	Yes	Yes
Costs valued appropriately	Yes	Yes	No
All outcomes identified	Yes	Yes	Yes
All outcomes measured appropriately	Yes	Yes	Yes
Outcomes valued appropriately	Yes	Yes	Yes
Incremental analysis of costs and outcomes performed	Yes	Yes	Yes
Discounting	NA	NA	Yes
Sensitivity analysis	No	No	Yes
Conclusions follow from the data	Yes	Yes	Yes

	Korthals-de Bos et al[297]	Lewis et al[298,299]	Willich et al[219,300]
reported			
Generalisability discussed	No	No	No
No potential conflict of interest	Yes	Yes	Yes
Ethical and distributional issues discussed appropriately	No	No	No

Table 6.1 – Quality Assessment on Observational Studies.

Item	Cassidy 2008 [301]	Kohlbeck 2005 [302]	Cook 2008 [303]	Rothwell 2001 [304]	Smith 2003 [305]
Reporting					
Is the hypothesis/aim/objective of the study clearly described?	Yes	Yes	Yes	Yes	Yes
Are the main outcomes to be measured clearly described in the Introduction or Methods section?	Yes	Yes	Yes	Yes	No
Are the characteristics of the patients included in the study clearly described?	Yes	Yes	Yes	No	Yes
Are the interventions of interest clearly described?	Yes	Yes	Yes	Yes	Unable to determine
Are the distributions of principal cofounders in each group of subjects to be compared clearly described?	No	No	No	Unable to determine	No
Are the main findings of the study clearly described?	Yes	Yes	Yes	Yes	Yes
Does the study provide estimates of the random variability in the data for the main outcome?	No	No	Unable to determine	Yes	No
Have all the important adverse events that may be a consequence of the intervention been reported?	Yes	Yes	Unable to determine	No	Yes
Have the characteristics of patients lost to follow-ups been described?	No	No	No	Unable to determine	No

Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	No	No	Unable to determine	Unable to determine	No
External validity					
Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	Unable to determine	Yes	Unable to determine	Unable to determine	Yes
Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	Unable to determine	Unable to determine	Unable to determine	Unable to determine	Unable to determine
Were the staff, places and facilities where the patients were treated, representative of the treatment the majority of patients receive?	Unable to determine	Unable to determine	Unable to determine	Unable to determine	Unable to determine
Internal validity - bias					
Was an attempt made to blind study subjects to the intervention they have received?	Unable to determine	No	Unable to determine	No	Unable to determine
Was an attempt made to blind those measuring the main outcomes of the intervention?	No	No	Unable to determine	No	Yes
If any of the results of the study were based on “data dredging”, was this made clear?	No	Unable to determine	Unable to determine	Unable to determine	Unable to determine
In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between intervention and outcome the same for cases and control?	Unable to determine	Yes	Unable to determine	Yes	Yes
Were the statistical tests used to assess the main outcomes appropriate?	Unable to determine	Unable to determine	Yes	Unable to determine	Unable to determine
Was compliance with the intervention/s reliable?	Unable to determine	Unable to determine	Unable to determine	Unable to determine	Yes
Were the main outcome measures used accurate (valid and reliable)?	Unable to determine	Yes	Unable to determine	Unable to determine	Unable to determine
Internal validity – confounding (selection bias)					
Were the patients in different intervention groups (trials and cohort studies) or were the	Yes	Yes	Unable to determine	Yes	Yes

cases and controls (case-control studies) recruited from the same population?					
Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	No	Yes	Unable to determine	Yes	Yes
Were study subjects randomized to intervention groups?	No	No	No	No	No
Was the randomized intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	No	No	No	No	No
Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	Yes	Unable to determine	Unable to determine	Unable to determine	Unable to determine
Were loses of patients to follow-up taken into account?	No	Unable to determine	Unable to determine	No	Unable to determine
Power					
Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?	Unable to determine	Yes	Unable to determine	Unable to determine	Unable to determine
Total Number of Yes	8	12	6	8	10

Table 7.1 - Methodological quality of RCTs by CAM treatment type (LBP)

Selected Item of the Cochrane Risk of Bias Tool	Acupuncture (n=104)	Spinal Manipulation (n=28)	Spinal mobilization (n=18)	Spinal Manipulation+ Spinal mobilization (n=9)	Massage (n=20)
Appropriate method of randomization	44 (43.1)	6 (18.2)	6 (37.5)	6 (66.7)	10 (50.0)
Inappropriate method of randomization	10 (9.8)	4 (12.1)	1 (6.3)	0	1 (5.0)
Appropriate concealment of treatment allocation	20 (19.6)	3 (9.1)	3 (18.8)	4 (44.4)	4 (20.0)
Inappropriate concealment of treatment allocation	11 (10.8)	7 (21.2)	2 (12.5)	1 (11.1)	3 (15.0)
Dissimilarity of baseline prognostic	8 (7.8)	3 (9.1)	1 (6.3)	1 (11.0)	1 (5.0)

Selected Item of the Cochrane Risk of Bias Tool	Acupuncture (n=104)	Spinal Manipulation (n=28)	Spinal mobilization (n=18)	Spinal Manipulation+ Spinal mobilization (n=9)	Massage (n=20)
indicators					
Appropriate outcome assessor blinding	29 (28.4)	15 (45.5)	10 (62.5)	5 (55.6)	4 (40.0)
Inappropriate outcome assessor blinding	10 (9.8)	2 (6.1)	0	0	2 (10.0)
Imbalance in use of co-interventions between groups	5 (4.9)	1 (3.0)	2 (12.5)	0	0
Described and acceptable drop out rates [1]	47 (46.1)	12 (36.4)	10 (62.5)	7 (77.8)	14 (70.0)
Unacceptable drop out rates	45 (44.1)	6 (18.2)	2 (12.5)	1 (11.1)	2 (10.0)
Similarity of timing in assessment of outcomes between groups	92 (90.2)	27 (81.8)	15 (93.8)	8 (88.9)	19 (95.0)
Reporting of intention-to-treat analysis	30 (29.4)	10 (30.3)	5 (31.3)	4 (44.4)	10 (50.0)
Absence of selected outcome reporting	39 (38.2)	17 (51.5)	10 (62.5)	5 (55.6)	13 (65.0)
Selected outcome reporting bias	17 (16.7)	10 (30.3)	2 (12.5)	4 (44.4)	4 (20.0)
Total Score of Risk of Bias (max 13) Median (Inter Quartile Range)	4 (1, 3)	2 (3, 6)	7 (4, 7)	8 (3, 6)	6 (5, 8)

[1] Item number # 9 of the Cochrane risk of bias tool: the number of participants who were included in the study but did not complete the observation period or were not included in the analysis must be described and reasons given. If the percentage of withdrawals and drop-outs does not exceed 20% for short-term follow-up and 30% for long-term follow-up and does not lead to substantial bias a "yes" is scored. (N.B. these percentages are arbitrary, not supported by literature).

Table 7.2- Methodological quality of RCTs by CAM treatment type (NP)

Item	Acupuncture (n=54)	Spinal Manipulation (n=30)	Spinal mobilization (n=11)	Spinal Manipulation+ Spinal mobilization (n=2)	Massage (n= 16)
Appropriate method of randomization	14 (26.4)	15 (51.7)	4 (44.4)		6 (37.5)
Inappropriate method of randomization	4 (7.5)	2 (6.9)	1 (11.1)		0
Appropriate concealment of treatment allocation	8 (15.1)	10 (34.5)	5 (55.6)		3 (18.8)
Inappropriate concealment of treatment allocation	2 (3.8)	4 (13.8)	1 (11.1)		0
Dissimilarity of baseline prognostic indicators	6 (11.3)	4 (13.8)	0		5 (31.3)
Appropriate outcome assessor blinding	14 (26.4)	10 (34.5)	5 (55.6)		7 (43.8)
Inappropriate outcome assessor blinding	0	2 (6.9)	5 (55.6)		1 (6.3)
Imbalance in use of co-interventions between groups	1 (1.9)	3 (10.3)	0		0
Described and acceptable drop out rates [2]	27 (50.9)	19 (65.5)	5 (55.6)		10 (62.5)
Unacceptable drop out rates	14 (26.4)	3 (10.3)	1 (11.1)		1 (6.3)
Similarity of timing in assessment of outcomes between groups	41 (77.4)	24 (82.8)	9 (100.0)		14 (87.5)
Reporting of intention-to-treat analysis	13 (24.5)	12 (41.4)	2 (22.2)		7 (43.8)
Absence of selected outcome reporting	26 (49.1)	20 (69.0)	6 (66.7)		11 (68.8)
Selected outcome reporting bias	8 (15.1)	5 (17.2)	3 (33.3)		4 (25.0)
Total Score of Risk of Bias (max 13) Median (Inter Quartile Range)	4 (3, 6)	3 (4, 7)	3 (5, 7)	Only two trials (NA)	5 (3, 6)

[2] Item number # 9 of the Cochrane risk of bias tool: the number of participants who were included in the study but did not complete the observation period or were not included in the analysis must be described and reasons given. If the percentage of withdrawals and drop-outs does not exceed 20% for short-term follow-up and 30% for long-term follow-up and does not lead to substantial bias a "yes" is scored. (N.B. these percentages are arbitrary, not supported by literature).

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Appendix H. List of Unobtained Articles

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Appendix I. Summary Tables

Table 1.1 Low Back Pain - Acupuncture – Acute/Sub-acute - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Huang, SR (2006)[1] China	98	% male: 49.8% Mean age: 44.5 yrs	L4/5 Disc herniation or with other disc herniation; Age<65yrs; Duration of pain≤2w; Non-use of glucocorticoid and non-steroidal anti-inflammatory drugs in the study period	1 – local single-point electro-acupuncture, treatment provider NR n = 53 2 – routine electro-acupuncture, n = 45	2 treatments/ Week 4 weeks	1 – Disability: Oswestry disability index 2 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks	4/13
Lai, Y (2004)[2] China	76	% male: NR Mean age: NR	Diagnostic using Chinese New Medicine Clinical Trial Reference 1993 ref[2]	1 – acupuncture Xi-cleft and normal points, treatment provider NR n = 41 2 – acupuncture normal points, n = 35	1 treatment /day 20 treatments	1 – Pain: VAS 2 – Quality of Life: Well being, Chinese Standard 3 – ADVERSE EVENTS: no harms reported Data measures at 20 days	4/13
Wen-Jun, L (2000)[3] China	238	% male: 84.5% Mean age: NR	Patients with acute lumbar sprain	1 – acupuncture-treatment, treatment provider NR n = 112 2 – acupuncture-control, n = 126	5 treatments NR	Response rate 1 – ADVERSE EVENTS: no harms reported	2/13

Table 1.2 Low Back Pain - Acupuncture – Acute/Sub-acute - Non –Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Kennedy, S (2008)[4] Northern Ireland	48	% male: 47.95% Mean age: 45.55 yrs	18-70 yrs adults with non-specific LBP, with/out referred pain, up to 12 weeks duration. Acute/sub-acute	1 – Acupuncture (verum), by senior experienced physiotherapists, n = 24 2 – Sham Acupuncture, by same senior experiences physiotherapists as intervention group n = 24	Maximum 12 treatment in total 6 weeks	1 – Pain: VAS (average and worst) 2 – Disability: Roland Morris Disability Questionnaire 3 – Quality of Life: NR 4 – Work: work absenteeism 5 – Utility of conventional care: medication use (tablets/day) 6 – ADVERSE EVENTS: no harms reported Data measured at baseline, 6 weeks and 3 mo	8/13
Eisenberg, DM (2007)[5] US	434	% male: 47.5% Mean age: 42.95 yrs	Patients with acute LBP for 21 d or less aged > 18 yrs	1 – acupuncture, by 11 acupuncturists, n = 58 2 – chiropractic, by 9 chiropractors, n = 76 3 – massage, by 12 massage therapists, n = 152 4 – usual care, n = 148	10 sessions total 5 weeks	1 – Pain: bothersomeness of worse symptom; 2 – Disability: Roland Morris Disability Questionnaire 3 – Quality of Life: physical and mental SF-12 4 – ADVERSE EVENTS: minor discomfort/soreness Data measured at immediate post-treatment	8/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Wenzhong, C (2001)[6] China	400	% male: 33.8% Mean age: NR	Patients with acute lumbago (severe and very severe pain) who sought medical advice from Department of Acu and Moxi and the surgical Department of Orthopedics	1 – acupuncture with filiform needle, n = 100 2 – acupuncture with filiform needle + cupping, n = 100 3 – acupuncture with filiform needle + pricking collateral + cupping, n = 100 4 - acupuncture with filiform needle + pricking collateral + cupping + Moxibustion, n = 100 Treatment provider : NR	5 or 10 times of separate treatment, once/2 days 6 hrs-9 days	1 – Quality of Life: curative effect at 5 and 10 treatments 2 – ADVERSE EVENTS: no harms reported Data measured at 5 and 10 treatments	0/13
Araki, S (2001)[7] Japan	40	% male: 70% Mean age: 43.8 yrs	Patients with acute LBP (who have gait disturbance; information from author)	1 – acupuncture by 2 acupuncturists with 3 and 6 years experience, n = 20 2 – sham acupuncture by same therapists = 20	Single treatment	1 – Pain: VAS (mm) of pain and LBP score by JOA 2 – Disability: JOA score 3 – ADVERSE EVENTS: no harms reported Data measured after single treatment	10/13
Kittang, G (2001)[8] Norway	60	Male (%): NR Mean age: NR (range 18 – 67 years)	Patients with non-radiating acute low-back pain (lasting less than 10 days).	1 – Acupuncture, n = 30 2 – Medication, n = 30 Co-intervention: advice and exercise Treatment provider: NR	4 sessions 2 weeks	1 - Pain (VAS) 2 - use of other pain medication 3 - number of back pain episodes at 6, 18 months 4 - stiffness measured at baseline 1, and 2 weeks, and 3 and 6 months 5 – ROM (lateral flexion) 6 - Harms at 1 and 2 weeks	7/13

Table 1.3 Low Back Pain - Acupuncture - Chronic - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Itoh, K (2004)[9] Japan	35	% male: 28.6% Mean age: 71.9 yrs	Patients with lumbar or lumbosacral LBP of ≥ 6 mo, aged ≥ 65 yrs, no radiation of LBP, normal neurological examination, no previous Treatment with Acu for LBP	1 – superficial-acupuncture (trigger points), by acupuncturist with 4 yrs training and 7 yrs experience, n = 12 2 – deep-acupuncture (trigger points by the same therapist = 10 3 – STD-acupuncture (traditional points), by same therapist, n = 13	6 weeks	1 – Pain: VAS pain intensity 2 – Disability: Roland Morris Questionnaire 3 – ADVERSE EVENTS: no harms reported Data measured at 6 weeks	7/13
Ceccherelli, F (2001)[10] Italy	42	% male: 71% Mean age: 41.64 yrs	Normal deep tendon reflexes at lower limbs; negative Laseque and Wassermann test findings; Patients with radiographic evidence of arthritis; negative CT scan findings for disc bulging; normal EMG results	1 – deep acupuncture, by medical licensed acupuncturists, n = 21 2 – superficial acupuncture, n = 21	8 session total 6 weeks	1 – Pain: McGill pain questionnaire-number of words; total score 2 – ADVERSE EVENTS: no harms reported Data measured at 6 weeks and 3 mo	9/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Gunn, CC (1980)[11] Canada	56	% male: 100% Mean age: 40.6 yrs	Male workers disabled from injury for at least 12 weeks; disabling pain despite traditional medical or surgical treatment ; disability periods 12-168 weeks	1 – acupuncture + standard care, by acupuncturist n = 29 2 – standard care by general practitioner, n = 27	Maximum of 15 treatments 8 weeks	1 – Pain: pain + work status questionnaire: full recovery; partial recovery; slight recovery; no recovery 2 – ADVERSE EVENTS: no harms reported Data measured at 8, 12 and 12-6 weeks, mean 27.3 weeks	4/13

Table 1.4 Low Back Pain - Acupuncture - Chronic - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Haake, M (2007)[12] Germany	1162	% male: 40.43% Mean age: 50.03 yrs	> 18 yrs old adults with chronic LBP for ≥ 24 weeks	1 – Acupuncture (verum), by physicians of various specializations with median of 8 yrs practice n = 387 2 – Sham acupuncture (placebo) by same physicians, n = 387 3 – standard therapy, n = 388	Up to 7 weeks	1 – Pain: CPGS 2 – Disability: HFAQ (treatment responses 12% or better) 3 – Quality of Life: SF-12 (physical score); patient global assessment 4 – ADVERSE EVENTS: not relevant for abstraction Data measured at 3 and 6 mo	10/13
Inoue, M (2006)[13] Japan	31	% male: 67.9% Mean age: 69 yrs	Patients consulted for LBP, newly referred and those re-attending, with only LBP in a limited area, which was exacerbated in particular posture	1 – acupuncture by acupuncturists, n = 15 2 – sham acupuncture by same therapists, n = 16	NR	1 – Pain: VAS 2 – Disability: range of lumbar spinal flexion 3 – ADVERSE EVENTS: no harms reported	9/13
Witt, CM (2006)[14] Germany	2841	% male: 42.7% Mean age: 52.85%	clinical diagnosis of chronic LBP lasting more than 6 months; age 18 or over, provision of written informed consent	1 – acupuncture by physicians with A-diploma of 140 hrs acu education, n = 1451 2 – control: no treatment, n = 1390	Maximum of 15 acu treatment 3 months	1 – Pain: back pain score; % reduction of pain 2 – Disability: HFAQ 3 – Quality of Life: SF-36 4 – Cost: incremental cost effective per quality adjusted life year-overall 5 – ADVERSE EVENTS: reported for Acu group but no details Data measured at 3 and 6 mo	7/13
Itoh, K (2006)[15] Japan	26	% male: NR Mean age: 76.15 yrs	Patients at least 65 yrs with history of LBP-lumbar/lumbosacral pain for at least 6 mo; leg pain;	1 – trigger point acupuncture by acupuncturist with 4 yrs training and 7 yrs clinical experience, n = 13 2 – sham by same therapist, n = 13	36 treatments total 12 weeks	1 – Pain: VAS 10 cm scale 2 – Disability: Roland Morris Questionnaire (24 questions) 3 – ADVERSE EVENTS: no harms reported Data measured at 12 weeks	8/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Brinkhaus (2006)[16] Japan	295	% male: 30.97% Mean age: 58.73 yrs	Clinical diagnosis of CLBP with a disease of more than 6 mo; 40-75 yrs; average pain intensity of 40 or more; written consent; use of oral non-steroidal anti-inflammatory drugs in 4 weeks before treatment	1 – acupuncture by acupuncture physicians with at least 3 yrs experience and 140 hrs of acu training, n = 145 2 – minimal acupuncture or sham by same physicians, n = 71 3 – waiting list group, n = 79	12 sessions total 8 weeks	1 – Pain: VAS score (pain intensity); PDI score 2 – Disability: FFbH-R scores; SF-36: physical component 4 – Quality of Life: SF-36 – physical health 5 – Utility of conventional care: analgesics use in weeks 5 - 8 (diary), days 6 – ADVERSE EVENTS: details not reported Data measured at 8 weeks, 2 mo, 6 months and 1 yr	8/13
Giles, LG (2003)[17] Australia	115	% male: 54.93% Mean age: 26.1 yrs	Patients at least 17 yrs; uncomplicated mechanical spinal pain for 13 weeks minimum-for long-term fu > 1 yr; those who received their randomly allocated treatment regimen during treatment period	1 – acupuncture(LB, NP, thorax), n = 36 2 – spinal manipulation, n = 36 3 – medication that has not been tried by Patients in this group, n = 43	Maximum of 9 weeks	1 – Pain: pain frequency; VAS intensity 2 – Disability: Oswestry Disability 3 – Quality of Life: SF-36 4 – ADVERSE EVENTS: hematoma and bleeding, n = 1 committed suicide Data measured at 9 weeks and 1 yr	6/13
Sator-Katzenschlager SM (2004)[18] Austria	61	% male: 0.299-verify Mean age: 53.6 yrs	Lumbar LBP of at least 6 mo; normal neurological function of lumbosacral nerved; no pain radiation; persisting pain intensity VAS ≥5	1 – Auricular electro-acupuncture, n = 31 2 – Auricular acupuncture, n = 30 Treatment provider : NR	6 weeks	1 – Pain: VAS pain intensity 2 – Quality of Life: well being 3 – Work: Patients on sick leave who returned to full-time work at 3 mo 4 – Utility of conventional care: consumption of tramadol rescue medication 5 – ADVERSE EVENTS: no harms reported No numerical data Data measured at 6 weeks	9/13
Chu, J (2004)[19] US	36	% male: 50% Mean age: 53.4 yrs	Patients with chronic LBP (duration=> 3 mo)	1 – E-MS (ETOIMS) by trained physician, n = 12 2 – MS by trained physician, n= 12 3 – SS by trained physician, n = 12	NR	1 – Pain: VAS pain intensity 2 – ADVERSE EVENTS: no harms reported Data measured at 1 and 2 weeks post-treatment	7/13
Cecherelli, F (2003)[20] Italy	31	% male: 29% Mean age: 49.36 yrs	Patients with chronic "lombalgia" meaning LBP (pain greater than 3 months)	1 – acupuncture 5x/week 2 – acupuncture 10x/week Treatment provider: Not specified, but author is from anesthesia department	1 – 5 weeks 2 – 10 weeks	1 – Pain: pain monitored with daily self-rating chart; final pain change relative to original pain (%) 2 – ADVERSE EVENTS: no harms reported No numerical data	7/13
Meng, CF (2003)[21] US	55	% male: 39.75% Mean age: 71 yrs	chronic non specific LBP > 12 weeks; age 60 years or more; radiography within past year	1 – acupuncture, n = 31 2 – usual care, NSAIDS, analgesics, exercises, n = 24 Treatment provider: NR	10 sessions total 4 weeks	1 – Pain: VAS with word anchors-ITT 2 – Disability: mRDQ - ITT 3 – Quality of Life: global transition scale Data measured at 4, 6 and 9 weeks	7/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Kerr, P (2003)[22] Northern Ireland	46	% male: 47.3% Mean age: 40.5 yrs	LBP symptoms > 6 mo; with or without leg pain; no neurological deficits; patients had to be happy to have acupuncture or another treatment; willing to participate in trial and undergo assessment procedures	1 – acupuncture by chartered physiotherapist trained in acu, n = 26 2 – placebo-TENS by same therapist, n = 20 3 – non-attendees (drop outs), n = 0	6 weeks	1 – Pain: McGill Pain Questionnaire; VAS (mm); 2 – Quality of Life: SF-36- duration of pain relief 3 - ADVERSE EVENTS: no harms reported Data measured at 6 weeks and 6 mo	4/13
Yeung, KN (2003)[23] Hong Kong	52	% male: 17.3% Mean age: 53 yrs	Patients with chronic non-specific LBP (> 6 mo) with or without radiation- age between 18-75 yrs - 3 (12%) of group 2 had prolapsed intervertebral disc	1 – electro-acupuncture + exercise by physiotherapist certified in acu, n = 26 2 – exercise by same therapist, n = 26	4 weeks	1 – Pain: NRS- average pain; worst pain 2 – Disability: Aberdeen LBP scale(0-100 points) 3 – ADVERSE EVENTS: n = 1 had a stroke before 3 months fu Data measured at 4 weeks and 3 mo	7/13
Molsberger, AF (2002)[24] Germany	186	% male: 47.9% Mean age: 49.3 yrs	LBP (pain between 12th rib and gluteal fold); with pain for at least 6 weeks; average pain score of at least 50 mm on 100 mm VAS during last week; 20-60 yrs; ability to communicate in German	1 – verum acupuncture + conventional orthopaedic therapy by experienced medical doctor, n = 65 2 – sham acupuncture + conventional orthopaedic therapy by same doctor, n = 61 3 – nil + conventional orthopaedic therapy, n = 60	6 weeks	1 – Pain: VAS mean pain intensity (ITT) 2 – Quality of Life: PBS: rated effectiveness of the treatment protocol Data measured at 6 weeks and 3 mo	3/13
Leibing, E (2002)[25] Germany	131	% male: NR Mean age: 48.1 yrs	Non-radiating pain for more than 6 months. Age 18-65 years	1 – combined traditional body and ear acupuncture + physiotherapy by experienced Taiwanese physician, n = 40 2 – physiotherapy by trained physiotherapist, n = 45 3 – sham acupuncture + physiotherapy by same investigators in other groups, n = 46	20-26 sessions total 12 weeks	1 – Pain: VAS (10 cm) –pain intensity; PDI (total score = 70) 2 – ADVERSE EVENTS: n = 2, painfulness of acupuncture; n = 1, problem with circulation Data measured at 12 weeks and 9 mo	2/13
Carlsson, CPO (2001)[26] Sweden	50	% male: 34% Mean age: 49.5 yrs	Lumbar or lumbosacral LBP for at least 6 mo; no radiation of pain below knee; normal neurological exam findings of lumbosacral nerve function	1 – manual acupuncture, n = 18 2 – electro-acupuncture, n = 16 3 – TENS, n = 16 Treatment provider: NR	8 weeks	1 – Pain: VAS- pain intensity in the morning; in the evening 2 – Quality of Life: Global assessments Data measured at 8 weeks, 1 and 3 mo	6/13
Cherkin, DC (2001)[27] US	262	% male: 41% Mean age: 44.9 yrs	Ages 20 to 70 years who visited a primary care physician for low back pain who had persistent LBP for 6 weeks	1 – acupuncture by licensed acupuncturists with at least 3 yrs experience, n = 94 2 – massage-manipulation of soft-tissue by licensed therapists with at least 3 yrs experience, n = 78 3 – self care education, n = 90	Up to 10 visits 10 weeks	1 – Pain: symptom bothersomeness during past week 2 – Disability: Roland Disability Scale Score; National Health Interview survey 3 – Quality of Life: SF-12 mental health summary scales 4 – ADVERSE EVENTS: no harms reported Data measured at 10 weeks and 1 yr	6/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Grant, DJ (1999)[28] UK	60	% male: 10.26% Mean age: 73.5 yrs	Patients at least 60 yrs old with complain of back pain of at least 6 months duration	1 – acupuncture by physiotherapist, n = 32 2 – TENS by same therapist, n = 28	8 sessions total 4 weeks	1 – Pain: VAS (IQR); NHP 2 – Utility of conventional care: tablets consumed in last week (IQR) 3 - Quality of Life 4 – ADVERSE EVENTS: drop outs: n = 2, influenza and immobility; n = 1, acute depression Data measured at 4 weeks, 4 days post treatment and 3 mo	6/13
Lehmann, TR (1983)[29] US	53	% male: 67% Mean age: 39 yrs	Patients with chronic disabling LBP who demonstrate at least minimal levels of motivation and in whom the level of disability would warrant the expense of inpatient treatment	1 – electro-acupuncture by certified and experienced acupuncturist, n = 17 2 – TENSE by experienced physical therapist, n = 18 3 – sham TENSE by same provider as in group 2, n= 18	3 weeks	1 – Pain: peak pain; average level of pain 2 – Return to work 3 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks and 3-6 mo	1/13
MacDonald, AJR (1983)[30] UK	17	% male: 29% Mean age: NR	Patients with chronic LBP which had failed to derive relief from conventional methods; referred BP for at least one year.	1 – elecrto-acupuncture, n = 8 2 – sham electro-acupuncture, n = 9 Treatment provider: NR	1 treatment/week NR	1 – Pain: %, pain relief; pain score reduction; activity pain score reduction; physical signs reduction; combined average reduction 2 – ADVERSE EVENTS: no harms reported Data measured at before each treatment	2/13
Mendelson, G (1983)[31] Australia	77	% male: 48.4% Mean age: 54.1 yrs	Chronic LBP; no Litigation or compensation claims pending; no overt psychiatric illness; ability to read and write in English	1 – Acupuncture/ placebo by surgeon, n = 36 2 – Placebo/ Acupuncture by same surgeon, n = 41	2 treatment/week 4 weeks	1 – Pain: VAS 100 mm; McGill Pain Questionnaire (PRI, PPI) 2 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks	6/13
Coan, R (1980)[32] US	50	% male: 46.3% Mean age: 46.9 yrs	LBP for 6 months or more; No previous acupuncture treatments; no history of diabetes, infection or cancer; not more than 2 back surgeries	1 – acupuncture-immediate, n = 23 2 – acupuncture-delayed (control), n = 16 3 – acupuncture-inadequate, n = 11 Treatment provider: NR	NR	1 – Pain: VAS 10 cm 2 – ADVERSE EVENTS: no harms reported Data measured at 3 and 6 mo	3/13
Mendelson, G (1978)[33] Australia	77	% male: 48% Mean age: 53.5 yrs	Chronic LBP; no Litigation or compensation claims pending; no overt psychiatric illness; fluent in English; referred by their attending doctor	1 – acupuncture, n = 36 2 – placebo (sham acupuncture), n = 41 Treatment provider: NR	2 treatment/week 4 weeks	1 – Pain: VAS 100 mm for pain 2 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks	1/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Fu, ZH (2006)[34] China	60	% male: 47% Mean age: 56.1 yrs	Adults 20-60 years old with chronic LBP (between the 12th rib and gluteal fold)	1 – Fu's subcutaneous needling (FSN), n = 32 2 – minimal needling, n = 28 Treatment provider: NR	NR	1 – Pain: VAS: motion related pain (MRP); pain under pressure (PUP) 2 – ADVERSE EVENTS: n = 1, fainted during intervention; n = 11, bleeding after intervention; n = 6, hurt feeling during needling manipulation Data measured at B	3/13
Nan, L (2005)[35] China	360	% male: NR Mean age: 46 yrs	Patients age 18- 65 yrs with lumbar strain in reference with relevant standard implementation in Traumatology in Chinese Medicine; (from Department of Pain)	1a – dermal needling, n = 88 1b – dermal needling, n = 92 2a – body acupuncture, n = 91 2b – body acupuncture, n = 89 Treatment provider: NR	1 - 10 treatment sessions total 2 – 14 treatment sessions total	1 – Pain: Patients with no pain at the end of two courses; Patients with grade II pain 2 – ADVERSE EVENTS: n = 3, pain during tapping could not be tolerated (did not get treatment) Data measured at B	3/13
Li, N (2005)[36] China	60	% male: 43.5% Mean age: 56.5 yrs	LBP and duration of pain>1 year; age:1870 yrs; Oswestry LBP disability index >30; Patients adhere to be follow-up	1 – acupuncture, n = 31 2 – physiotherapy, n = 29 Treatment provider: NR	One treatment/day 4 weeks	1 – Pain: overall efficiency; relapse rate 2 – Disability: Oswestry LBP disability index 3 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks and 6 mo	4/13
Wang, BX (2004)[37] Pakistan	40	% male: NR Mean age: 46 yrs	Patients with intervertebral disc protrusion aged => 18 yrs suffering from radiating pain to the lower limb for > 2 yrs	1 – electro-acupuncture by acupuncturist, n = 23 2 – medication by same therapist, n = 17	One treatment/ day 5-7 days	1 – Pain: VAS pain intensity at buttock 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment period, 5-7 days	2/13
Hollisaz, MT (2008)[38] Iran	119	% male: 45.4% Mean age: NR	Patients with LBP of sciatica origin (> 6 mo) aged ≥ 20 yrs Chronic	1 – electro-acupuncture, n = 41 2 – physiotherapy, n = 38 3 – placebo, n = 40 Treatment provider: NR	15 sessions in total	Percent of patients with resolved symptoms not related to LBP – irrelevant to review 1 – ADVERSE EVENTS: no harms reported	2/13
Takeda, H (2001)[39] Japan	20	% male: 85% Mean age: 31.1 yrs	Students of acupuncture college who are suffering from lumbago	1 – acupuncture-distal point needling, n = 10 2 – acupuncture-lumbar area needling, n = 10 Treatment provider: NR	6 treatment sessions in total 3 weeks	1 – Pain: VAS; pain threshold at lumbar area, and foot 2 – Disability: ADL score 3 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks and 3, 5, and 7 days after each session	5/13
Sakai, T (1998)[40] Japan	26	% male: 27% Mean age: 52.3 yrs	Non-specific LBP	1 – acupuncture, n = 14 2 – medication (NSAID), n = 12 Treatment provider: NR	4 sessions in total 2 weeks	1 – Pain: subjective symptoms of LBP in JOA score; pain relief score 2 – Disability: ADL in JO score 3 – ADVERSE EVENTS: no harms reported Data measured at 1 week after start of all treatments and 2 weeks	0/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Yu, W (1997)[41] China	200	% male: NR Mean age: NR	Pain in waist and leg	1 – acupuncture local point, n = 103 2 – acupuncture local and Weizhong point, n = 97 Treatment provider: NR	1 treatment/ day, 20 treatments/ course 1 or 2 courses 20 or 40 days	1 – Quality of Life: well being 2 – ADVERSE EVENTS: no harms reported Data measured at 20 or 40 days	
Itoh, K (2008)[42] Japan	32	% male: 37.5% Mean age: NR	Outpatients 60 yrs or older with non-specific LBP; lumbar or lumbosacral LBP for at least 6 mo; no radiation of LBP; normal neurological findings of lumbosacral nerve; not receiving acu treatment for more than 6 mo; no change in medicine and dose for one months or longer	1 – acupuncture by acupuncturist with at least 4 yrs experience, n = 8 2 – acupuncture + TENS by same therapist, n = 8 3 – TENS by same therapist, n = 8 4 – control-topical poultice when necessary, n = 8	5 treatments/ week 1 week total	1 – Pain: pain intensity VAS (10 cm) 2 – Disability: RDQ (0-24 points) 3 – ADVERSE EVENTS: WDAE, n = 1 Data measured 1, 2, 3, 4, 5 and 10 weeks	6/13
Yuan, J (2009)[43] Ireland	30	% male: 60% Mean age: 43.7 yrs	Subjects with chronic Non-Specific LBP	1 – acupuncture by acupuncturists with experience of > 5 yrs in clinical practice, n = 15 2 – acupuncture by same therapists, n = 15	1 – 2 treatments/ week for 5 weeks 2 – 5 treatments/ week for 2 weeks	1 – Pain: VAS average 2 – Disability: RMDQ 4 – ADVERSE EVENTS: minor bleeding, n = 11; pain, n = 2; tiredness, n = 4; dizziness/headache/redness/dry mouth, n = 1 Data measured at 2 or 5 weeks, 3 and 6 mo	9/13
Cherkin, DC (2009)[44] US	638	% male: 40.5 Mean age: 47.2 yrs	Patients aged 18-70 yrs receiving care for chronic LBP (3-12 months) within the past yr	1 – IND-acupuncture by 6 licensed acupuncturists with 4-19 yrs experience, n = 157 2 – St-acupuncture by same therapists, n = 158 3 – sham by same therapists, n = 162 4 – usual care, n = 161	1-2 treatments /week 4 weeks	1 – Disability: RMDQ 2 – ADVERSE EVENTS: n = 11 Patients had moderate short-term, n = 1 pt had severe harms-no details Data measured at 4 weeks, 3 and 6 mo	6/13
Not yet screened (2005)[45] Japan	9	% male: NR Mean age: NR	Patients with chronic (> 6 months) LBP	1 – acupuncture-trigger point needling, n = 4 2 – acupuncture-tender point needling, n = 5 Treatment provider: NR	Total of 5 treatment sessions 5 weeks	1 – Pain: VAS 2 – Disability: RDQ 3 – ADVERSE EVENTS: no harms reported Data measured at 5 weeks	5/13
Tsui MLK (2004)[46] China	42	% male: 31% Mean age: 39.9 yrs	Patients aged 20-55 yrs with LBP radiating down to the thigh or calf for => 3 months mechanical cause but not from cancer or TB, with positive SLR findings	1 – electro-acupuncture by principal investigator , n = 14 2 – EH-acupuncture by principal investigator, n = 14 3 – exercise, n = 14	Total of 8 sessions 4 weeks	1 – Pain: pain intensity VAS 2 – Disability: Roland Morris Disability Questionnaire 3 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks and 3 mo	6/13
Thomas, A (1994)[47] Sweden	43	% male: NR Mean age: NR	Patients with CLBP; sudden or insidious onset of LBP with or without trauma; duration ≥ 6 mo; recurrences with pain of variable intensity;	1 – acupuncture (manual stimulation = MS; LF electrical stimulation; HF electrical stimulation) by 2 physiotherapists trained in acu, n = 33 2 – waiting list, n = 10	3 treatments 6 weeks	1 - Pain: activities with <50% pain; word score 2 – Disability: subjective assessment 3 – ADVERSE EVENTS: no harms reported Data measured at 6 weeks and 6 mo	4/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Kwon, Y.D (2007)[48] China	50	% male: 33.5 Mean age: NR	Lumbar or lumbosacral pain for duration of at least 3 months; older than 20 years of age, LBP as main complaint; normal neurological examination;	1 – acupuncture, n = 25 2 – sham acupuncture, n = 25 Treatment provider : NR	12 sessions 4 weeks	1 – Pain: VAS scores 2 – Disability: RDQ 3 – Quality of Life: PGA, patient global 4 – ADVERSE EVENTS: no harms reported Data measured at 2 and 4 weeks	7/13
Inoue, M (2001)[49] Japan	27	% male: NR Mean age: 59.9 yrs	Patients with chronic lumbago who attended the university acupuncture clinic as outpatient and gave consent to attend to the trial	1 – acupuncture, n = 15 2 – sham acupuncture, n = 12 Treatment provider : NR	Single treatment	1 – Pain: VAS (10 cm) of pain at most restricted action 2 – ADVERSE EVENTS: no harms reported Data measured after single treatment	10/13

Table 1.5 Low Back Pain - Acupuncture - Mixed duration- Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Chen, MZ (2005)[50] China	90	% male: 70% Mean age: 34.47 yrs	disc herniation, bone TB, tumour; pain threshold < 0.4 mA	1 – Warming needle and acupoint injection + oral medication, n = 30 2- Oral medication, n = 30 3 – Acupoint injection, n = 30 Treatment provider : NR	3 courses of treatment NR	1 – Quality of Life: Cured rate; total effective rate 2 – ADVERSE EVENTS: no harms reported	4/13
Liang, SY (2008)[51] China	112	% male: NR Mean age: NR	Patients with myofascitis LBP	1 – tendon muscle picking (acupuncture), n = 56 2 – electro-acupuncture, n = 56 Treatment provider : NR	Total of 14 sessions, 5 or 7 days each course 2 treatment courses	1 – Quality of Life: Therapeutic effect	5/13
Hua-Sheng Tang (2008)[52] China	165	% male: 56.9% Mean age: 40.2 yrs	Between 20-69 yrs; CLBP/ traumatic LB injury;	1 – electro-acupuncture along channel by neuropathy doctor, n = 85 2 – routine acupuncture by same doctor, n = 80	1 session/day 40 sessions (days) total	1 – Quality of Life: Cure rate; significantly effective; effective; ineffective; total efficacy; reoccurrence 2 – ADVERSE EVENTS: no harms reported Data measured at immediate post-NR and 6 mo	3/13
Rui,ping She (2008)[53] China	279	% male: 55.9% Mean age: NR	LBP; sciatica; lower limb numbness; limp intermittently; protective posture; deformity of spinal cord; straight leg raise test(+); Bragard's test(+); dysuria or lower limb myophagism; dura mater and nerve root disturbed; MRI:interverte bral space narrow	1 – electro-acupuncture (deeply needling Qiangji 4 points) by neuropathy doctor, n = 140 2 – electro-acupuncture (routine points) by same doctor, n = 139	1 session/day 20 sessions (days) in total	1 – Quality of Life: Cure rate; significantly effective; effective; ineffective; total efficacy; 2 – ADVERSE EVENTS: no harms reported Data measured at immediate post-treatment	3/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Mu, JP (2007)[54] China	120	% male: NR Mean age: 39.27 yrs	lumbar herniation; between 20-65 yrs; acute LBP less than 2 weeks after lumber herniation diagnosed; not undergoing hormonotherapy or taking steroid hormones; signed consent form	1 – Jiaji electro-acupuncture by neuropathy doctor, n = 40 2 – laser needle knife by same doctor, n= 40 3 – Jiaji electro-acupuncture + laser needle knife by same doctor, n= 40	1 – 21 sessions total 2 – 3 sessions total 3 - 1 + 2 1 – 3 weeks	1 – Quality of Life: SF-MPQ score 2 – ADVERSE EVENTS: no harms reported	5/13
Qian-mei, Wu (2007)[55] China	116	% male: 53.75% Mean age: NR	Diagnosed as lumbar herniation according to "traditional Chinese medicine diagnostic efficacy standards" Mixed	1 – needling acupoints at same nervous segment by neuropathy doctor, n = 66 2 – needling acupoints selected routinely by same doctor, n= 50	21 sessions in total	1 – Quality of Life: Cure rate; significantly effective; effective; ineffective; total efficacy 2 – ADVERSE EVENTS: no harms reported Data measured at immediate post-treatment	4/13
He, X (2007)[56] China	78	% male: 53.85% Mean age: 45.2 yrs	Diagnosed as lumbar herniation according to Diagnosis verified with CT or MRI; Age <70	1 – routine acupuncture + warming needle Moxibustion by neuropathy doctor, n = 39 2 – routine acupuncture by same doctor, n = 39	15 sessions total	1 – Quality of Life: total effective rate; incidence rate 2 – ADVERSE EVENTS: no harms reported Data measured at immediate post-treatment	3/13
Zhou, YL (2006)[57] China	310	% male: 47.46% Mean age: 45.41 yrs	Disc herniation; VAS>=3; Sign a consent form; 20-65yrs	1 – ankle-three-needle, n = 162 2 – routine acupuncture, n = 76 3 – medication injection, n = 72 Treatment provider: NR	NR	1 – Pain: improvement of VAS; time of inducing analgesia; effect-lasting time 2 – Disability: straight leg raising test 3 – ADVERSE EVENTS: no harms reported Data measured at immediate post-treatment	5/13
Zhang, BM (2008)[58] China	200	% male: 52.1% Mean age: 47.3 yrs	Disc herniation; 25-60 yrs old	1 – electro-acupuncture, n = 100 2 – oral medication, n = 100 Treatment provider : NR	20 treatments (days)	1 – Pain: diagnosis and treatment of local standards 2 – Disability: lower extremity pain or numbness; ability of walking; skin sensory function of lower extremity; straight let raising test; muscle tension 3 – ADVERSE EVENTS: n = 3, local hematoma; n = 54, gastrointestinal discomfort Data measured at 20 days	4/13
Huang, GF (2006)[59] China	68	% male: 58.8% Mean age: NR	Disc herniation	1 – special acupuncture, n = 36 2 – routine acupuncture, n = 32 Treatment provider : NR	20 days (treatments)	1 – Pain: VAS; overall efficiency; level of b-endorphin, nitric oxide, superoxide dismutase and malondialdehyde in serum 2 – ADVERSE EVENTS: no harms reported Data measured at 20 days	6/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Wang, N (2007)[60] China	90	% male: 53.4% Mean age: 41.5 yrs	Disc herniation; age:18-65yrs; Diagnosed by CT or MRI	1 – spinal manipulation, n = 45 2 – spinal manipulation + acupuncture, n = 45 Treatment provider : NR	24 treatments (days)	1 – Pain: VAS; overall efficiency 2 – ADVERSE EVENTS: no harms reported Data measured at 24 days	6/13
Li, D (2006)[61] China	240	% male: not sure Mean age: NR	Patients with lumbar disc herniation	1 – traction rotary manipulation of lumbar spine treatment, n = 80 2 – acupuncture silver needle heat conductive treatment, n = 80 3 – traction + needle heat, n = 80 Treatment provider : NR	One treatment/ week 2 weeks	1 – Pain: NRS; improvement of clinical signs and curative effect 2 – ADVERSE EVENTS: no harms reported Data measured at 3 and 6 mo	6/13
Wang, YQ (2005)[62] China	58	% male: 74.1% Mean age: 45.7 yrs	Disc herniation	1 – massage + spinal mobilisation + acupuncture, n = 30 2 – massage + spinal mobilisation, n = 28 Treatment provider : NR	One treatment/ day 20 days	1 – Pain: VAS; overall efficiency 2 – ADVERSE EVENTS: no harms reported	6/13
Guo, W (2005)[63]	197	% male: 52.8% Mean age: 43.5 yrs	Disc herniation; age: 20-70y; Diagnosed by CT or MRI; Clinical Positive Signs	1 – electro-acupuncture + acupoint inject medication, n = 100 2 – spinal manipulation or spinal mobilisation + oral medication, n = 97 Treatment provider : NR	10 days	1 – Pain: VRS 2 – Disability: angle for straight leg raising test 3 – ADVERSE EVENTS: no harms reported Data measured at 10 days	4/13
Xingsheng, C (1998)[64] China	198	% male: 59.1% Mean age: 45.6 yrs	Patients with sciatica aged => 18 yrs	1 – acupuncture-point-to-point penetration + deep puncture, n = 108 2 – routine acupuncture, n = 90 Treatment provider : NR	1-2 treatments / day 1-3 courses, 10 sessions each	1 – Quality of Life: Cured: all signs and symptoms disappeared 2 – ADVERSE EVENTS: no harms reported Data measured at 6 mo	2/13
Jia, Chao (2004)[65] China	82	% male: NR Mean age: NR	Diagnosed as Cervical Spondylosis using ref[1] 1993-chinese, only those who were compliant with the treatment, only those who responded to the surveys	1 – deeply-acupuncturing Jiaji acupoint + acupoint-injection by one doctor, two are not mentioned, n = 45 2 – acupuncturing back-shu acupoint + acupoint-injection by same doctor and two others, n = 37	1 treatment /day 20 days	1 – Pain: VAS; McGill PRI total, feeling, sense 2 – Quality of Life: Chinese Medical Diagnostic and effectiveness standard (cure, improve, no effect) 3 – ADVERSE EVENTS: no harms reported Data measured at 20 days	5/13
Yuan, X (2006)[66] China	144	% male: 55.5% Mean age: NR	Patients (age ≥ 18 yrs) with Diagnosis of lumbar intervertebral disc prolapsed	1 – acupuncture, n = 78 2 – conventional medical care, n = 66 Treatment provider : NR	1 treatment/ day 45 days	1 – Pain: Hu's criteria of curative effect 2 – ADVERSE EVENTS: no harms reported Data measured at 45 days	0/13
Ye, Z (2004)[67] China	56	% male: 76.8% Mean age: 44.5 yrs	Diagnostic as lumbar intervertebral disc protrusion using CT examination and based on Shanghai Chinese Medical Diagnostic and Treatment Standard	1 – needle-knife + take Chinese medicine + therapy by hand, n = 30 2 – electro-acupuncture + take Chinese medicine + therapy by hand, n = 26 Treatment provider : NR	Total of 6 treatments	1 – Quality of Life: well being, Chinese Standard 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	2/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Ding, X (2002)[68] China	68	% male: 33.8% Mean age: NR	Diagnosed as intervertebral disc protrusion; Only one side is in pain; Who has obvious 1 or 2 symptoms: cannot go to sleep, turn aside, walk, cough, sneeze, bowel movement, bend waist because of the pain; Pain in waist 1 Jiaji and waist 5 jiaji is in the healthy side; pain rate is ++ above	1 – injection + acupuncture on healthy side, n = 34 2 – injection + acupuncture on affected side, n = 34 Treatment provider : NR	1 treatment/ day Total of 20 treatments	1 – Quality of Life: well being, instrument was not reported 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	3/13
Zhang, D (2002)[69] China	96	% male: NR Mean age: NR	Patients with LBP due to lumbar intervertebral disc protrusion	1 – acupuncture Moxibustion + massage, n = 48 2 – acupuncture Moxibustion, n = 22 3 – massage, n = 26 Treatment provider : NR	NR	1 – Quality of Life: cure rate; effective rate 2 – ADVERSE EVENTS: no harms reported	2/13
Zhang, Zhong-yi (2002)[70]	61	% male: NR Mean age: NR	Diagnosed as Lumbar Intervertebral Disc Protrusion using Xray, CT or MRI	1 – acupuncture + massage, n = 30 2 – massage, n = 31 Treatment provider : NR	2 treatments/ week 10 weeks	1 – Quality of Life: well being, Chinese Medical Diagnostic and therapeutic Effective Standard 2 – ADVERSE EVENTS: no harms reported Data measured at 10 weeks	1/13
Ye, D (2002)[71] China	60	% male: NR Mean age: NR	Diagnosed using Chinese Medical Diagnostic and therapeutic Standard	1 – electric-acupuncture + traction + Tuina (massage), n = 20 2 – electric-acupuncture + traction, n = 20 3 – electric-acupuncture + Tuina (massage), n = 20 Treatment provider : NR	1 treatment/ day 30 days	1 – Quality of Life: well being, Chinese Medical Diagnostic and therapeutic Effective Standard 2 – ADVERSE EVENTS: no harms reported Data measured at 30 days	2/13
Chen, Xiao-kai (2001)[72] China	160	% male: NR Mean age: NR	Diagnosed as lumbar intervertebral disc prolapsed based on ref[1]-Chinese Medical Diagnostic and therapeutic Effective Standard 1994,	1 – acupuncture and Moxibustion + three-palm massage by doctors and assistants , n = 80 2 – acupuncture and Moxibustion + traction (full automatic computer traction table), providers not mentioned n = 80	1 treatment/ day for 10 days then 1 treatment/ 2 days for next 20 days 30 days	None 1 – ADVERSE EVENTS: no harms reported	4/13
Yao, Z (2007)[73] China	116	% male: NR Mean age: NR	Diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard,	1 – acupuncture + Moxibustion, n = 62 2 – electro-acupuncture, n = 54 Treatment provider: NR	18 treatments (days) total	1 – Quality of Life: well being, cured 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment, 18 days	3/13
Chen, X (2007)[74] China	88	% male: 54.5% Mean age: NR	Diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard CT examination showed lumbar intervertebral Disc Protrusion	1 – deep acupuncture of lumbar Jiaji points, n = 44 2 – conventional acupuncture of Jiaji point, n = 44 Treatment provider: NR	10 treatments/ course 2 courses	1 – Quality of Life: well being, B, based on Chinese Medical Diagnostic and therapeutic Effective Standard 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	3/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Zeng, Y (2007)[75] China	133	% male: 46.6% Mean age: NR	Diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard; 20-65 yr; CT or MRI examination showed lumbar intervertebral Disc Protrusion; Signed consent form	1 – abdomen acupuncture, n = 67 2 – body acupuncture, n = 66 Treatment provider: NR	1 treatment/ day 10 treatments/ course	1 – Quality of Life: well being, B, based on Chinese Medical Diagnostic and therapeutic Effective Standard 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	2/13
Zhong, B (2006)[76] China	60	% male: NR Mean age: NR	Had injuries, caught cold; Waist pain complained with sciatic nerve pain; Lumbar bend, limitation on movement, pain around Jitu with radiating pain, skin nerve control too sensitive or obtuse,	1 – abdominal acupuncture + traction + body acupuncture, n = 30 2 – lumbar traction + body acupuncture, n = 30 Treatment provider: NR	NR	1 – Quality of Life: efficacy rate 2 – ADVERSE EVENTS: no harms reported	2/13
Qu, Y (2006)[77] China	120	% male: 56.5% Mean age: NR	Outpatients with diagnosis on syndrome of L3 transverse process (in Criteria on Diagnosis and Therapeutic Effects on Syndromes of Chinese Medicine)	1 – acupuncture with warming needles, n = 60 2 – electro-acupuncture, n = 60 Treatment provider: NR	7 treatments total 7 days	1 – Quality of Life: therapeutic effect: cured 2 – ADVERSE EVENTS: no harms reported Data measured at 7 days and 2 weeks	2/13
Ye, L (2004)[78] China	98	% male: 51% Mean age: 38.4 yrs	MRI and CT examination, using Chinese Medical Diagnostic and Therapeutic Standard for lumbar intervertebral disc	1 – hypodermic catgut embedding therapy on prolapse of lumbar intervertebral disc, n = 49 2 – electro-acupuncture, n = 49 Treatment provider: NR	1 treatment/ week 3 courses	1 – Quality of Life: well being 2 – Pain: score for symptoms somatoscopy and activity of daily life 3 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	
Wang, Y (2004)[79] China	111	% male: 64.1% Mean age: NR	Diagnosed third lumbar vertebra transverse process syndrome	1 – Waiguan-through-Neiguan and Lumbus 2 through-Lumbus 4 and transverse acupuncture methods, n = 66 2 – routine acupuncture, n = 45 Treatment provider: NR	1 treatment/ day 10 treatments /course	1 – Quality of Life: well being, 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	2/13
Zhou, Z (2004)[80] China	82	% male: 63.3% Mean age: NR	LBP or sciatic nerve pain, pain may become worse when coughing, sneezing or bow movement; pain on lumbar vertebra or sciatic nerve, test of raising straight leg; CT or MRI examination diagnostic lumbar intervertebral disc protrusion	1 – abdominal acupuncture + Danshen injection + TDP illuminate, n = 42 2 – lumbar shallow acupuncture + Danshen injection + TDP illuminate, n = 40 Treatment provider: NR	1 treatment/ day 4 courses 24 days, 1 day between courses Injection: 1 treatment/ day 20 days	1 – Quality of Life: well being, Chinese Medical Diagnostic and therapeutic Standard 2 – ADVERSE EVENTS: no harms reported Data measured at 20 or 24 days	4/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Chu, J (2004)[81] China	50	% male: 58% Mean age: 42.5 yrs	Chinese Medical Diagnostic and Therapeutic Standard.	1 – scalp acupuncture + massage, n = 25 2 – massage, n = 25 Treatment provider: NR	1 treatment/ day, 10 treatments/ course, 2 courses 20 days	1 – Quality of Life: well being, Chinese Medical Diagnostic and therapeutic Standard 2 – ADVERSE EVENTS: no harms reported	4/13
Wu, Y (2004)[82] China	114	% male: 60.3% Mean age: NR	Diagnosed using Chinese Medical Diagnostic and Therapeutic Standard	1 – abdominal acupuncture, n = 62 2 – body acupuncture, n = 52 Treatment provider: NR	1 treatment/ day, 10 treatments/ course, 3 courses 30 days	1 – Quality of Life: well being 2 – ADVERSE EVENTS: no harms reported Data measured at 30 days	3/13
Zhu, Q (2003)[83] China		% male: 80% Mean age: 33.5 yrs	Diagnosed using Chinese Medical Diagnostic and Therapeutic Standard	1 – acupuncture + Moxibustion + autonomic traction of knee-chest, n = 31 2 – acupuncture + Moxibustion, n = 29 Treatment provider: NR	30 treatments total 30 days	1 – Quality of Life: well being 2 – Pain: VAS 3 – ADVERSE EVENTS: no harms reported Data measured at 30 days	4/13
Zhang, Honglai (2003)[84] China	120	% male: 54.2 Mean age: NR	diagnosed as Cervical Spondylosis using ref[1] 1993-chinese; compliant with treatment; responded to the surveys	1 – electro-acupuncture, n = 60 2 – traction, n = 60 Treatment provider: NR	45 treatments total 45 days	1 – Quality of Life: well being 2 – ADVERSE EVENTS: no harms reported Data measured at 45 days	6/13
Zhou, Q (1998)[85] China	58	% male: NR Mean age: 48 yrs	CT diagnosed as lumbar intervertebral disc protrusion	1 – acupuncture on Jiaji, n = 30 2 – acupuncture on pangguangjingxue, n = 28 Treatment provider: NR	30 treatments total 30 days	1 – Quality of Life: well being 2 – ADVERSE EVENTS: no harms reported Data measured at 30 days	3/13
Xia, F (1997)[86] China	82	% male: NR Mean age: NR	X-ray or CT diagnosed Mixed	1 – acupuncture + injection + massage, n = 41 2 – acupuncture, n = 40 Treatment provider: NR	1 treatment/ 2 days 10 treatments/ course	1 – Quality of Life: well being 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	2/13
Li, Q (1997)[87] China	156	% male: 51.3 Mean age: NR	NR	1 – acupuncture + cupping, n = 78 2 – acupuncture, n = 78 Treatment provider: NR	1-2 treatment/ day, 10 treatments/ course Cupping-1 treatment/ 2days Until cured	1 – Quality of Life: well being 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	2/13
Ding, Y (1998)[88] China	54	% male: 71.6 Mean age: 43.5 yrs	LBP repeatedly occurring; lumbar sacrum pain become worse with fatigue; X-ray and examination exclude the other disease; LBP caused by Qi and blood stagnant.	1 – fly-probing-acupoint manipulation, n = 35 2 – routine acupuncture, n = 19 Treatment provider: NR	1 treatment/ day 10 treatment/ course	1 – Quality of Life: well being 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	3/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Luo, S (2007)[89] China	108	% male: 72.2 Mean age: NR	Varying degrees of LBP radiating to the lower limb. With straight leg raising test: </= 30 degrees in 37 cases, 31 - 65 in 68 cases, sand 3 cases with positive response in the intensive test; Patients diagnosed with CT and or MRI exam.	1 – scalp acupuncture + traction, n = 56 2 – traction, n = 52 Treatment provider: NR	30 min/session 3 sessions	1 – Quality of Life: clinically cured; marked effective; improved; no change 2 – ADVERSE EVENTS: no harms reported Data measured t 3 sessions	
Peng, Y (2006)[90] China	116	% male: 53.4 Mean age: 47 yrs	Diagnosed using Chinese Medical Diagnostic and Therapeutic Standard; 30-60 yrs; CT-MRI examined and diagnosed; signed on the consent form	1 – acupuncture: round sharp needle therapy combined with massage by a doctor, n = 58 2 – acupuncture : filiform needle plus massage by a doctor, n = 58	20 treatments total 20 days	1 – Quality of Life: well being, Chinese Medical Diagnostic and Therapeutic Standard 2 – ADVERSE EVENTS: no harms reported Data measured at 20 days	3/13
Zhou, Y (2005)[91] China	242	% male: 53.1 Mean age: 45.5 yrs	Diagnosed using Chinese Medical Diagnostic and Therapeutic Standard and 1988 Clinical Trial Diagnostic Standard; 20-65 yrs; signed consent form	1 – acupuncture-Huaisanzhen, n = 96 2 – medication-drug control, n = 48 3 – acupuncture, n = 48 4 – combination, n = 50 Treatment provider: NR	NR	1 – Pain: VAS 2 – Quality of Life: well being, Chinese Medical Diagnostic and Therapeutic Standard and 1988 Clinical Trial Diagnostic Standard 3 – ADVERSE EVENTS: no harms reported Data measured at 1, 12, 24, and 48 hours later	4/13

Table 1.6 Low Back Pain - Acupuncture - Mixed - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Zhang, Y (2007)[92] China	120	% male: 54.17% Mean age: 39.28 yrs	Low back pain	1 – electro-acupuncture, n = 40 2 – acupoint injection of Danggui, n = 40 3 – acupoint injection of O_3, n = 40 Treatment provider: NR	10 days total	1 – Pain: Overall efficiency 2 – ADVERSE EVENTS: no harms reported Data measured at immediate post-treatment	4/13
Ratcliffe, J (2006)[93] (9010)	241	% male: 22.5 Mean age: 43.6 years	Adults aged 18-65 with N-S LBP of 4-52 weeks duration	1 – Acupuncture, by acupuncturists trained in traditional Chinese medicine, n = 160 2 – Usual care, n = 81	10 treatments 3 months	1 – Pain: bodily pain dimension on SF-36 2 – Quality of Life: QALYs (quality adjusted life years) 3 – Cost: NHS Data measures at 12 and 24 months	
Tsukayama, H (2002)[94] Japan	19	% male: 15.5% Mean age: 45 yrs	LBP without sciatica, at least 2 weeks history of pain and > 20 yrs of age	1 – electro-acupuncture, n = 9 2 – TENS, n = 10 Treatment provider: NR	2 weeks	1 – Pain: PRS – 10 mm VAS 2 – Disability: JOA 3 – ADVERSE EVENTS: transient aggravation of LBP, n = 2; one of each: discomfort due to needles; pain on needle insertion; small subcutaneous bleeding; transient fatigue; itching with electrode Data measured at 2 weeks	7/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Sakai, T (2001)[95] Japan	68	% male: 55% Mean age: 36.8 yrs	LBP without sciatica; at least 2-week history of LBP; over 20 years old	1 – electro-acupuncture, n = 32 2 – TENS, n = 36 Treatment provider: NR	4 treatment sessions total 2 weeks	1 – Pain: pain relief scale- VAS 1-10 cm 2 – Disability: JOA score 3 – ADVERSE EVENTS: n = 2, itching with electrode and dullness after treatment Data measured at 2 weeks	8/13
He (1997)[96] China	100	% male: NR Mean age: 44 yrs	LBP, fixed in location, limited range of motion, worse in cold and raining weather.	1 – manual acupuncture + Moxibustion + Chinese herbal medicine, n = 50 2 – Chinese herbal medicine, n = 50 Treatment provider: NR	Total of 20 treatments 20 days	1 – Quality of Life: cured-treatment effect; marked effective; improved; no change 2 – ADVERSE EVENTS: no harms reported Data measured at 20 days and 1 year	4/13
Thomas, KJ (2006)[97] UK	241	% male: 40.5% Mean age: 43 yrs	Patients aged 18-65 yrs with non-specific LBP of 4-52 weeks duration, assessed as suitable by their general practitioner (GP) for primary care management	1 – acupuncture by 6 acupuncturists with 3.2 yrs mean duration of training and mean of 12.8 yrs in practice, n = 160 2 – standard treatment-usual care, n = 81	10 treatments 3 months	1 – Pain: SF-36 Bodily Pain score; McGill PPI 2 – Disability: Oswestry Disability Index 3 – Quality of Life: SF-6D 4 – ADVERSE EVENTS: no harms reported Data measured at 3, 12 and 24 mo	9/13

Table 1.7 Low Back Pain - Acupuncture - Unknown - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Wang, Z (2009)[98] China	139	% male: 67.5% Mean age: 58.9 yrs	Patients with senile radical sciatica	1 – electro-acupuncture, n = 70 2 – TENS, n = 69 Treatment provider: NR	2 courses (possibly 5-7 days in each course)	1 – Quality of Life: cure rate (%) 2 – ADVERSE EVENTS: no harms reported Data measured at end of each course	
Wu, J (2004)[99] China	300	% male: NR Mean age: NR	Diagnosed as lumbar intervertebral disc protrusion; 25-60 yrs; stop using other treatment or medicine; signed consent form	1 – electro-acupuncture by professional doctor, n = 100 2 – normal acupuncture by same doctor, n = 100 3 – medicine by same doctor, n = 100	1 treatment/ day, 10 treatments/ course, 2 courses 20 days	1 – Quality of Life: well being, using both Chinese and Western diagnostic and therapeutic standard for Lumbar intervertebral disc protrusion 2 – ADVERSE EVENTS: no harms reported Data measured at 20 days	4/13
Lee, J (2007)[100] Korea	31	% male: 0 Mean age: NR	Female patients 20-50 yrs old with LBP and accompanied sciatic neuralgia	1 – Kuesu-point acupuncture, n = 16 2 – non Kuesu-point acupuncture, n = 15 Treatment provider: NR	12-15 sessions 3 weeks	1 – Pain: VAS 0-10 2 – Quality of Life: Estimation Index of Backache 0-100 3 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks	3/13

Table 1.8 Low Back Pain - Acupuncture - Unknown - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Garvey, TA (1989)[101] US	63	% male: 65.1% Mean age: 38 yrs	Patients treated for strain LBP with non-steroidal anti-inflammatory agents; hot showers; avoidance activity that might aggravate the pain for 4 weeks	1 – Trigger point (TP) method I: Lidocaine injection- and method II: Lidocaine and Aristospan injection, n = 27 2 – dry-needling injection, n = 20 3 – ethylchoride spray, n = 16 Treatment provider: NR	One time intervention	1 – Pain: self rating scale (1-10); pain improvement 2 – ADVERSE EVENTS: no harms reported Data measured at 2 weeks	7/13
Mencke (1988)[102] Germany	75	% male: 49.3% Mean age: 49.4 yrs	Patients who have previously been treated unsuccessfully (general practitioner, orthopedic, physiotherapist); no involvement in other therapies	1 – typical AP by same therapist, n = 40 2 – atypical AP by same therapist, n = 35	6 treatment sessions 3 weeks	1 – Pain: VAS average 2 – Disability: Examination of affected arm, orthopaedic parameter, ante version of head 3 – Physical measures: Aversion of the head (AOH); Inner rotation of damages arm (IRDA) 4 – ADVERSE EVENTS: no harms reported Data measured at 3 and 8 weeks	9/13
Inoue, M (2001)[103] Japan	16	% male: NR Mean age: 55.7 yrs	Patients with lumbago who attended the university acupuncture clinic as outpatient and gave consent to attend to the trial	1 – acupuncture-real needling by acupuncturist, n = 10 2 – placebo-sham needling by same therapist, n = 6	Single treatment	1 – Pain: VAS (100 mm) of pain at most restricted action 2 – ADVERSE EVENTS: no harms reported Data measured post treatment	10/13
Kurosu, Y (1979)[104] A Japan	20	% male: 50% Mean age: NR	Patients with pain in the low back or the low back and sacral region.	1 – acupuncture, n = 10 2 – acupuncture-garlic Moxibustion, n = 10 Treatment provider: NR	NR	1 – Pain: pain recovery score by questionnaire 2 – ADVERSE EVENTS: no harms reported Data measured at 2nd and 4th visit before treatment	3/13
Kurosu, Y (1979)[104] B Japan	20	% male: 55% Mean age: NR	Patients with pain in the low back or the low back and sacral region.	1 – acupuncture-needle retention technique, n = 10 2 – acupuncture-simple insertion technique, n = 10 Treatment provider: NR	NR	1 – Pain: pain recovery score by questionnaire 2 – ADVERSE EVENTS: no harms reported Data measured at 2nd and 4th visit before treatment	3/13
Edelist, G (1976)[105] Canada	30	% male: NR Mean age: NR	Patients with disc disease- not responding to conventional therapy including bed rest, analgesics, heat, and physiotherapy	1 – acupuncture, n = 15 2 – sham acupuncture, n = 15 Treatment provider: NR	3 treatments total, 2 day intervals 6 days	1 – Pain: subjective improvement of pain 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	2/13
Kawase, Y (2006)[106] Japan	64	% male: 56% Mean age: 52.8 yrs	NR	1 – whole body acupuncture pole treatment (Taikyo-Ryoho) + low frequency acupuncture by acupuncturist with 6-53 yrs experience, n = 12 2 – whole body acupuncture pole treatment by same therapist, n = 13 3 - low frequency acupuncture by same therapist, n = 20 4 - sham acupuncture by same therapist, n = 19	1 time treatment	1 – Pain: therapeutic effectiveness-VAS 2 – Disability: measuring patients' ADL-JOA score 3 – ADVERSE EVENTS: no harms reported Data measured at end of single treatment	10/13

Table 1.9 Low Back Pain - Manipulation – Acute/Sub-acute - Specific Pain – No Studies

Table 1.10 Low Back Pain – Manipulation – Acute/Sub-acute - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Russell I (UK BEAM Trial) (2004)[107] UK	1334	% male: 43.2 Mean age: 43.1 yrs	Patients aged 18-65 yrs with LBP (RMDQ => 4) who had experienced the pain daily for the past month	1 – standard care by general practitioner (GP), n = 338 2 – Exercise by trained Physical therapists with ≥ 2 yrs experience, n = 310 3 – Private-M by qualified manipulators, n = 180 4 – NHS-M by same therapists/manipulators, n = 173 5 – Private-M + Exercise by same therapists/manipulators , n = 172 6 – NHS-M + Exercise by same therapists/manipulators, n = 161	8 sessions over 4-8 weeks Last session at 12 weeks	1 – Pain: Serious spinal disorder 2 – ADVERSE EVENTS: no harms reported Data measured at 12 weeks	5/13
Hoiriis K (2004)[108]	156	% male: 56.7 Mean age: 41.9 yrs	21 - 59 years old with uncomplicated LBP of 2 - 6 weeks duration	1 – Chiropractic adjustments and medical placebo by a chiropractor, medical doctor, n = 50 2 – Muscle relaxants and sham adjustments by a medical doctor, n = 53 3 – Medical placebo and sham adjustments by a medical doctor, n = 53	N of treatments varied 7 weeks	1 – Pain: VAS (10 cm) 2 – Disability: Oswestry LBP Disability Questionnaire 3 – ADVERSE EVENTS: no harms reported Data measured at 7 weeks and 3 mo	8/13
Hsieh, C (2002)[109] California	200	% male: 65.4 Mean age: 48.2 yrs	18 years or older, LBP between 3 weeks and 6 months for the current episode or a pain-free period of at least 2 months in the preceding 8 months for recurrent LBP, agreement for randomization, and consent for treatment	1 – Back school program by experienced licensed physical therapists and chiropractors, n = 48 2 – Myofascial therapy program by trained clinicians – Physical therapists and chiropractors, n = 51 3 – Joint manipulation by experienced licensed chiropractors with 5 years min. Clinical experience, n = 49 4 – Combined joint manipulation + myofascial therapy, same providers as group 2 and 3n = 52	1-3 times/ week 3 weeks	1 – Pain: VAS scale for pain during past week 2 – Disability: Roland-Morris Activity Scale (RMAS) 3 – ADVERSE EVENTS: n = 23 reported adverse effects, mostly transient exacerbations of symptoms N based on intent to treat Data measured at 3 weeks an 6 mo	4/13
Seferlis T (2000)[110] Stockholm, Sweden	180	% male: 53 Mean age: NR	18 - 16 years of age; LBP with or without sciatica requiring sick-leave; and a sick-leave period for LBP less than 2 weeks before entering the study. Acute	1 – General practitioner program (GPP) (Control), n = 60 2 – Manual Therapy program (MTP), by physiotherapist, n = 60 3 – Intensive Training program (ITP), by physical therapist, n = 60	3 times/week 8 weeks only reported for ITP group	1 – Cost: Direct, indirect and total costs 2 – ADVERSE EVENTS: no harms reported	5/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Pope, M (1994)[111] California, US	240	% male: 62 Mean age: 32 yrs	Ages 18-55 years; general good health; LBP between 3 weeks and 6 months duration (this episode); free from LBP for minimum 3 weeks for this episode	1 – Manipulation by 5 licensed chiropractors, n = 60 2 – Soft-tissue massage by 2 licensed massage therapist serving as a chiropractor, n = 30 3 – Transcutaneous muscle stimulation by a licensed chiropractor, n = 30 4 – Lumbosacral corset by a licensed chiropractor, n = 30	9 sessions 3 weeks	1 – Pain: 10 cm VAS 2 – Disability: Rage of motion-Schober's test – Extension; Flexion 3 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks	5/13
Sanders GE (1990)[112] US	18	% male: 50 Mean age: NR	Patients with acute LBP (< 2 weeks) naïve to chiropractic manipulation and had not taken any pain medication for 48 hrs prior to the study enrolment	1 – Spinal manipulation, n = 6 2 – Sham-SM, n = 6 3 – No treatment, n = 6 Treatment provider: NR	One treatment	1 – Pain: VAS 2 – ADVERSE EVENTS: no harms reported Data measured at end of single treatment	7/13
Hadler NM (1987)[113] US	54	% male: 48 Mean age: NR	Patients aged 18-40 yrs with acute LBP (<= 1 mo), no other episode of back pain in previous 6 mo, not work-related pain, no previous surgery	1 – Mobilization by an investigator with experience, n = 28 2 – Manipulation by the same investigator, n = 26	NR	1 – Disability: RMDQ 2 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	7/13
Alaksiev A (1996)[114]	65	% male: 49.2 Mean age: 33.4 years	Outpatients with LBP lasting no more than 1 mo	1 – SM, n = 22 2 – Relaxation, n = 22 3 – Placebo, n = 21 Treatment provider: NR	3-4 treatment/week 3 weeks	1 – Total improvement 2 – ADVERSE EVENTS: no harms reported	3/13
Rasmussen, G (1979)[115]	24	% male: 100 Mean age: 34.9 years	Male outpatients, 20-50 years of age with LBP without signs of root pressure; duration less than 3 weeks; no treatment except analgesics prior to the trial	1 – Short wave, n = 12 2 – Manipulation in pain free direction by a physiotherapist or physician, n = 12	3 times/week-6 sessions 2 weeks	1 – Pain: Restoration 2 – Disability: Schober's test 3 – ADVERSE EVENTS: no harms reported Data measured at 2 weeks	2/13
Shah, M (1989)[116] UK	16	% male: NR Mean age: NR	Patients with acute back pain	1 – Manipulation, n = 10 2 – Naprosyn (oral medication), n = 6 Treatment provider: NR	7 days (assumed)	1 – Quality of Life: % improved 2 – Pain: PRS 3 – Disability 4 – ADVERSE EVENTS: no harms reported Data measured at 1 and 4 weeks	

Table 1.11 Low Back Pain- Manipulation- Chronic specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Morton, J (2005)[117]	29	% male: 35 Mean age: 44.6 yrs	Aged between 18 and 70 years with acute mechanical LBP of approx. 4 weeks or less; Pain located between T12 and the gluteal fold (might radiate to one lower limb)	1 – Manipulation + exercise, n = 15 2 – Exercise alone, n = 14 Treatment provider: NR	8 treatments total 4 weeks	1 – Pain: AVAS 2 – Disability: RMDQ 3 – ROM in degrees 4 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks	4/13

Hoehler, FK (1981) [118] USA	95	% male: 59.0 Mean age: 31 years	Patients with low back pain candidate for manipulation by palpatory cues; no psychosocial or contradictions for manipulation	1 – Manipulation by a physician, n = 56 2 – Soft tissue massage by the same physician, n = 39	1 treatment session	1 – Pain: VAS 2 – Range of motion 3 – Adverse events: not reported	3/13
Postacchini, F (1988) [119] Italy	398	% male: 50.5 Mean age: 36.5 – 39.5 years	Low back pain patients aged 17-58 years presenting at 2 clinics	1 – Manipulation by a trained chiropractor, n = 87 2 – Drug therapy, n = 81 3 - Physiotherapy, n = 78 4 – Bed rest, n = 29 5 – Low back school, n = 50 6 – Placebo, n = 73	7 times for 1st week, then twice for up to 6 weeks	1 - Combined Score (Pain VAS, disability, forward spinal flexion, leg lowering test) on a 32 point scale ranging from 5 (poor clinical status) to 32 (excellent clinical status).	6/13

Table 1.12 Low Back Pain – Manipulation - Chronic - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Haas, M (2004)[120] NR	191	% male: 45.8 Mean age: 47.8 yrs	Current episode of CLBP; LB was defined as the area below the 12th rib and above the gluteal fold. Chronic defined as episode of pain of at least 3 months duration; 18 yrs or older; English literacy	1 – a- 3 treatments of spinal manipulation (SM); b- a + 3 treatments of physical modalities (PM) by 4 chiropractors with 2-22 yrs of practice experience, n = 54 2 – a- 6 treatments of SM; b- a + 6 treatments of PM by same the chiropractors, n = 46 3 – a- 9 treatments of SM; b- a + 9 treatments of PM by same the chiropractors, n = 44 4 – a-12 treatments of SM; b- a + 12 treatments of PM by the same chiropractors , n = 47	3-12 treatments total 3 weeks	1 – Pain: Von Korff Pain Scale 2 – Disability: Von Korff Disability Scale 3 – ADVERSE EVENTS: no harms reported Data measured at 3 and 12 weeks	7/13
Niemisto (2003)[121]	204	% male: 46 Mean age: 37 yrs	24-46 yrs, employed, patients who had LBP (with or without sciatica) of at least 3 months'; self-rated disability index (Oswestry LBP Disability Questionnaire) score had to be at least 16% Chronic	1 – Manipulation + Stabilizing exercise, by experienced manual therapist, n = 102 2 – Consultation only, by physician, n = 102	4 treatments 4 weeks	1 – Pain: VAS (0-100); PDI (6 pts); RMQ adjusted for length of symptoms; VAS (100 mm) 2 – Disability: ODI (0-100) 3 – Quality of Life: 4 – Work: N days of work, sick leaves 5 – Utility of conventional care: Visits to physicians; visits to physiotherapy 6 – Cost: total healthcare cost 7 – ADVERSE EVENTS: no harms reported Data measured at 5 and 12 mo	8/13
Triano JJ (1995)[122] US	209	% male: 54 Mean age: 41.6 yrs	Patients aged => 18 yrs with mechanic CLBP (pain > 12 months between L1 and L5 including sacroiliac joints) experiencing palpatory tenderness	1 – SM (HVLA), n = NR 2 – HVLF mimic, n = NR 3 – BEP, n = NR Treatment provider: NR	Daily sessions 2 weeks	1 – Pain: VAS 2 – Disability: Oswestry scale 3 – ADVERSE EVENTS: no harms reported Data measured at 2 weeks and 3 mo	6/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Cote P (1994)[123] Canada	30	% male: 54.4 Mean age: 31 yrs	Patients with mechanic CLBP > 2 mo	1 – Manipulation by a clinician, n = 16 2 – Mobilization by a clinician, n = 14	One session	1 – Pain: PPT-L5 tender point; SI ligament tender point; gluteus tender point 2 – ADVERSE EVENTS: no harms reported Data measured at end of single session	4/13
Mohseni-Bandpei, M (2006)[124] UK	120	% male: 41% Mean age: 36 yrs	Patients with CLBP, age 18-55 with pain in LB between L1 and L5 and the sacroiliac joints; had LBP > 3 mo, signs and symptoms interpreted to be referred from the lumbar spine and not other organs; good self-reported general health	1 – Manipulation/ Exercise by one qualified manipulative therapist, n = 60 2 – Ultrasound/ exercise by a second physiotherapist, n = 60	6 sessions 1-2 times/week	1 – Pain: VAS pain intensity 2 – Disability: Oswestry Disability Index (%) 3 – ADVERSE EVENTS: no harms reported Data measured at end of treatment 3 or 6 weeks	2/13
Biedermann, F (1980)[125] NR	NR	% male: NR Mean age: 30.5 yrs	Sudden onset associated with trauma, recent onset usually of 2 or 3 weeks duration, abnormally low straight leg raising tests presumably due to tight hamstrings	1 – Rotational Manipulation, n = NR 2 – Soft-tissue Massage, n = NR Treatment provider: NR	NR	1 – Pain: duration of pain relief (mean in days) 2 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	3/13
Waagen, G (1986)[126] Iowa, US	29	% male: 46.7 Mean age: 24.8 yrs	Chief complaint of LBP; no experience with chiropractic	1 – Spinal adjusting therapy by a chiropractor, n = 11 2 – Sham adjustment by a chiropractor, n = 18	2-3 treatments /week 2 weeks	1 – Pain: 10 cm VAS decrease 2 – Disability: Straight leg raising test; Lumbar flexion; Lumbar extension; Global index; Lateral flexion 3 – ADVERSE EVENTS: no harms reported Data measured at 2 weeks and 3 mo	5/13
Rasmussen, J (2008)[127] Denmark	72	% male: Mean age:	18-60 yrs; LBP more than 3 mo	1 – Extension exercises + Manipulation by and examiner with a diploma in manual medicine, n = 35 2 – Extension exercises by the same examiner, n = 37	Manipulation at baseline, 2 and 4 weeks	1 – Pain: VAS (1-10) 2 – ADVERSE EVENTS: reported but no details Data measured at 3 and 6 mo	6/13
Lalanne, K (2009)[128] Quebec	27	% male: 52.2 Mean age: 39.8 yrs	18-60 yrs; constant or recurrent LBP for more than 6 mo Chronic	1 – Lumbar Spine Manipulation by an experienced chiropractor, n = 13 2 – Control (no manipulation-side lying posture), n = 14	One manipulation	1 – Pain: VAS (1-100) 2 – ADVERSE EVENTS: no harms reported Data measured after end of treatment	1/13
Giles, LGF (1999)[129] Australia	69	% male: 35.67% Mean age: 41.3%	Patients suffering from spinal pain for at least 13 weeks; at least 18 years of age	1 – acupuncture, n = 18 2 – Spinal manipulation, n = 32 3 – medication, n = 19 Treatment provider: NR	6 treatments 3-4 weeks	1 – Pain: VAS 2 – Disability: Oswestry Disability Index 3 – ADVERSE EVENTS: no harms reported Data measured at 3-4 weeks	1/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Giles, LG (2003)[17] Australia	115	% male: 54.93% Mean age: 26.1 yrs	Patients at least 17 yrs; uncomplicated mechanical spinal pain for 13 weeks minimum-for long-term fu > 1 yr; those who received their randomly allocated treatment regimen during treatment period	1 – acupuncture (LB, NP, thorax), n = 36 2 – spinal manipulation, n = 36 3 – medication that has not been tried by Patients in this group, n = 43	Maximum of 9 weeks	1 – Pain: pain frequency; VAS intensity 2 – Disability: Oswestry Disability 3 – Quality of Life: SF-36 4 – ADVERSE EVENTS: hematoma and bleeding, n = 1 committed suicide Data measured at 9 weeks and 1 yr	6/13
Postacchini, F (1988)[119] Italy	398	% male: 50.1% Mean age: 36.3 – 40.3	Patients 18 – 58 years Group I: LBP with no radiating pain, n = 271 Acute, chronic, or acute with chronic history Group II: LBP with radiating pain, n = 188 Acute and chronic	1 – spinal manipulation by trained chiropractor, n = 271 2 – drug therapy: NSAIDS (Diclofenac) 3 – physiotherapy: light massage, analgesic currents and diathermy (infrareds in acute syndromes and short wave diathermy in chronic) 4 – placebo: antioedema gel contained in a vessel without identification 5 – bed rest 6 – low back school (only in chronic syndromes) based on Canadian model of back education	3 (acute), to 6 (chronic) weeks	1 – pain severity, VAS 1 – 4 (higher better) 2 – disability: patients ability to perform ten everyday activities as assessed by a disability questionnaire (1 -= extremely disabled; 4 = unlimited) 3 – forward flexion, (fingertips and floor distance: > 60 cm = 1 pint; < 20 cm = 4 pints) 3- abdominal muscle strength by leg lowering test 4 – isometric endurance of back muscles	6/13
Herzog, W (1991)[130] Canada	37	% male: 67.6% Mean age: 33.5 years	Patients age 18- 50 years, ambulatory with chronic sacroiliac joint problems diagnosed independently by two chiropractors	1 – spinal manipulation, by chiropractors, n = 16 2 – back school therapy by physiotherapist, n = 13	4 weeks, 10 treatments	1 – pain intensity by VAS (recovery = 0 on scale of 0 – 10) 2 – disability, by Oswestry Functional Disability questionnaire (recovery = 6% or less) 3 – sacroiliac joint fixation evaluation by Gillett motion palpation test 4 – gain analysis by Kistler force platform 5 – Adverse events: NR	5/13

Table 1.13 Low Back Pain – Manipulation – Mixed - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Jull, G (2005)[131] Australia	200	% male: NR Mean age: 36.6 years	Patients between 18-60 years with chronic cervicogenic headaches	1 – Manipulative therapy, n = 51 2 – Therapeutic exercise, n = 52 3 – Combined exercise and manipulative therapy, n = 49 4 – Control, n = 48 Treatment provider NR	6 weeks	1 – Pain: VAS (10 cm); PRI; MPQ 2 – Disability – Northwick Park Neck Pain Questionnaire; CCFT (25) Data measured at 7 weeks and 3, 6, and 12 months post intervention	
Mathews W (1988)[132]	282	% male: NR Mean age: NR	18-60 years of age; presenting episode of pain of less than 3 mo	1 – Manipulation, Trial B1, n = 31 2 – Control-Infrared lamp, Trial B1, n = 25 3 – Manipulation, Trial B2, n = 127 4 – Control-Infrared lamp, Trial B2, n = 99 Treatment provider: NR	3 times/week 2-3 weeks	1 – Pain: VAS (1-6) 2 – ADVERSE EVENTS: no harms reported Point of measurement not reported	2/13

Zhang, W (2008)[133] China	11928	% male: NR Mean age: NR	Diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard; diagnosed using CT or MRT; signed consent form	1 – Manipulation reduction + lumbar traction + various physiotherapies, n = 5760 2 – Lumbar traction + various physiotherapies, n = 5368 Treatment provider: NR	30 treatments 30 days	1 – Pain: VAS 2 – Quality of Life: well being, NR 3 – ADVERSE EVENTS: no harms reported Data measured at 30 days	4/13

Table 1.14 Low Back Pain - Manipulation - Mixed - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Childs, JD (2004)[134] US	131	% male: 58 Mean age: 34 yrs	LBP Patients aged 18-60 yrs with ODQ score ≥ 30%	1 – SM + exercise by 13 licensed Physical therapists who received one training session, n = 70 2 – Exercise by same therapists, n = 61	4 weeks	1 – Disability: ODQ 2 – Utility of conventional care: medication use; healthcare utilization 3 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks and 6 mo	8/13
UK BEAM Trial (2004)[135] UK	1334	% male: NR Mean age: NR	Mixed	1 – General practice, n = 326 2 – Exercise program, n = 297 3 – Spinal manipulation, n = 342 4 – Combined treatment, n = 322	2 – 9 classes 3 – 8 sessions 4 – 6 weeks manipulation + 6 weeks exercise 12 weeks	1 – Cost: healthcare; cost/QALYs 2 – Quality of Life: QALYs	2/13
Cherkin D (2008)[136] Ottawa, Canada	321	% male: 52.7 Mean age: 40.5 yrs	20-64 years old who saw their primary care physician for LBP and who still had pain seven days later.	1 – Physical Therapy by 13 therapists with a median of 14 yrs experience, n = 133 2 – Chiropractic Manipulation by chiropractors with 6-14 yrs experience, n = 122 3 – Educational Booklet, n = 66	Up to 9 visits 1 mo	1 – Quality of Life: Bothersomeness of symptoms index 2 – Disability: RDQ 3 – ADVERSE EVENTS: no harms reported Data measured at 1 and 3 mo	5/13
Hoehler F (1981)[137] California	95	% male: 59 Mean age: 31.1 yrs	Presence of palpatory cues indicating that manipulation might be successful	1 – Rotational Manipulation of lumbosacral spine by a physician, n = 56 2 – Soft-tissue massage by a physician, n = 39	N of treatments varied	1 – Pain: Improvement in amount of pain 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	3/13
Mathews W (1988)[132]	282	% male: NR Mean age: NR	18-60 years of age; presenting episode of pain of less than 3 mo	1 – Manipulation, Trial B1, n = 31 2 – Control-Infrared lamp, Trial B1, n = 25 3 – Manipulation, Trial B2, n = 127 4 – Control-Infrared lamp, Trial B2, n = 99 Treatment provider: NR	3 times/week 2-3 weeks	1 – Pain: VAS (1-6) 2 – ADVERSE EVENTS: no harms reported Point of measurement not reported	2/13
Bronfort, G (1989)[138] Denmark	19	% male: 49 Mean age: 37.5 yrs	Native to chiropractic and between 18-70 yrs of age; Primarily suffering from LBP of various durations with or without radiating pain to one or both lower extremities	1 – Chiropractic-no practical technique named by chiropractors, n = 10 2 – Medical-analgesic, local analgesic-anaesthetic injections, bed rest and/or physiotherapy by MDs, n = 9	1 month	1 – Pain: Patient rate of improvement 2 – ADVERSE EVENTS: no harms reported Data measured at 1, 3, and 6 months	2/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Rupert R (1985)[139] Egypt	145	% male: NR Mean age: NR	18-68 years with LBP or leg pain and/or restriction in lumbar ROM	1 – SM by 2 clinically experienced chiropractors, n = 49 2 – Sham SM by same chiropractors, n = 46 3 – Medication, Drugs and bed rest by a team of medical orthopaedic specialists, n = 50	3 treatment/week	1 – Pain reduction	2/13
Zhang, W (2008)[133] China	11928	% male: NR Mean age: NR	Diagnosed using Chinese Medical Diagnostic and therapeutic Effective Standard; diagnosed using CT or MRT; signed consent form	1 – Manipulation reduction + lumbar traction + various physiotherapies, n = 5760 2 – Lumbar traction + various physiotherapies, n = 5368 Treatment provider: NR	30 treatments 30 days	1 – Pain: VAS 2 – Quality of Life: well being, NR 3 – ADVERSE EVENTS: no harms reported Data measured at 30 days	4/13
Hoiriis K (1999)[140]	26	% male: NR Mean age: NR	LBP of greater than 2 months	1 – Cervical adjustments, n = NR 2 – Full Spine Adjustments, n = NR 3 – Combination of both techniques, n = NR Treatment provider: NR	Up to 6 mo	1 – Pain: VAS 2 – Disability: Oswestry Disability Questionnaire 3 – ADVERSE EVENTS: no harms reported Data measured at 6 mo	0/13
Herzog, W (1991) [130] Canada	29	% male: 76.5 Median age: 33.5 years	Patients with chronic sacroiliac joint problem, aged 18-50 years, ambulatory	1 – Manipulation by a chiropractor, n = 16 2 – Other (stretching, exercises) by a physiotherapist, n = 13	10 sessions over 4 weeks	1 - Pain (VAS) 2 - Functional disability (Oswestry) 3 - Harms (not reported)	
Evans, D.P (1978)[141]	32	% male: 47 Mean age: NR	Patients with chronic LBP	1 – Rotational manipulation, n = 15 2 – Control, n = 17 Treatment provider NR	3 treatments at weekly intervals	1 – Anterior spinal flexion measurements 2 – Pain: daily pain scores 3 – Patients global assessment 4 – Patients assessment of efficacy Data measured at 21 and 42 days	
Honduras, M (2009)[142]	240	% male: 56 Mean age: 63.1 years	Subjects at least 55 years old with sub-acute or chronic non-ridiculer LBP	1 – High velocity, low amplitude spinal manipulation, by 4 chiropractors with more than 6 yrs experience, n = 96 2 – Low velocity, variable amplitude spinal mobilization, by same treatment providers as group 1, n = 95 3 – Minimal conservative medical care, n = 49	12 visits of HVLA-SM, LVVA-SM or 3 visits of MCMC 6 weeks	1 - Disability: 24-item Roland Morris disability questionnaire 2 – Pain: severity of pain-100 mm VAS 3 – Global improvement measure Data measured at 3, 6, 12, and 24 weeks	

Table 1.15 Low Back Pain - Manipulation - Unknown - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Dai, DC (2006)[143] China	99	% male: 23.2 Mean age: 58.1 yrs	Lumbar stability of degenerative spondylolisthesis	1 – Spinal fine adjusting manipulation, n = 50 2 – Flexing hip and knee manipulation, n = 49 Treatment provider: NR	10 treatments 5 weeks	1 – Pain: Local standard of integrated score of symptoms and function 2 – Disability: X-ray changes of lumbar spine 3 – ADVERSE EVENTS: no harms reported Data measured at 5 weeks	3/13

Table 1.16 Low Back Pain – Manipulation - Unknown - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Shearar K (2004)[144] South Africa	60	% male: 50 Mean age: NR	18 - 59 ; diagnosed with sacroiliac joint syndrome	1 – High velocity, Low amplitude chiropractic adjustments (HVLA) by a chiropractor, n = 30 2 – Mechanical force, manually assisted chiropractic adjustments by the same chiropractor, n = 30	4 treatments 2 weeks	1 – Pain: NRS-101 2 – Disability: Revised Oswestry LBP Disability Questionnaire 3 – ADVERSE EVENTS: no harms reported Data measured at 2 weeks	1/13

Table 1.17 Low Back Pain – Mobilization – Acute/Sub-acute-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hadler NM (1987)[113] US	54	% male: 48 Mean age: NR	Patients aged 18-40 yrs with acute LBP (<= 1 mo), no other episode of back pain in previous 6 mo, not work-related pain, no previous surgery	1 – Mobilization by an investigator with experience, n = 28 2 – Manipulation by the same investigator with experience, n = 26	NR	1 – Disability: RMDQ 2 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	7/13
Hanrahan, S (2005)[145] U.S.	19	% male: 100 Mean age: 20.3 years	Male collegiate athletes with acute low back pain and no neurological deficits or suspected disc herniation	1 – Grade 1 (small amplitude) or 2 (large amplitude) posteroanterior joint mobilization by a certified athletic trainer, n = 9 2 – Control, n = 10 Co-intervention: standardized protocol of cryotherapy and stretching	Single session	1 – Pain (McGill Pain Questionnaire, and VAS) 2 – Muscle strength (by handheld dynamometer) Measured immediately post intervention	2/13
Aleksiev A (1995)[146] Bulgaria	NR	% male: 46.3 Mean age: NR	LBP but not a candidate for surgery prior or during the trial	1 – Post-isometric relaxation, n = NR 2 – AFSMC and sham mobilization, n = NR 3 – Perl's traction therapy and sham mobilization, n = NR 4 – Sham mobilization, n = NR Treatment provider: NR	20 treatment days, 12 procedures each group	1 – Pain: 2 – Disability: 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention and 6 mo	2/13

Table 1.18 Low Back Pain – Mobilization – Acute/Sub-acute-Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Wreje, U (1992)[147] Sweden	39	% male: 0 (all female) Mean age: 32 years	Patients with LBP due to pelvic joint dysfunction , and no neurological disease or spine pathology	1 – Spinal mobilization, n = 18 2 – Sham mobilization (manual transverse frictions on the gluteus medius), n = 21 Standardized co-intervention: paracetamol Treatment provider: NR	Single session	1 – Pain (VAS) 2 – number of patients using analgesic drugs Measured immediately after intervention	4/13

Table 1.19 Low Back Pain – Mobilization – Chronic-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Timm, K. E (1994)[148] US	250	% male: 73 Mean age: 43 years	LBP with or without radiation, and associated symptoms for at least 6 months following a single-level lumbar laminectomy of the L5 segment	1 – Joint Manipulation by a physical therapist, n= 50 2 – Physiotherapy by the same therapist, n=50 3 – Low-tech McKenzie exercises by the same therapist, n= 50 4 – High-tech Cybex exercises by the same therapist, n= 50 5 – No treatment, n= 50	Three times per week for 8 weeks	1 - Functional Disability (Oswestry, Schober) (A, B)	4/13

Table 1.20 Low Back Pain – Mobilization – Chronic-Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Ritavanen, T (2007)[149] Finland	61	% male: 55 Mean age: 41 years	Patients with chronic LBP aged 20-60 yrs who had restricted functioning and no contradiction to mobilization	1 – Spinal mobilization by experienced bone setter , n = 33 2 – Physiotherapy including massage, therapeutic stretching, trunk stabilization exercise, exercise therapy by a fitness centre specialist, n = 28	5 treatments with 2 weeks interval 2 months	1 – Pain (VAS 0 - 100) 2 – Disability (Oswestry index 0 – 100) 3 – ROM (finger- floor distance), lateral bending) 4 – Depression score 5 – ADVERSE EVENTS: no information Measured at short term follow up (1 month after last intervention)	5/13
Hemmila H (2002)[150] Finland	114	% male: NR Mean age: NR	Non-retired people ; BP and no contraindicatio ns to manual therapies Sub-acute	1 – Physiotherapy, n = 34 2 – Bone-setting, by 4 folk healers, n = 45 3 – Exercise, n = 35	Maximum of 10 treatments 6 weeks	1 – Disability: ODQ 2 – ADVERSE EVENTS: no harms reported Data measured at 6 weeks, 3 and 6 mo	8/13
Cote P (1994)[123] Canada	30	% male: 54.4 Mean age: 31 yrs	Patients with mechanic CLBP > 2 mo	1 – Manipulation by a clinician, n = 16 2 – Mobilization by a clinician, n = 14	One session	1 – Pain: PPT-L5 tender point; SI ligament tender point; gluteus tender point 2 – ADVERSE EVENTS: no harms reported Data measured at end of single session	4/13
Mackawan S (2007)[151] Thailand	67	% male: 39 Mean age: 38.8 yrs	20 - 60 years; persistent chronic LBP (more than 12 weeks); no evidence of underlying diseases or anatomical abnormalities	1 – Traditional Thai Massage (TTM) by an experienced physiotherapist, n = 35 2 – Joint Mobilization by the same therapist, n = 32	One 10 min session	1 – Pain: VAS (10 cm); Substance P levels in saliva (severity of chronic pain) 2 – ADVERSE EVENTS: no harms reported Data measured at end of single session	5/13
Lopez de, C (2007)[152] Spain	100	% male: NR Mean age: NR	Patients with non specific chronic low back pain, age 18 – 65 and no lumbar fracture; tumour, rheumatoid disease, or spondylolysis	1 – Spinal mobilization, n = NR 2 – No treatment, n = NR Treatment provider: NR	Single session	1 - Pain: VAS (100 mm) 2 - Function 3 - range of motion 4 – ADVERSE EVENTS: no information	8/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hemmila, H. M (1997)[153] Finland	114	% male: 57 Mean age: 42 years	Back pain between the shoulders and the buttocks	1 - Bone Setting by 4 folk healers, n= 34 2 – Physiotherapy by a physiotherapist, n = 45 3 – Home exercises by the same therapist, n = 35	1-2 times per week for 6 weeks	1 – Pain: VAS (0-100) Pain during past 3 days 2 – Pain Point Sensitivity 3 – Pressure Pain Threshold	6/13

Table 1.21 Low Back Pain – Mobilization – Mixed – Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Konstantinou K [crossover] (2007)[154] UK	26	% male: 57 Mean age: 38.3 years	Patients aged > 18 yrs with or without leg pain with LBP Mixed	1 – Flexion mobilization with movement technique (MWMs), n = 15 2 – Placebo-Flexion MWMs, n = 11	NR	1 – Pain: VAS 2 – Disability: RMDQ-reported for respondents only Crossover data	5/13
Hoving, J (2006)[155] Netherlands	183	% male: NR Mean age: NR	Non-specific NP for at least 2 weeks Mixed	1 – Mobilization, n = 60 2 – Physical Therapy (PT), n = 59 3 – General Care, n = 64	1 – 6 sessions 2 – 12 sessions 3 – 3 sessions 6 weeks for all	1 – Pain: Pain intensity 11-pt scale 2 – Disability: Physical dysfunction 11-pt scale; functional neck 3 – Quality of Life: Global perceived recovery Data measured at 3, 7, 13, 26 and 52 weeks	7/13
Chiradejnant A (2003)[156] Sydney, Australia	140	% male: 51 Mean age: 46.4 yrs	Resting pain of more than 2 on a 0 to 10 pain scale and the treating physiotherapist had to agree that spinal mobilisation treatment was indicated. Mixed	1 – Correct mobilization treatment by physiotherapist, n = 70 2 – Randomly assigned mobilization technique, by physiotherapist, n = 70	Two 1 min repetitions	1 – Pain: VAS (10 cm) 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	9/13
Goodsell, M (2000)[157] Australia	26	% male: 51.5 Mean age: 39.2 yrs	Current episode of LBP experienced pain in previous 48 hrs; BP elicited by active lumbar flexion or extension movements Mixed	1 – PA Manual mobilization, by one physiotherapist with a postgraduate qualification in manual therapy, n = 12 2 – Control treatment, n = 14	NR	1 – Pain: McGill Pain score-Worst pain; Overall % 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	3/13
Chiradejnant, A (2002)[158] Australia	120	% male: 59 Mean age: 41.2 yrs	Non-specific LBP Mixed	1 – Posteroanterior (PA) mobilization at most symptomatic spinal level, n = 60 2 – Posteroanterior (PA) mobilization at randomly selected lumbar level, n = 60 Treatment provided by one physiotherapist	Two 1 minute repetition	1 – Pain: NRS 11 pt scale; Global Perceived Effect 11 pt scale 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	5/13

Powers, CM (2008)[159]	30	% male: 37 Mean age: 31.2 yrs	18 to 45 years of age with non-specific LBP; recent onset of LBP (duration of < 3 months) Mix (acute, sub-acute)	1 – Passive segmental mobilization, n = 15 2 – Press up exercise, n = 15 Both treatments administered by a physical therapist with 18 yrs of manual therapy experience and certification as an Orthopaedic Clinical Specialist by the American Board of Physical Therapy Specialties	1 intervention 10 minutes	1 – Pain: VAS 2 – Disability: Lumbar extension 3 – ADVERSE EVENTS: no harms reported Data measured at end of single treatment	4/13

Table 1.21 Low Back Pain – Manipulation + Mobilization – Acute/Sub-acute- -Specific Pain- No Trials

Table 1.22 Low Back Pain – Manipulation + Mobilization – Acute/Sub-acute-Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hancock MJ (2007)[160] Australia	240	% male: 56 Mean age: 40.3 yrs	Patients with acute LBP (< 6 weeks) in the area between the 12th rib and the buttock crease causing moderate pain and disability	1 – Diclofenac-NSAID by a general practitioner, n = 60 2 – Spinal manipulation by Physical therapists with graduate diploma in manipulative therapy, n = 60 3 – Dicloflenac + SM by a general practitioner and Physical therapists, n = 60 4 = Placebo manipulative therapy + placebo diclofenac, n = 60	Twice/day 2-3 times/week 4 weeks	1 – Pain: VAS; time to recovery 2 – Disability: RMDQ; PFS 3 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks and 3 months	9/13
Hurley DA (2004)[161]	240	% male: 52 Mean age: 40.1 yrs	Patients aged 18-65 yrs with acute LBP (duration: 4-12 weeks) with or without pain irradiation to the buttock or legs Acute LBP	1 – MT by chartered Physical therapists , n = 80 2 – IFT-standard stimulation by same therapists, n = 80 3 – MT + IFT by the same therapists, n = 80	8 weeks	1 – Pain: VAS; McGill pain questionnaire; SF-36 Bodily pain 2 – Disability: RMDQ 3 – ADVERSE EVENTS: no harms reported Data measured at 8 weeks, 3 and 6 months	6/13

Table 1.23 Low Back Pain – Manipulation + Mobilization – Chronic-Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Aure, O (2003)[162] Norway	49	% male: 53 Mean age: 40.2 yrs	Men and women age 20 to 60 years that had been sick-listed between 8 weeks and 6 months due to LBP with or without leg pain.	1 – Manual Therapy by a specialist, n = 27 2 – Exercise Therapy by 2 physiotherapists, n = 22	16 treatments 8 weeks	1 – Pain: VAS (100 mm) 2 – Disability: Oswestry LBP Questionnaire 3 – Work: N of sick-listed patients at each assessment session (Analysis' based on intention to treat) Data measured at 8 weeks, 3 and 6 mo	8/13
Ferreira ML (2007)[163] Australia	240	% male: 31 Mean age: 53.6 yrs	Patients with Non-specific CLBP aged 18-80 yrs; Patients with OA, disc protrusion, or herniation without neurological compromise were also included	1 – Spinal manipulation + mobilization by physiotherapists, n = 80 2 – MC + exercise by the same therapists, n = 80 3 – GEN exercise by the same therapists, n = 80	12 sessions 8 weeks	1 – Pain: VAS 2 – Disability: RMDQ; PSFS 3 – ADVERSE EVENTS: no harms reported Data measures at 8 weeks, 3 and 6 mo	7/13

Table 1.24 Low Back Pain – Manipulation + Mobilization – Mixed- Specific Pain- No trials

Table 1.25 Low Back Pain – Manipulation + Mobilization – Mixed-Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hurwitz, EI (2006)[164] US	681	% male: 48 Mean age: 51 years	Health maintenance organization membership, sought care in one of the study sites between 1995-1998 with LBP, had no treatment received for the past month, age ≥ 18 yrs	1 – Spinal manipulation /mobilization by chiropractors with ≥ 5 yrs experience, n = 169 2 – Spinal manipulation /mobilization by the same chiropractors, n = 172 3 – MC,-instruction in proper back care, exercises, prescriptions by family medicine practitioners, n = 170 4 – MC + PT- one PM by licensed physiotherapists, n = 170	6 weeks	1 – Pain: VAS-most severe; average 2 – Disability: RMDQ 3 – Utility of conventional care: OTC use; prescribed use; mean n of back related visits 4 – ADVERSE EVENTS: no harms reported Data measured at 2 and 6 weeks, 6 and 18 mo	6/13
Koes, B (1992)[165] Netherlands	136	% male: 52 Mean age: 42.8 yrs	Pain or self-reported limited range of motion in the back or neck for at least 6 weeks	1 – Spinal manipulation /mobilization by a manual therapist, n = 36 2 – Physiotherapy by a physiotherapist, n = 31 3 – Continued treatment with General practitioner, n = 39 4 – Physical exam and detuned shortwave diathermy by a physiotherapist, n = 30	Maximum duration of 3 mo 4 – 2 times/ week for 6 weeks	1 – Physical measures: Improvement in spinal mobility-mean change of ROM at T1 measured by inclinometer-spinal forward flexion 2 – ADVERSE EVENTS: no harms reported Data measured at 6 and 12 weeks	5/13
Macdonald, R (1989)[166] London	95	% male: 41 Mean age: NR	Patients between 16 and 70, presenting to their general practitioner with pain partly or wholly between the inferior angles of the scapula and the buttock folds	1 – Spinal manipulation /mobilization by a registered osteopath, n = 49 2 – Control, advice; patients seen in clinic for examination, n = 49	2 times/week until cured	1 – Pain: Pain Disability Index; Pain Analog 2 – Disability: Activity Loss (ALA) 3 – ADVERSE EVENTS: Excess lumbar lordosis; pins and needles Data measured at end of treatment	5/13

Table 1.26 Low Back Pain – Manipulation + Mobilization – Unknown -Specific Pain- No trials

Table 1.27 Low Back Pain – Manipulation + Mobilization – Unknown -Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Meade, TW (1991)[167-170] UK	741	% male: 51 Mean age: 38.6 yrs	LBP mechanical origin, no contraindicatio n to SM, no treatment within the past month	1 – Spinal manipulation /mobilization by chiropractors, n = 384 2 – HM-Maitland mobilization/manipulation by hospital staff, n = 357	1 – Maximum 10 sessions 30 weeks 2 – 12 weeks	1 – Disability: ODQ; ODQ pain intensity 2 – Utility of conventional care: % patients using analgesic/NSAIDs drugs 3 – ADVERSE EVENTS: no harms reported Data measured at 6 mo, 1 year and 2 yrs post-R	5/13
Sims-Williams H (1979)[171] UK	94	% male: 58.3 Mean age: 42.7 yrs	Patients with non-specific LBP	1 – Spinal manipulation /mobilization n = 48 2 – Placebo, n = 46	Assuming 15 sessions 4 weeks	1 – Disability: Spinal movement- Flexion; Extension 2 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks and 3 mo	4/13

Table 1.28 Low Back Pain – Flexion Distraction Technique – Acute/Subacute- Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Kominski, G.F (2005)[164,172]	681	% male: 52 Mean age: 51.1 years	Adults with complaint of LBP (with or without leg symptoms)	1 – Medical care only, by primary care physician, n = NR 2 – Medical care with physical therapy, by physical therapist, n = NR 3 – Chiropractic care only, by chiropractor, n = NR 4 – Chiropractic care with physical modalities, n = NR	NR	1 – Pain: pain scale, lower-extremity pain (0-10 scale) 2 – Quality of Life: SF-36 emotional and physical function scores (0-100 scale)	3/13

Table 1.29 Low Back Pain – Flexion Distraction Technique – Chronic- Specific- No studies

Table 1.30 Low Back Pain – Flexion Distraction Technique – Chronic -Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Cambron JA (2006)[173] US	235	% male: 63 Mean age: 41.6 yrs	Patients aged > 18 yrs with chronic LBP > 3 months from L1 to S1 joint inclusive, willing to undergo narcotic/NSAIDs muscle relaxant's use	1 – Flexion + distraction by a chiropractor with postgraduate certification in the technique, n = 123 2 – Exercise by licensed physiotherapists, n = 112	2-4 times/ week 4 weeks	1 – Pain: VAS; VAS, Patients with radiculopathy; VAS, Patients without radiculopathy 2 – Disability: RMDQ 3 – Utility of conventional care: annual mean N of visits; healthcare utilization 4 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks, 3 and 6 mo, 1 yr	3/13

Table 1.31 Low Back Pain – Flexion Distraction Technique – Mixed - Specific- No studies

Table 1.32 Low Back Pain – Flexion Distraction Technique – Mixed - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hawk, C (2005)[174] Midwestern US	111	% male: NR Mean age: 52 yrs	18 yrs and over, with sub-acute (onset 4-12 weeks prior to contact) or CLBP (onset more than 12 weeks prior)	1 – Flexion distraction technique by 4 experienced licensed chiropractors in FDT and TP therapy, n = 54 2 – Control-Manipulation, n = 57	8 treatments 3 weeks	1 – Pain: PDI; RMQ; VAS (100 mm) 2 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks	8/13
Hawk C (1999)[175]	13	% male: 66.6 Mean age: 33. 5 yrs	18 years of age or older; self-report of LBP within the last 6 mo	1 – Chiropractic Adjustment (active)-Flexion distraction technique by a licensed doctor of chiropractic (DC) certified in FDT, n = 8 2 – Placebo-Sham adjustments by the same doctor, n = 5	4 visits 2 weeks	1 – Pain: VAS (10 cm) 2 – Quality of Life: Global Well-Being scale (GWBS) (VAS, 10 cm) 3 – ADVERSE EVENTS: no harms reported Data measured at 2 weeks	4/13

Table 1.33 Low Back Pain – Flexion Distraction Technique – Unknown - Specific- No studies

Table 1.34 Low Back Pain – Flexion Distraction Technique – Unknown -Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Beyerman, KL (2006)[176] US	217	% male: NR Mean age: NR	English speaking patients with arthritis, OA, degenerative joint/disc disease, facet arthropathy, capable of traveling to the appointments	1 – Flexion distraction technique + moist hot pack, n = 124 2 – Moist heat, n = 93 Treatment provider: NR	20 sessions 5 weeks	1 – Disability: ODQ pain intensity; ODQ (ADL) 2 – ADVERSE EVENTS: no harms reported Data measured at 5 weeks	4/13

Table 1.35 Low Back Pain - Massage – Acute/Sub-acute - Specific Pain – No studies

Table 1.36 Low Back Pain - Massage – Acute/Sub-acute - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Preyde M (2000)[177] Canada	98	% male: 48.2 Mean age: 46.2 years	18 - 81 years; existence of sub-acute (between 1 week and 8 months LBP; stable health.	1 – Comprehensive massage therapy by 2 massage therapists with more than 10 yrs experience, n = 25 2 – Soft-tissue manipulation by the same therapists, n = 25 3 – Remedial exercises by the same therapists, n = 22 4 – Sham laser treatment by 1 massage therapists with more than 10 yrs experience and 1 certified personal trainer and certified weight-trainer supervisor, n = 26	6 treatments 1 month	1 – Disability: RMDQ; Modified Schober test 2 – Pain: MPQ (PRI and PPI scores) 3 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	6/13
Pope, M (1994)[111] California, US	240	% male: 62 Mean age: 32 yrs	Ages 18-55 years; general good health; LBP between 3 weeks and 6 months duration (this episode); free from LBP for minimum 3 weeks for this episode	1 – Manipulation by 5 licensed chiropractors, n = 60 2 – Soft-tissue massage by 2 massage therapists serving as chiropractic interns, n = 30 3 – Transcutaneous muscle stimulation by 1 licensed chiropractor, n = 30 4 – Lumbosacral corset by 1 licensed chiropractor, n = 30	9 sessions 3 weeks	1 – Pain: 10 cm VAS 2 – Disability: Rage of motion-Schober's test – Extension; Flexion 3 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks	5/13
Konrad K (1992)[178] Hungary	158	% male: 44.7 Mean age: 41.5	NS LBP with or without radiation to the thigh, 1 months <= duration <= 3 mo, a pain free year before the present episode	1 – Balneotherapy, n = 35 2 – Underwater traction bath, n = 44 3 – Underwater massage, n = 26 4 – Control, no treatment, n = 53 Treatment provider: NR	4 weeks	1 – Pain: VAS 2 – Utility of conventional care: N of analgesics taken in past 24 hrs 3 – ADVERSE EVENTS: no harms reported Data measured at 6 mo	6/13
Farasyn A (2006)[179] Belgium	60	% male: 41.3 Mean age: 41.3 years	21 - 75 years; N-S sub-acute LBP with or without referred pain to the leg	1 – Placebo by 2 male manual therapists with minimum 2 yrs experience in physical examinations and pressure pain, n = 20 2 – Massage by same manual therapists, n = 20 3 – Control, no treatment by same manual therapists, n = 20	One 30 min session	1 – Pain: VAS (100 mm) 2 – Disability: ODI 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	7/13

Yip, YB (2004)[180] China	61	% male: 15.0 Mean age: 44.0 – 48.1 years	Patients 18 years old or older with non-specific sub-acute low back pain for most days in the past 4 weeks who had not received acupuncture, manipulation, or physiotherapy in the past week	1 – Acupoint stimulation for relaxation with electrode pads followed by acupressure massage with natural aromatic lavender oil and conventional treatment, n = 32 2 - Conventional treatment alone, n = 29	8 sessions of 35-40 min each for 3 weeks	1 – Pain (VAS) 2 – Walking time (in sec) 3 – Lateral fingertip-to-floor distance (cm)	5/13

Table 1.37 Low Back Pain - Massage - Chronic- Specific Pain – No Studies

Table 1.38 Low Back Pain - Massage - Chronic - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Little, P (2008)[181-183] UK	579	% male: 30.5 Mean age: 45.5 years	Patients with recurrent or CLBP, presenting to primary care with LBP > 3 months (currently scoring ≥ 4 on Roland disability scale, current pain for ≥ 3 weeks (to exclude recurrence of short duration)	1a – Massage only 1b – Massage + Exercise, n = 147 2a – Six Alexander technique lessons 2b – Six Alexander lessons + Exercise, n = 144 3a – 24 Alexander lessons 3b – 24 Alexander lessons + Exercise, n = 144 4a – Usual care 4b – Usual care + Exercise, n = 144	1 – 6 sessions, 6 weeks 2 – 6 sessions, 4 weeks 3 – 24 lessons in 5 mo 4 – 4b started exercise treatment at 6 weeks	1 – Pain: median days with no pain (IQR) 2 – Disability: Roland disability score 3 – Quality of Life: SF-36 physical score 4 – ADVERSE EVENTS: no significant harms reported Data measured at 3 and 12 mo	8/13
Zaproudina, N (2009)[184] Finland	122	% male: 49 Mean age: 41 years	Chronic LBP with or without referred leg pain; minimal VAS of 30 and/or Oswestry Disability Index of at least 16%.	1 - physical and exercise therapy by an experienced registered therapist, n = 63 2 - Traditional bone setting by a Finnish bone-setter, n = 59	1 – Five sessions 2- Three - Five sessions lasting 90 minutes per patient at 1 or 2 week intervals	1 – Pain: VAS (0-100)	5/13
Quinn, F (2008)[185] UK	15	% male: 32.2 Mean age: 43.5 years	Staff employed at the U of Ulster with non-specific LBP, any physiotherapy, medication or other treatment for LBP has been stabilized for at least 3 mo	1 – Massage-reflexology by 3 experienced reflexologists, n = 7 2 – Sham (foot massage) by the same therapists, n = 8	1 treatment/ week 6 weeks	1 – Pain: VAS-primary outcome measure; MPQ 2 – Disability: RMDQ; SF-36 health survey 3 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	9/13
Poole H (2007)[186] UK	290	% male: 40.8 Mean age: 46.8 years	18 - 65 yrs with benign CLBP	1 – Massage-reflexology by 5 experienced reflexologists, n = 77 2 – Relaxation by an experienced certified therapist, n = 82 3 – standard treatment by general practitioner -non-intervention, n = 131	6 treatments 6-8 weeks	1 – Pain: SF-36; VAS 2 – Disability: ODQ; physical functioning SF-36; BDI II 3 – ADVERSE EVENTS: no harms reported Data measured at 6 mo	5/13
Hsieh LLC (2006)[187] Taiwan	129	% male: 30 Mean age: 51.4 yrs	Patients aged > 18 yrs with CLBP (> 4 mo)	1 – Acupressure by a senior acupressure therapist, n = 64 2 – PT by a physical therapist, n = 65	6 sessions 1 mo	1 – Pain: VAS; Core outcome measures 2 – Disability: RMDQ score; modified Oswestry score 3 – Work: Satisfaction of life with symptoms 4 – ADVERSE EVENTS: no harms reported Data measured at 1 and 6 mo	9/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Geisser, M (2005)[188] Michigan	100	% male: 34 Mean age: 40.2 yrs	Aged 18-65 yrs; single or primary complaint of CLBP and were judged to have musculoskeletal pain based on evaluation by the physician or physical therapist	1 – Manual therapy, Specific Exercise by a physical therapist with 12 yrs post-grad training in manual medicine, n = 26 2 – Sham therapy, specific exercise by the same therapist, n = 25 3 – Manual therapy, non-specific exercise by the same therapist, n = 24 4 – Sham therapy by the same therapist, N-S exercise, n = 25	5 visits 5 weeks	1 – Pain: VAS; MPQ 2 – Disability: Quebec Back Pain Disability Scale (QBPDS) 3 – ADVERSE EVENTS: no harms reported Data measured at 5 weeks	3/13
Hsieh, L (2004)[189] Taiwan	146	% male: 47.7 Mean age: 47.6 years	16 - 84 yrs with chronic LBP	1 – Massage-Acupressure by a senior acupressure therapist, n = 69 2 – Physical therapy by the same therapist, n = 77	6 sessions 4 weeks	1 – Pain: Chinese version of SF-PQ 2 – ADVERSE EVENTS: no harms reported Data measured at 6 mo	9/13
Cherkin, DC (2001)[27] US	262	% male: 41% Mean age: 44.9 yrs	Ages 20 to 70 years who visited a primary care physician for low back pain who had persistent LBP for 6 weeks	1 – acupuncture, n = 94 2 – massage-manipulation of soft-tissue, n = 78 3 – self care education, n = 90	Up to 10 visits 10 weeks	1 – Pain: symptom bothersomeness during past week 2 – Disability: Roland Disability Scale Score; National Health Interview survey 3 – Quality of Life: SF-12 mental health summary scales 4 – ADVERSE EVENTS: no harms reported Data measured at 10 weeks and 1 yr	6/13
Hernandez-Reif M (2001)[190] US	24	% male: 45.8 Mean age: 40.25 years	Adults with LBP with a duration of at least 6 mo	1 – Massage therapy by trained massage therapists, n = 12 2 – Relaxation-no treatment, n = 12	2 sessions/ week 5 weeks	1 – Pain: SF-MPQ; VAS 2 – Disability: Range of motion (trunk flexion; pain flexion) 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	2/13
Field T (2007)[191] US	30	% male: 53 Mean age: 41 years	Adults with LBP of a duration of at least 6 mo; cleared by their primary physician to participate in the study	1 – Massage therapy by trained massage therapists, n = 15 2 – Relaxation therapy, n = 15	2 session/ week 5 weeks	1 – Pain: VAS (10 cm) 2 – Disability: Range of motion (trunk flexion; pain flexion) 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	2/13
Mackawan S (2007)[151] Thailand	67	% male: 39 Mean age: 38.8 yrs	20 - 60 years; persistent chronic LBP (more than 12 weeks); no evidence of underlying diseases or anatomical abnormalities	1 – Traditional Thai Massage (TTM) by an experience physiotherapist, n = 35 2 – Joint Mobilization by the same therapist, n = 32	One 10 min session	1 – Pain: VAS (10 cm); Substance P levels in saliva (severity of chronic pain) 2 – ADVERSE EVENTS: no harms reported Data measured at end of single session	5/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hollinghurst, S (2008)[183]	579	% male: 30.5 Mean age: 45.5 years	Chronic or recurrent LBP recruited from primary care	1 – Normal care (no exercise), n = 72 2 – Therapeutic massage (no exercise), by massage therapists, n = 75 3 – Six Alexander technique lessons (no exercise, by teachers, n = 73 4 – Twenty-four Alexander technique lessons (no exercise), n = 73 5 – Normal care + exercise, n = 72 6 – Therapeutic massage + exercise, n = 72 7 - Six Alexander technique lessons + exercise, n = 71 8 - Twenty-four Alexander technique lessons + exercise, n = 71	6- 24 sessions	1 – Cost: QALYs 2 – Disability: Roland-Morris disability score Data measured at 3 and 12 months	
Franke, A (2000) [192]	190	% male: 61.0 Mean age: 43.5 – 45.6 years	Patients with low back pain aged 20 – 55 years, German speaking, chronic back pain > 1 year	1 – acupuncture massage (APM) according to Penzel + individual gymnastic exercise (EG), n = 46 2 – Classical Swedish massage TM + individual gymnastic exercise (EG), n = 49 3 – APM + gymnastic exercises in groups (KGG) by therapists trained according to Penzel, n = 46 4 – KGG + TM, n = 49	EG: 12-16 sessions each 30 min KKG: in gym – 8-10 sessions each 30 min, in pool 4-6 sessions APM: 4 sessions each 30 min TM: 8 sessions each 15 min	1 - VAS (at baseline and after treatment) 2 - Flexion & extension (at baseline and after treatment)	8/13

Table 1.39 Low Back Pain - Massage - Mixed - Specific Pain – 193

Table 1.40 Low Back Pain - Massage - Mixed - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hoehler F (1981)[137] California	95	% male: 59 Mean age: 31.1 yrs	Presence of palpatory cues indicating that manipulation might be successful	1 – Rotational Manipulation of lumbosacral spine by a physician, n = 56 2 – Soft-tissue massage by a physician, n = 39	N of treatments varied	1 – Pain: Improvement in amount of pain 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	3/13
Chatchawan U (2005)[194]	180	% male: 36 Mean Age: 36.4 years	21-50 years; persistent BP, either sub-acute (lasting 4-12 weeks) or chronic (lasting for over 12 weeks) Mixed	1 – Traditional Thai Massage (TTM) by 1 of 3 massage therapists who had 4, 8, and 20 yrs of experience, n = 90 2 – Swedish massage (SM) by the same massage therapists, n = 90	6 sessions 3-4 weeks	1 – Pain: VAS (10 cm) 2 – Disability: ODQ 3 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	6/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Zhang, J (2004)[193] China	165	% male: 31.5 Mean age: 41.4 years	2-60 yrs Diagnosed as Shanghai Chinese Medical Diagnostic and therapeutic Effective Standard Mixed	1 – Traction by a doctor and a hospital staff member, n = 55 2 – Massage by the same treatment provider, n = 55 3 – Massage + Exercise by the same treatment provider, n = 55	1 or 3 treatment/week 20 treatments total	1 – Pain: Shanghai Chinese Medical Diagnostic and treatment Standard Procedure 2 – Disability: Function of lumbar spine 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	6/13

Table 1.41 Low Back Pain - Massage - Unknown - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Li ZY (2006)[195] China	60	% male: 53.6 Mean age: 45.4 yrs	Typical symptoms; Clinical positive signs; Diagnosed by CT or MRI; age: 20-55 yrs	1 – Massage-Living acupoint treatments, n = 30 2 – Spinal Manipulation-Oblique-pulling, n = 30 Treatment provider: NR	NR	1 – Pain: Score evaluation of pain treatment; VAS 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	10/13

Table 2 1 Neck Pain - Acupuncture - Acute - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Aigner, N (1999)[196] Austria	74	% male: NR Mean age: NR	18-65 years with whiplash for no longer than 4 days	1 – Cervical collar, Chlormezanon, Paracetamol + Acupuncture, n = 28 2 – Cervical collar, Chlormezanon, Paracetamol + Laser Acupuncture, n = 23 3 - Chlormezanon, Paracetamol and cervical collar, n = 33 Treatment provider: NR	NR	1 – Pain: improvement in ROM 2 – Work: sick leave 3 – ADVERSE EVENTS: no harms reported	6/13

Table 2.2 Neck Pain - Acupuncture - Acute - Non –Specific Pain - No Studies

Table 2.3 Neck Pain - Acupuncture - Chronic - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Venancio RA (2008)[197,198] Brazil	45	% male: 11.1 Mean age: NR	Patients 18-65 years with chronic (≥6 mo) myofascial pain and headache	1 – Acupuncture (dry needling), n = 15 2 – Lidocaine injection, n = 15 3 – Lidocaine + Decadron, n = 15 Treatment provider: NR	NR 3 weeks	1 – Pain: pain intensity, frequency, duration (SSI scores); VAS 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention and 6 mo	2/13
Ga, H (2007)[199] Korea	39	% male: 7.5 Mean age: 77.6 years	Patients aged > 60 yrs complaining of chronic shoulder/neck pain or headache for more than 6 mo	1 – Acupuncture by a family physician who completed TP injection courses, n = 18 2 – Lidocaine injection, n = 21	3 treatments/ week	1 – Pain: Pain intensity: VAS; FACES; PTS 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention and 3 mo	5/13
Ga, H (2007)[200] Korea	40	% male: 7.5 Mean age: 77.8 years	Patients aged > 20 years complaining of chronic shoulder/neck pain or headache for more than 6 mo	1 – Acupuncture by a family physician who completed TP injection courses, n = 18 2 –Acupuncture (IMS) , n = 22	Treatment performed 3 times a week	1 – Pain: pain intensity scores: VAS; FACES; PTS 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention and 3 mo	6/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Lv, YX (2006)[201] China	70	% male: 38.7 Mean age: 41.4 years	Cervicogenic headache	1 – Probing needling, n = 36 2 – Routine Acupuncture, n = 34 Treatment provider: NR	12 treatments 12 days	1 – Pain: VAS 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	3/13
Irnich D [crossover] (2002)[202,203] Germany	102	% male: 26.4 Mean age: 51.9 years	Patients with chronic NP (> 2 mo) and myofascial or irritation syndrome	1 – non-local-Acupuncture by an acupuncturist with 2 yrs training, n = 34 2 – Local-Acupuncture (Dry Needling) by the same therapist, n = 34 3 – Laser-Acupuncture Sham by the same therapist, n = 34	30 min/session immediate post treatment – 1 session	1 – Pain: VAS (0-100) motion-related 2 – ROM 2 – ADVERSE EVENTS: one subject reported mild hypotension and sweating Data measured immediately post intervention (only crossover data reported)	8/13
Zhu XM [crossover] (2002)[204] Australia	29	% male: 52 Mean age: 49.4 years	Patients with chronic NP aged 31-71 years had neck complaints ≥ 6 mo	1 – Acupuncture, n = 14 2 – Sham-Acupuncture, n = 15 Treatment provider: NR	9 sessions 3 weeks	1 – Pain: Pain intensity-adapted MPQ; VAS; Daily pain duration 2 – Disability: NDI 3 – Healthcare Utilization: Daily use of pain pills 4 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	7/13
Irnich D (2001)[205-207] Germany	177	% male: 34 Mean age: 52.4 years	Patients with chronic NP (>1 mo) and painful restriction of cervical spine mobility, not received treatment two weeks before the study	1 – Acupuncture by an experienced and licensed acupuncturists, n = 56 2 – Massage by experienced physiotherapists, n = 60 3 – Sham Laser acupuncture, n = 61	5 sessions 3 weeks	1 – Pain: VAS (0-100); PPT 2 – Quality of Life: SF-36: Role physical, Pain Index 3 – ROM 4 – ADVERSE EVENTS: mild reactions (slight pain, sweating, low blood pressure) Data measured at 1 and 3 weeks, and 3 months	4/13
White, PF (2000)[208] U.S.	204	% male: NR Mean age: 52 years	Patients with history of NP and cervical disk disease with a stable level of pain for a period of at least 3 months before enrolment	1 – Acupuncture with electrical stimulation at local points, n = 23 2 – Acupuncture with ES at remote points (Low Back region), n = 68 3 – Acupuncture needles only at neck, n = 23 Treatment provider: NR	9 treatments 3 weeks	1 – Pain: VAS (10 cm) crossover design 2 –Quality of Life: SF-36 crossover design 3 – Healthcare utilization: Daily analgesic decrease 4 – ADVERSE EVENTS: needle site side effects only Data measured immediately post intervention	5/13
Lundeburg (1991)[209]	58	% male: NR Mean age: NR	44-76 years; osteoarthritis of the cervical and/or thoracic spine (C1-T1), with no previous experience of acupuncture; pain for 6 months or more	1 – Sham-superficial needling by an acupuncturist, n = 14 2 – Manual acupuncture by the same therapist, n = 14 3 – 2 Hz Electrical stimulation by the same therapist, n = 15 4 – 80 Hz Electrical stimulation by the same therapist, n = 15	One 40 minute session	1 – Pain: pain intensity (sensory) VAS (10 cm); pain unpleasantness (affective) VAS (10 cm) 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	1/13
Cecchereli F (2006)[210] Italy	62	% male: 26 Mean age: 42.7 years	Myofascial cervical pain	1 – Somatic Acupuncture, n = 31 2 – Acupuncture + Auriculotherapy, n = 31 Treatment provider: NR	8 sessions 8 weeks	1 – Pain: MPQ; VAS 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention, 3 and 6 mo	6/13
Thomas, M (1991)[211] Sweden	44	% male: NR Mean age: NR	42-77 years with osteoarthritis of the cervical spine	1 – Acupuncture by an acupuncturist, n = NR 2 – Sham Acupuncture by an acupuncturist, n = NR 3 – Diazepam, n = NR 4 – Sham Diazepam, n = NR	3-5 days between different trials NR	1 – Pain: (VAS 10 cm sensory) pain intensity; VAS (10 cm) affective 2 – ADVERSE EVENTS: no harms reported Data measured immediately post treatment	5/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Zhao, Z (2004)[212] China	106	% male: 49.1 Mean age: 46.5 years	Diagnostic using Chinese Standard; X-ray show unstable of neck spinal and discs	1 – Moxibustion + Acupuncture, n = 53 2 – Acupuncture, n = 53 Treatment provider: NR	10 treatments 20 days (2 courses)	1 – Quality of Life: well-being 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	3/13
Yang, T (2009)[213] China	66	% male: 51.5 Mean age: 45.1 years	Spinal cord type and radicular type cervical intervertebral disc	1 – Acupoint sticking therapy, n = 33 2 – Acupuncture, n = 33 Treatment provider: NR	34 days	1 – Quality of Life: number of effect 2 – ADVERSE EVENTS: n = 2 discontinued treatment due to allergy Data measured immediately post intervention and 3 mo	

Table 2.4 Neck Pain - Acupuncture - Chronic - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Abernathy, AP (2008)[214]	123	% male: NR, majority female Mean age: 46.5 years	Patients ≥ 18 years with uncomplicated NP for at least 3 months with motion-included pain of at least 30 on 100 mm VAS	1 – Acupuncture by an acupuncturist, n = NR 2 – TENS, n = NR	5 sessions 3 weeks	1 – Pain: VAS (0-100 mm) motion 2 – Quality of Life: SF-36 improvement 3 – Medication used (no data provided) 4 – ADVERSE EVENTS: mild but not described Data measured at 1 week post treatment and 6 months post randomization	0/13
Itoh, K (2007[215] Japan	40 (cross over design)	% male: 27.5 Mean age: 62.3 years	Patients age at least 45 years, no radiation of neck pain, and no major trauma or systemic disease	1 – Trigger point acupuncture, n = 10 2 – Acupoint acupuncture (standard), n = 10 3 – Non trigger point acupuncture, n = 10 4 – Sham acupuncture, n = 10 All treatments by acupuncturist with 2 – 7 years experience and 4 years training	A pre-cross over period followed by 18 acu treatments 3 weeks	1 - Pain (VAS) 2 – Disability (Neck Disability Index) 3 – ADVERSE EVENTS: reported	6/13
Salter GC (2006)[216] US	24	% male: 25.5 Mean age: 48.2 years	Patients with chronic neck pain aged 18 yrs or older who had consulted the neck pain practice in the previous 12 mo	1 – Acupuncture + standard treatment by acupuncturists and general practitioner, n = 10 2 – general practitioner, n = 14	3 months	1 – Pain and disability: NPQ 2 – Drug utilization 3 – ADVERSE EVENTS: aggravation of symptoms, dizziness, tiredness Data measured immediately post intervention	6/13
Seidel (2002)[217 218] Germany	51	% male: 9.8 Mean age: 49.5 years	Patients with cervical pain for at least 6 months aged 20-72 years; no AP treatment for past 6 mo; consent	1 – Low-level laser therapy (LLLT) on AP by a “therapist”, n = 13 2 – LLLT 7 mW, n = 12 3 – LLLT 30 mW, n = 13 4 – Conventional Acupuncture, n = 13	8 treatments 4 weeks	1 – Pain: pain intensity VAS (0-10); pain sensation PPT; 2 – Disability: Cervical movement function 3 – Physical Measures: cervical mobility; mental health questionnaire 4 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention and 1 mo	10/13
Petrie, J (1986)[219] United Kingdom	25	% male: 36.5 Mean age: 50.5 years	Chronic neck pain (at least 6 months)	1 – Acupuncture + analgesic, n = 13 2 – Sham transcutaneous nerve stimulation (TNS) + analgesic, n = 12 Treatment provider: NR (author administered the treatment)	8 sessions 4 weeks	1 – Pain: MPQ-PRI based on word rank; Daily pain score-VAS (0-10) - 2 – ADVERSE EVENTS: no harms reported Data measured at 4 weeks	5/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Petrie, JP (1983)[220] New Zealand	13	% male: 32.2 Mean age: 65 years	Chronic cervical pain (> 2 yrs) defined as NP radiating to the occipital and /or shoulders with some limitations in movement	1 – Acupuncture, n = 7 2 – TENS-placebo Treatment provider: NR	8 sessions 4 weeks	1 – Pain: pain relief: 5-pt simple scale (no relevant outcome reported) 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	6/13
Gallacchi G (1983)[221,222] Switzerland	113	% male: NR Mean age: NR	Tendomyotical cervical and lumbar syndrome were under medical and/or physical treatment for number of months before volunteered for acupuncture study (data reported for cervical pain)	1 – AP conventional needle AP at classical acupuncture points by a physician, n = 15 2 – PN conventional needle AP at classical acupuncture points with placebo needles, n = 14 3 – PP needle acupuncture at placebo points, n = 14 4 – Laser AP at classical acupuncture points- laser light, n = 15 5 – Laser AP at classical a acupuncture points-no emission of rays, n = 14 6 - Laser AP at classical a acupuncture points-mixed light, n = 14 7 - Laser AP at classical a acupuncture points-red light, n = 13 8 - Laser AP at classical a acupuncture points-infrared light, n = 14	8 treatments 4 weeks	1 – Pain: VAS (Scale NR) 2 - VAS muscle tension 3 – ADVERSE EVENTS: no harms reported	5/13
Coan RM (1982)[223] US	30	% male: 26.7 Mean age: 49.3 years	chronic Neck pain and/or radicular arm and hand pain ≥6 mo	1 – Acupuncture + electroacupuncture or Moxibustion was used on some subjects, n = 15 2 – wait list control, n = 15 Treatment provider: NR	3-4 times/week 8 weeks	1 – Pain: VAS (0-10); mean number of hrs with pain/day 2 – mean number of pain pills used 3 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	4/13
Giles, LGF (1999)[129] Australia	40	% male: 35.7 Mean age: 41.3 years	Patients suffering from NP for at least 13 weeks, at least 18 years of age	1 – Acupuncture, n = 10 2 – Manipulation, n = 20 3 – Medication [tenoxicam (NSAID) with ranitidine], n = 10 Treatment provider: NR	6 treatments 3-4 weeks	1 – Pain: VAS (0-10) 2 – Disability: NDI (0-50) 3 – ADVERSE EVENTS: no side effects occurred for acupuncture or manipulation Data measured immediately post intervention	1/13
David, J (1998)[224] UK	70	% male: 28.6 Mean age: 46 years	Patients aged 18-75 years with chronic neck pain (> 6 weeks) and WAD	1 – Acupuncture by general practitioners registered with the BMAS, n = 35 2 – PT (Maitland mobilization) by a senior physiotherapist, n = 35	6 sessions 6 weeks	1 – Pain: VAS (0-100); NPQ 2 – Quality of Life: GHQ 3 – ADVERSE EVENTS: no harms reported No numerical data given, data measured at 6 weeks and 6 mo	4/13
Vas, J (2006)[225] Spain	123	% male: 18 Mean age: 46.7 yrs	17 yrs and over with uncomplicated NP over 3 months duration; symptomatic at examination; motion-related NP intensity 30 and over on 100mm VAS, no treatment during past week	1 – Acupuncture by a doctor with over 15 years of clinical experience, n = 61 2 – TENS placebo, unclear who administered the treatment, n = 62	5 sessions 3 weeks	1 – Pain: VAS(0-100 mm); NPQ (Spanish) 2 – Disability: ACM (Active Cervical Mobility; PCM (Passive Cervical Mobility) 3 – Quality of Life: SF-36 physical score 4 – Utility of conventional care: N of doctor visits in past 3 mo 5 – ADVERSE EVENTS: swelling of the hand, bruising, pain, ulcer of the ear; cephalea, aggravation of symptoms Data measured at 3 weeks and 3 mo	7/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
White P (2004)[226,227]	135 123 of 235 were analyzed	% male: 35.6 Mean age: 53.4 years	Patients aged 18-80 years with chronic mechanical neck pain (> 2 months) and a pain score > 30 mm on VAS (0-100 mm) for 5 of 7 pre-treatment days	1 – Acupuncture by an acupuncturist with 7 years of experience, n = 70 2 – TENS-Placebo by the same therapist, n = 65	8 sessions 4 weeks	1 – Pain: VAS (0-100) 2 – Disability: NDI 3 – Quality of Life: PCS/SF-36 4 – Healthcare utilization: daily consumption of acetaminophen tablets 5 – ADVERSE EVENTS: increase in symptoms, faintness, swelling of the hand, bruising, mild headache, euphoria and enhanced vision, dizziness Data measured immediately post treatment, 8 weeks and 6 mo, 12 mo	9/13
Sator-Katzenschlager SM (2003)[228] Austria	21	% male: 28.5 Mean age: 52 years	Chronic cervical pain (≥ 6 mo), normal neurologic function, of cervical nerves with no pain radiation, neural or spinal structure pathology, VAS≥5	1 – M-Au-Acupuncture, n = 11 2 – EI-Au-Acupuncture, n = 10 Treatment provider: NR	Once/week 6 weeks	1 – Pain: VAS (no numerical data) 2 – Quality of Life: well-being(no numerical data) 3 – Utility of conventional care: utilization of rescue medication 4 – ADVERSE EVENTS: no harms reported Data measured at 3 mo	4/13
Nabeta, T (2002)[229] Japan	34	% male: 29.4 Mean age: 32.5 years	Patients with chronic pain/stiffness in neck and shoulder without arm symptoms	1 – Acupuncture by well- trained acu instructors, n = 17 2 – Sham-Acupuncture by the same instructors, n = 17	3 treatments at weekly intervals 3 weeks	1 – Pain: VAS (0-10); PPT 2 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks and 3 mo	5/13

Table 2.5 Neck Pain - Acupuncture - Mixed - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Bin, X (2007)[230] NR	57	% male: 26.3 Mean age: NR	35-68 years; diagnostic criteria of western medicine	1 – Electro-acupuncture, n = 29 2 – Control-Simple acupuncture, n = 28 Treatment provider: NR	20 treatments	1 – Therapeutic effects 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	5/13
Shang, Xiu-kui (2002)[231] China	80	% male: NR Mean age: NR	Diagnostic as nerve-root cervical spondylopathy using Chinese Medical Diagnostic Standard	1 – Acupuncture, acupoint Sitianxue, n = 50 2 – Acupuncture, acupoint Jiajixue, n = 30 Treatment provider: NR	1 treatment/ 2 days 9 treatments/ course, 3 courses	1 – Pain: Scoring based on Chinese Medical Diagnostic and therapeutic Effective Standard for Neck Disease 2 – Quality of Life: Scoring based on Chinese Medical Diagnostic and therapeutic Effective Standard for Neck Disease 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	
Li, Xiang-hui (2004)[232] China	780	% male: 46.4 Mean age: 49 years	Patients diagnosed as cervical spondylosis using Chinese Medical Diagnostic and Effectiveness Standard	1 – Acupuncture Centro-square needling Danzhui, n = 260 2 – Acupuncture needling cervical Jiaji point, n = 260 3 – Traction-Massage, n = 260 Treatment provider: NR	20 treatments 20 days	1 – Quality of Life: well-being based on Chinese Medical Diagnostic and therapeutic Effective Standard 2 – ADVERSE EVENTS: no harm reported Data measured immediately post intervention and 1 yr	4/13
Zhang, Honglai (2003)[84] China	120	% male: 54.2 Mean age: NR	Diagnosed as Cervical Spondylosis using ref[1] 1993-Chinese; compliant to treatment, responded to surveys	1 – Electro-acupuncture, n = 60 2 – Traction, n = 60 Treatment provider: NR	45 treatments 45 days, 2 days rest between courses-3 courses	1 – Pain: McGill PRI; VAS; PRI 2 – Quality of Life: Cure, improved, effective, no effect 3 – ADVERSE EVENTS: no harms reported Data measured after each of the 3 courses	6/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Zhuang, Li-Xing (2004)[233] China	34	% male: 29.4 Mean age: 53.5 years	Patients diagnosed as vertebral artery type of cervical spondylosis by Western Medicine, 36-72 years, duration 1 mo-5 yr, also diagnosed by Chinese medicine	1 – Pressed Acupuncture at the Baihui acupoint + Local Electro-Acupuncture by trained professionals, n = 17 2 – Local Electro-Acupuncture by trained professionals, n = 17	21 treatments 21 days	1 – Quality of Life: well being: scoring based on Chinese Medical Diagnostic and therapeutic Effective Standard 1995 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	4/13
Lin, M (2004)[234] China	100	% male: 65 Mean age: 46 years	Cervical spondylopathy of nerve root type, aged 25-76 years	1 – Needle scalpel combined with Massage therapy, n = 50 2 – Simple Massage therapy, n = 50 Treatment provider: NR	21 treatments 3 months	1 – Quality of Life: Cure 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	3/13
Chu J (1997)[235] US	164	% male: 34.8 Mean age: NR	Neck and arm pain, MPS due to cervical nerve root irritation	1 – Acupuncture (dry needling)-tender points, n = 122 2 – Acupuncture (dry needling)-random points, n = 42 Treatment provider: NR	NR	1 – Pain: ≤ 50% pain relief 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	1/13
Zhu, HZ (2006)[236] China	221	% male: 50.8 Mean age: 46.3 years	18-75 years with cervical spondylosis	1 – Needle-knife therapy, n = 115 2 – Acupuncture, n = 106 Treatment provider: NR	9 treatments 1 treatment/ 3-5 days	1 – Pain: Overall efficiency 2 – ADVERSE EVENTS: no harms reported Data measured at 6 mo	4/13
Cun-sheng jia, Jing Shi, Xio-shun Ma, Xiao-feng Li, Ying Wang, Jing-lan Wang (2007)[237] China	98	% male: 51 Mean age: NR	Diagnosed as cervical spondylosis according to "The diagnostic criteria for cervical spondylosis"; NP; consent	1 – Otopoint-penetrative needling by a neuropathy doctor, n = 49 2 – Otopoint-straight needling by the same doctor, n = 49	30 minutes total	1 – Pain: SF-MPQ 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	5/13
Yuan-fang Huang, Tai-fen Wang, Yan liu, Shi-xing Zhang (2008)[238] China	107	% male: 65.5 Mean age: 42.1 years	Numbness, NP and radiating pain towards upper limb	1 – Acupuncture at Jiquan (HT1) with lifting thrusting manipulation by a neuropathy doctor, n = 37 2 - Acupuncture at Jiquan (HT1) with twirling manipulation by the same doctor, n = 36 3 – Routine needling by the same doctor, n = 34	10 sessions 20 days	1 – Physical Measures: Traditional Chinese medicine diagnostic efficacy standards: cure, effective, ineffective 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	4/13
Xi lin Wang (2008)[239] China	102	% male: 51 Mean age: 44.2 years	NP, neck pressure pain and/or radiating pain	1 – Shu-needling + Electro-Acupuncture by a neuropathy doctor, n = 51 2 – Routine needling + Electro-Acupuncture by a neuropathy doctor, n = 51	30 sessions 30 days	1 – Disability: Efficacy of TCM diagnostic criteria 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	4/13
Zhang, W (2005)[240] China	96	% male: 60.9 Mean age: NR	Patients with cervical sponodylosis	1 – Acupuncture + Massage/Manipulation, n = 64 2 – Control-Massage, n = 32 Treatment provider: NR	9 sessions 3 weeks	1 – Quality of Life: Cure rate; total effective rate 2 – ADVERSE EVENTS: no harms reported	0/13

Table 2. 6 Neck Pain - Acupuncture - Mixed Duration of Disorder - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Fu ZH (2007)[241] China	47	% male: 32.5 Mean age: NR	18-80 years, TrP in neck/upper back for 10 days-1 yr Acute – sub-acute	1 – FSM-Along (insertion along the local muscle fibres pointed to the MTrP), n = 22 2 – FSM-Across (insertion across the local muscle fibres pointed to the MTrP), n = 25 Treatment provider: NR	One treatment (24 hrs)	1 – Pain: MRP scores; PUP scores 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	4/13

Table 2. 7 Neck Pain - Acupuncture – Unknown duration of disorder - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Liang, Z (2009)[242] China	108	% male: 18.9 Mean age: 33.9 years	18-60 years; no acupuncture treatment for NP within 6 mo; signed consent form	1 – Acupuncture, n = 54 2 – Control-Acupuncture, n = 54 Treatment provider: NR	3 weeks	1 – Pain: Northwick Park NP Questionnaire 2 – Disability: not measured 3 – number of all effect/number of total patients 4 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	
Zheng, Ling (2005)[243] China	60	% male: NR Mean age: 52 years	No surgery; Diagnostic as cervical spondylopathy by ref[1]-A Chinese paper; coronary heart disease, rheumatism	1 – Point-through-point Acupuncture, n = 30 2 – General Acupuncture, n = 30 Treatment provider: NR	30 treatments 30 days(2 courses), 3 days between courses	1 – Pain: Number of patients who have pain-Chinese paper, Internal Medical Disease Diagnosis standard 2 – Quality of Life: well-being, scoring based on Ref[1] 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	5/13
Xi-lin Wang, Hai-yan Huang (2007)[244] China	120	% male: 54.2 Mean age: 47.8 years	Diagnosed as Cervical Spondylosis according to "Chinese medicine clinical research guiding principles"	1 – Needle retention at GV 20 for 8 hrs and Electro-Acupuncture at local points by a neuropathy doctor, n = 60 2 – Needle retention at GV 20 for 30 min and Electro-Acupuncture at local points by the same doctor, n = 60	30 sessions total 30 days	1 – Pain: NR 2 – Quality of Life: Cured 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	3/13
Fu, W (2005)[245] China	158	% male: 55.1 Mean age: 34.5 years	Western Medical and Chinese Medical Diagnostic Standards to Diagnostic	1 – Needle picking Acupuncture, n = 56 2 – Local anaesthesia, n = 47 3 – Normal Acupuncture, n = 55 Treatment provider: NR	8 treatments 4 weeks	1 – Pain: PRI 2 – Quality of Life: Well-being, scoring based on Chinese paper ref[1] 3 – ADVERSE EVENTS: too much pain to continue treatment, scars left after treatment Data measured immediately post intervention	3/13
Edwards J (2003)[246] UK	40	% male: 30.7 Mean age: 56.3 years	Patients aged ≥ 18 years with active MTrPs, consent and compliance	1 – SDN + Stretching exercise, n = 14 2 – Stretching exercise, n = 13 2 – No treatment, n =13 Treatment provider: NR	3 weeks	1 – Pain: SFMPQ; PPT 2 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks and 3 mo	6/13
Duann, J (2007)[247] Taiwan	72	% male: NR Mean age: NR	Cervical myofascial pain syndrome	1 – Mini scalpel-needle (MSN) Treatment, n = 36 2 – Lidocaine Trigger Point Treatment, n = 36 Treatment provider: NR	One treatment (30 s, 30 min observation)	1 – Pain: pain intensity VAS 2 – Disability: NP and Disability CAS (NPDVAS) 3 – Tripper Point Evaluation 4 – ADVERSE EVENTS: no harms reported Data measured at 2 weeks, 2 and 3 mo	2/13

Table 2. 8 Neck Pain - Acupuncture - Unknown - Non-Specific Pain – No studies

Table 2. 9 Neck Pain - Manipulation & Mobilization Therapies - Acute - Specific Pain – No studies

Table 2. 10 Neck Pain - Manipulation & Mobilization - Acute - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Buchmann, J (2005)[248] Germany	27	% male: 57.3 Mean age: 46.3 years	18 -80 years, manually diagnosed dysfunction of one or both of the segments occipital/cervical 1 and cervical 1/cervical 2	1 – Spinal Manipulation by a neurologist experienced in manual and osteopathic medicine, n = 10 2 – Postisometric Relaxation (mobilization) by the same neurologist, n = 8 3 – Placebo by the same neurologist, n = 8	NR	1 – Disability: Number of found dysfunctions in motion segments 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	7/13
Pikula, J (1999)[249] Brantford, ON	36	% male: 22 Mean age: 42.1 yrs	Acute unilateral NP; no prior similar history; no history of trauma; no neurological deficit; no previous chiropractic treatment of cervical spine	1 – Spinal Manipulative Therapy (SMT) applied to same side as pain (ipsilateral) by a chiropractor, n = 12 2 – SMT applied to opposite side of pain (contralateral) by the same chiropractor, n = 12 3 – Placebo Ultrasound Therapy, n = 12	One single treatment	1 – Pain: VAS (100 mm)(0-100) for pain intensity 2 – Disability: CROM for cervical range of motion 3 – ADVERSE EVENTS: no harms reported Data measured at end of treatment session	4/13
Yurkiw, D (1996)[250] Canada	14	Male (%): 27.3 Mean age: 37.4 years	Unilateral neck pain	1 – manipulation by a chiropractor, n = 7 2 – mechanically assisted manipulation by the same chiropractor, n = 7	Single treatment session	1 – Pain: VAS (0 – 10) lower values better 2 – Physical Measures: range of motion 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	7/13
Gonzalez-Iglesias, J (2009)[251]	45	Male (%): 53.4 Mean age: 34.5 years	Mechanical neck pain	1 - thoracic spine thrust manipulation + electro thermal therapy, n = 23 2 – electrothermal therapy, n = 22 Treatment provider: NR	Once per week (5 electro/thermal therapy) 3 weeks	1 – Pain: VAS 100 mm-lower values better 2 – Disability: Northwick Pain Questionnaire - Spanish version (max score = 36) Measured at 2 and 4 week	9/13

Table 2. 11 Neck Pain - Manipulation & Mobilization - Chronic - Specific Pain – No studies

Table 2. 12 Neck Pain - Manipulation & Mobilization - Chronic - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Giles, LG (2003)[17 252] Australia	115	% male: 54.9 Mean age: 26.1 years	At least 17 years with uncomplicated mechanical spinal pain for minimum of 13 weeks	1 – Acupuncture (LB, Neck, Thorax), n = 36 2 – Spinal Manipulation by a chiropractor, n = 36 3 – Medication that has not been tried by patients randomized to this group by a sports physician, n = 43	2 treatments/ week Up to 9 weeks	1 – Pain: pain intensity and frequency neck VAS-lower values better 2 – Disability: NDI; Oswestry-lower values better 3 – Quality of Life: SF-36-higher values better 4 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	5/13
Giles, LGF (1999)[129] Australia	40	% male: 35.7 Mean age: 41.3 years	Patients suffering from NP for at least 13 weeks, at least 18 years of age	1 – Acupuncture, n = 10 2 – Manipulation, n = 20 3 – Medication, n = 10 Treatment provider: NR	6 treatments 3-4 weeks	1 – Pain: VAS 2 – Disability: ODI 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	1/13
Sloop, P (1982)[253] NR	39	Male (%): 33 Mean age: 49 years	19-68 years with non-specific or cervical spondylosis NP	1 – manipulation by a rheumatologist experienced in manipulation, n = 21 2 – no treatment (delayed manipulation) by a physician, n = 18	Single treatment session	1 – Pain: VAS (0 – 8) Measured immediately post intervention and at 3, 12 week	5/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Cleland, J (2005)[254] New Hampshire, US	36	% male: 24.9 Mean age: 35.5 yrs	18 – 60 yrs with primary complaint of mechanical NP, referred by primary care physician to outpatient orthopaedic physical therapy clinic.	1 – Thoracic Spine Manipulation by a licensed physical therapist, n = 19 2 – Placebo Manipulation by the same therapist, n = 17	One treatment	1 – Pain: VAS to assess resting pain (0-100 mm) 2 – Disability: NDI to assess perceived disability due to NP 3 – ADVERSE EVENTS: no harms reported Data measured at end of single treatment	7/13
Bischoff, A (2003)[255] NR	49	Male (%): NR Mean age: NR	Non-specific neck pain	1 – osteopathic intervention + sham ultrasound, n = 24 2 – sham ultrasound, n = 25 Treatment provider: NR	Once every 2 weeks (ultrasound was given one per week) 10 weeks	1 – Pain: pain intensity 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	1/13
Chen, L (2007)[256] China	70	Male (%): 57.5% Mean age: 42 years	Patients with cervicogenic headache > 6 months without drug therapy in 3 months	1 - Spinal manipulation, n = 36 2 – TENS, n = 34 Treatment provider: NR	20 to 30 minutes every 2 days 10 sessions in total	1 – Pain (numeric rating scale, NRS) 2 – ROM 3 – ADVERSE EVENTS: no information reported	7/13
Haas, M (2004)[257] U.S.	24	Male (%): 18% Mean age: 40 years	Patients 18 years and older and uncomplicated chronic cervicogenic headaches for at least 3 months	1 – Spinal manipulation by chiropractors with 3-9 years experience, 3 sessions, n = 8 2 – Spinal manipulation by the same chiropractors, 9 sessions, n = 8 3 – Spinal manipulation by the same chiropractors, 12 sessions, n = 8 Co-intervention for all groups: massage and other treatments	3, 9, or 12 sessions of manipulation were compared	1 – Pain intensity and number of headaches in past 4 weeks 2 – Neck pain 3 – Disability due to headache 4 – Disability due to neck pain Immediate, short term and intermediate follow up	7/13
Bokine, P (1995)[258] U.S.	126	Male (%):	Patients 18 years and older and chronic cervicogenic headaches for at least 3 months	1 – Spinal manipulation by general practitioner, n = 70 2 – medication (Amitriptyline) by general practitioner, n = 56	20 minutes, twice a week 6 weeks	1 – Pain (0 – 5) 2 – quality of life 3 – AE Immediate, short term and intermediate follow ups	1/13
Ouseley, BR (2002) [259] U.K	11	Male (%): 35% Mean age: 40 years	Patients with chronic headache (tension type)	1 – Spinal manipulation by clinician with at least 3 years experience, n = 5 2 – Spinal mobilization, n = 6	Maximum of 8 sessions 4 weeks	1 – Pain (NRS, 0 – 10) 2 – Neck disability index (NDI) 3 – ADVERSE EVENTS: no information reported	5/13
Nilsson, N (1997)[260] Denmark	54	Male (%): 43% Mean age: NR (median 37 years)	Patients 20 to 60 years with headache >= 5 days per month for at least 3 months in occipital region	1 – Spinal manipulation by registered chiropractor, n = 28 2 – massage by registered chiropractor, n = 25	2-week observation period, followed by six sessions of SM 3 weeks	1 – Pain (VAS headache) 2 – change in medication use Immediate post treatment follow up	7/13
Whittingham, W (2001)[261] Australia	105 (cross over design)	Male (%): 41% Mean age: 40 years	Patients with cervicogenic headache for longer than 6 months, headache in occipital region	1 – Spinal manipulation by experienced chiropractor 2 – Placebo manipulation by experienced chiropractor 3 – No treatment	2- week observation period SM, placebo SM, and no treatment 3 weeks each 9 weeks trial duration	1 – Pain intensity (head and neck) 2 – Pain frequency 3 – change in medication use 3 – ADVERSE EVENTS: no information reported Data for 1st phase is used	8/13
Sterling, M (2001)[262] Canada	30 (cross over design)	Male (%): 50% Mean age: 36 years	Patients with mid to lower cervical spine pain of insidious onset, greater than 3 months duration	1 –Spinal mobilization, n = 10 2 – Sham mobilization, n = 10 3 – no treatment, n = 10 Treatment provider: NR	Once per treatment	1 – Pain (VAS) 2 - Pressure Pain Threshold 3 –EMG activity 4 – ADVERSE EVENTS: no data reported	7/13

Table 2. 13 Neck Pain - Manipulation & Mobilization – Mixed - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Fernandez-de-las-Penas, C (2004)[263] Spain	88	% male: 45 Mean age: 31.2 yrs	Suffering from neck and head pain due to whiplash injury of less than 3 months and classified in grades II and III	1 – Dorsal Manipulation + Physiotherapy, n = 44 2 – Physiotherapy, n = 44 Treatment provider: NR	15 sessions	1 – Pain: VAS (0-100) 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment sessions	6/13
Coppieters, M (2003)[264] Belguim	20	Male (%): 40% Mean age: 48.5 years	Patients with cervicobrachial pain of 2 – 6 months duration due to neurogenic disorders	1 – cervical mobilization by trained manipulative therapist, n = 10 2 – Ultrasound, n = 10	Single treatment session of 3 repetitions	1 – Pain perception during NTPT1 - neural tissue provocation testing for median nerve	5/13

Table 2. 14 Neck Pain - Manipulation & Mobilization - Mixed - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hurwitz, E (2002)[265] California, US	336	% male: 31.2 Mean age: 45.7 yrs	18-70 years belonging to a health maintenance organization; seeking care between Feb 9/98- June 30/00 presenting with NP; not having received treatment for NP in past mo Unknown (	1 – Manipulation by a chiropractor, n = NR 2 – Manipulation with heat, n = NR 3 – Manipulation with Electrical Muscle stimulation, n = NR 4 – Manipulation with heat and electrical muscle stimulation, n = NR 5 – Mobilization, n = NR 6 – Mobilization with heat, n = NR 7 – Mobilization with electrical muscle stimulation, n = NR 8 – Mobilization with heat and electrical stimulation, n = NR	4 weeks	1 – Pain: 11-pt NRS most severe pain in last week; average pain intensity during past week-11-pt NRS 2 – Disability: NDI (0-50) 3 – Quality of Life: SF-36 physical function, physical role 4 – Work: Job Demands Questionnaire 5 – ADVERSE EVENTS: Transient minor discomfort Data measured at 4 weeks, 3 and 6 mo, and 1 yr	7/13
Cassidy, J (1992)[266] Canada	100	Male (%): NR Mean age: 36 years	Mechanical neck pain with radiation into the trapezius muscle	1 – manipulation by an experienced clinician, n = 52 2 – mobilization by an experienced clinician, n = 48	Single treatment session	1 – Pain: numerical rating scale (0 – 100)- lower values better 2 – Physical measures: range of motion 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	6/13
Martinez-Segura, R (2006)[267] Alicante, Spain	71	% male: 36.7 Mean age: 37 yrs	18 yrs or older with mechanical NP of at least 1 mo; referred by primary care physician to private physical therapy and osteopathy clinic	1 – Cervical HVLA by a therapist with more than 5 years experience, n = 34 2 – Control (manual mobilization) by the same therapist, n = 37	One treatment	1 – Pain: VAS NP at rest (0-100 cm) 2 – Disability: Cervical range of motion 3 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	6/13
Haas, M (2003)[268] Portland, US	104	% male: 37 Mean age: 42.6	18 years and older; minimum pain level of 10 on 100mm VAS who had not received cervical manipulation in preceding 48 hrs	1 – Manipulation-Supine HVLA of cervical spine by 2 chiropractors, one with 20 years experience and the other with 2 years, n = 52 2 – Sham Manipulation generated by computer algorithm by the same chiropractors, n = 52	One treatment	1 – Pain: VAS 100 mm for NP 2 – Disability: VAS 100 mm for Neck stiffness 3 – ADVERSE EVENTS: no harms reported Data measured at end of treatment and 3 mo	8/13
Vernon, H (1990)[269] Canada	9	Male % = 67 Mean age: 38 years	Mechanical neck pain (not defined) Mixes population, majority acute and sub-acute	1 – manipulation, n = 5 2 – mobilisation, n = 4 Treatment provider: NR	Single treatment session	1 – Pain: pressure pain threshold (kg/cm^2) a t 4 tender points 2 – ADVERSE EVENTS: no harms reported Measured immediately post treatment	6/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Cleland, JA (2007) [270] US	104	% male: 45 Mean age: 43.2 yrs	Subjects aged 18-60 yrs with primary complaint of neck pain, and baseline NDI=>10%	1 - TS-M/M with thrust by a clinician with 9.7 (1-19) years experience, n= 30 2 - TS-M/M without thrust by the same clinician, n= 30	Single treatments session; duration: 3 min	1 - Pain: NPR 2 - Disability: NDI 3 - Well-being: GROC 4 - ADVERSE EVENTS: no harms reported	7/13
Strunk, R (2007)[271] U.S.	6	Male (%): 83% Mean age: 48 years	Patients 20- 65 years with primary complaint of mechanical neck pain for at least 4 weeks	1 – Cervical manipulation by experienced licensed chiropractor, n = 3 2 - Thoracic and sacroiliac joint manipulation by experienced licensed chiropractor, n = 3	4 sessions 2 weeks	1 – Pain (VAS 0 – 100 mm) 2 – Neck Disability 3 – ADVERSE EVENTS: no information reported Immediate post treatment follow up	6/13
Kanlayanaphotporn, R (2009)[272] Thailand	60	Male (%): 40% Mean age: 43 years	Patients with mechanical neck pain provoked by neck movements or sustained pressure, unilaterally distributed for at least 1-week duration; and VAS score of >20 at rest	1 – Ipsilateral unilateral posteroanterior mobilization by physical therapist, n = 30 2 – Random mobilization by physical therapist, n = 30	Single treatment	1 – Pain (VAS 0 – 100) 2 – Neck disability 3 – ADVERSE EVENTS: no AE occurred	11/13
Brodin, H (1983)[273] Sweden	63	Male (%): NR Mean age: NR	Patients 27 to 60 years; condition suitable for manual therapy	1 – Mobilization by physiotherapist, n = 23 2 – Sham mobilization, n = 17 3 – Medication and information, n = 23 Cointervention in group 1 and 2: medication and information	3 times per week 3 weeks	1 – Pain 2 – Mobility Immediate and short term follow ups	3/13

Table 2. 15 Neck Pain - Manipulation & Mobilization - Unknown - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Cilliers, K (1998)[274] South Africa	30	Male (%): 40 (53 vs. 27) Mean age: 31 years	Cervical facet syndrome and neck pain	1 – manipulation (top segment adjustment) by a chiropractor, n =15 2 – manipulation (bottom segment adjustment) by a chiropractor, n = 15	8 treatments 4 weeks	1 – Pain: McGill pain questionnaire 2 – Disability: neck disability index 3 – Physical Measures: range of motion Data measured at 4 weeks and 3 mo	3/13
Egwu, MONTHS (2008)[275] Nigeria	96	Male (%): 100% Mean age: 44 years	Patients 40 – 50 years old with cervical spondylosis and severe neck pain with onset of within 6 weeks at time of entry to the trial	1 – posteroanterior unilateral manipulation, n = 24 2 – Antero-posterior unilateral manipulation, n = 24 3 - Cervical oscillatory rotation, n = 24 4 - Transverse oscillatory pressure, n = 24 Treatment provider : therapists	3 times per week until cured up to 4 weeks 4 weeks	1 – Pain (pain free patients at the end of treatment) 2 – ADVERSE EVENTS: no information provided	1/13

Table 2. 16 Neck Pain - Manipulation & Mobilization - Unknown - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
van Schalkwyk, R (2000)[276] South Africa	30	Male (%): 67 Mean age: 30 years	Mechanical NP with lateral fixation	1 – manipulation on the ipsilateral side, n = 15 2 – manipulation on the contralateral side, n = 15 Treatment provider: NR	10 sessions 4 weeks	1 – Pain: numerical pain rating 101; McGill short form pain questionnaire 2 – Disability: Neck disability index 3 – Range of motion Measured immediately post intervention and at 1 month	1/13

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Krauss, J (2008)[277] Oakland, US	32	Male (%): 22 (14 vs. 30) Mean age: 35 years	Non-specific neck pain (C4 – C7) aggravated by active rotation	1 – Manipulation by an orthopaedic manual physical therapist, n 22 2 – No treatment by the same therapist, n = 10	Single treatment session	1 – Pain: Faces pain scale measuring pain at end of active R, L, and bilateral rotation in R and L component Immediately post intervention	9/13
Parkin-Smith, G (1998)[278] South Africa	30	% male: 62.5 Mean age: 35.4 yrs	Patients between 16-60 yrs; negative Wallenberg's test; mechanical NP without neurological or vascular deficit; no medication for NP during study	1 – Cervical Manipulation by a chiropractor, n = 13 2 – Cervical and Upper Thoracic Manipulation, n = 17	6 treatment sessions 3 weeks	1 – Pain: NPRS (0-100) 2 – Disability: CMCC NDI (0-100) 3 – ADVERSE EVENTS: no harms reported Data measured at 3 weeks	6/13
Metcalfe, S (2006)[279,280] Canada	67	% male: 23.9 Mean age: 37 years	With NP or headaches	1 – Manipulation by a physical therapist, n = 46 2 – Control-Manipulation by the same therapist, n = 26	One treatment	1 – Physical Measures: Neck muscle strength 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	4/13

Table 2.17- Neck Pain – Spinal Manipulation – Chronic – Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Bischoff, A (2003)[255] NR	49	Male (%): NR Mean age: NR	Non-specific neck pain Chronic	1 – osteopathic intervention + sham ultrasound, n = 24 2 – sham ultrasound, n = 25 Treatment provider NR	Once every 2 weeks (ultrasound was given one per week) 10 weeks	1 – Pain: pain intensity 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	1/13

Table 2.18- Neck Pain – Spinal Manipulation – Mixed – Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Korthanis-de Bos, I (2003)[281,282] Netherlands	183	% male: 39 Mean age: 45.5 yrs	Physiotherapy or manual therapy for NP in previous 6 mo, surgery of neck or specific cause of NP Unknown (mix)	1 – Manual therapy, by 6 registered manual therapists who had followed a 3 years curriculum in manual therapy after training in physiotherapy, n = 60 2 – Physiotherapy, by 5 physiotherapists, n = 59 3 – General Practitioner care, n = 64	1 – maximum of 6 sessions 2 – maximum of 12 sessions 6 weeks 3 – one session	1 – Pain: Perceived recovery-6-pt scale; mean pain during preceding week-11-pt scale 2 – Disability: NDI 3 – Work: Absenteeism from paid, unpaid work due to NP 4 – Utility of conventional care: Euro Quality of Life; N of patient taking prescription drugs; N of visits to general practice; N of sessions of manual therapy, physiotherapy; help from others; N of outpatient visits to medical specialist care 5 – Cost: 52-week cost diary-Direct, Indirect costs 6 – ADVERSE EVENTS: minor benign short term, reaction; increase in NP Data measured at 3 months and 1 year	7/13

Table 2.19- Neck Pain – Spinal Manipulation – Unknown – Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Cleland, J (2004)[283] United States	68	Male % = NR Age range: 18 – 60 years	Mechanical neck pain NR	1 – thoracic spine manipulation, n = NR 2 – sham, n = NR Treatment provider NR	Single treatment session	1 - Pain: VAS 2 – ADVERSE EVENTS: no harms reported Measured immediately post intervention	2/13

Table 2.20- Neck Pain- Spinal Mobilization- Acute – Specific Pain –

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Kongsted, A (2007)[284] Denmark	458	% male: 28.3 Mean age: 33.3 years	18-65 years with acute whiplash associated disorder Acute	1 – Mobilization program, by one physiotherapist, n = 149 2 – Information and advice, by research nurse, n = 153 3 – Cervical collar (immobilization) applied by project nurse at initial phase and active mobilization as group 1 for rest of study period	1 – Maximum twice daily for 6 weeks 2 – one session 3 – 2 weeks collar + 4 weeks twice daily mobilization	1 – Pain: neck and headache VAS (0-10)-lower better 2 – Disability: Neck Disability Scale (0-30) lower better; SF-36 Physical health summary 3 – Work: Subjects with affected work disability, ability 4 – Utility of conventional care: analgesics used; any other treatments other than study intervention 5 – ADVERSE EVENTS: no harms reported Data measured at 1 year	5/13

Table 2.21- Neck Pain- Spinal Mobilization- Acute – non-Specific Pain

Table 2. 22 Neck Pain - Massage - Acute - Specific Pain – No studies

Table 2. 23Neck Pain - Massage - Acute - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Blikstad, A (2007)[285] England	45	% male: 44.7 Mean age: 23.8 yrs	Between 18-55 yrs; Non-specific unilateral or bilateral NP of 4-12 weeks and at least 4 on an 11pt NRS Sub-acute	1 – Activator Trigger Point Therapy (AtrPT) by a clinician, n = 15 2 – Myofascial band therapy (MBT), n = 15 3 – Sham Ultrasound (SUS), n = 15	One treatment session	1 – Pain: NRS (0-10); PPT (kg/cm^2) (pressure algometer) 2 – ADVERSE EVENTS: no harms reported Data measured at end of treatment	10/13

Table 2.24 Neck Pain - Massage - Chronic- Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Yagci, N (2004)[286] Turkey	40	% male: 25 Mean age: 30.9 years	Diagnosis of myofascial pain syndrome for at least 6 mo Chronic	1 – Vapo-coolant spray and stretch technique, n = 20 2 – Connective tissue massage, n = 20 Treatment provider: NR	3 treatments/ day	1 – Pain: VAS; Pain threshold; Pain tolerance 2 – Disability: Number of trigger points 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	2/13
Irnich D (2001)[205,206] Germany	177	% male: 34 Mean age: 52.4 years	Patients with chronic NP (>1 mo) and painful restriction of cervical spine mobility, not received treatment two weeks before the study	1 – Acupuncture by experienced and licensed acupuncturists, n = 56 2 – Massage by experienced physiotherapists, n = 60 3 – Sham Laser, n = 61	5 sessions 3 weeks	1 – Pain: VAS; PPT 2 – Quality of Life: SF-36: Role physical, Pain Index 3 – ADVERSE EVENTS: mild reactions (slight pain, sweating, LBP) Data measured at 1 and 3 weeks, and 3 months	4/13
Cen, S (2003)[287] California, US	31	% male: 25.8 Mean age: 48.7 years	NP and loss in ROM for more than 1 year	1 – Traditional Chinese Therapeutic Massage (TCTM) by a licensed acupuncturist, n = 10 2 – Exercise Program, n = 10 3 – Control-no treatment, n = 11	1 – 18 sessions over 6 weeks 2 – assuming one session	1 – Pain: Northwick Park Neck Pain Questionnaire (0-100)-higher score 2 – Neck flexibility 3 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	4/13

Table 2. 25 Neck Pain - Massage - Chronic - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Zaproudina, N (2007)[288] Finland	102	% male: 34.2 Mean age: 41.5 years	Patients with chronic N-S NP, aged 28-50 years	1 – Traditional bone-setting by an experienced Finnish bone setters, n = 35 2 – Physiotherapy by a registered therapist, n = 34 3 – Massage by a physiotherapist, n = 33	5 sessions	1 – Pain: NP VAS 2 – Disability: NDI 3 – ADVERSE EVENTS: no harms reported Data measured at 3 months and 1 year	
Sherman, K.J (2009)[289] US	64	% male: 31.2 Mean age: 57 years	20-64 years who had received primary care for NP at least 3 months prior to the study	1 – Massage by massage therapists, n = 32 2 – Self-care-book, n = 32	Up to 10 massage treatments 10 weeks	1 – Disability: NDI 2 – Pain: 11-pt(0-10) NRS; SF-36 physical and mental health component 3 – Quality of Life: global improvement 4 – Utility of health care: questions regarding use of other treatments during study period; use of medication in last week 5 – ADVERSE EVENTS: increased soreness, discomfort or pain during treatment Data measured at 4, 10 and 26 weeks	8/13

Table 2. 26 Neck Pain - Massage - Mixed - Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Lin, M (2004)[234] China	100	% male: 65 Mean age: 46 years	Cervical spondylopathy of nerve root type, aged 25-76 years Acute-Chronic	1 – Needle scalpel combined with Massage therapy, n = 50 2 – Simple Massage therapy, n = 50 Treatment provider: NR	21 treatments 3 months	1 – Quality of Life: Cure 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	3/13
Yi-zhen (2005)[290] China	52	% male: 55.8 Mean age: NR	Diagnosis of cervical spondylopathy owing to first attack or repeated attacks	1 – Traction and Massage, n = 26 2 – Traction only, n = 26 Treatment provider: NR	One treatment /day 5 days/course 1-2 courses	1 – Pain: treatment effect rating scale 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	1/13
Fernandes-de-las-Penas, C (2005)[291] Spain	40	% male: 42.5 Mean age: 28.7 years	At least 18 years old with mechanical NP for at least 2 weeks	1 – Ischemic compression technique, n = 20 2 – Transverse friction massage, n = 20 Treatment provider: NR – vaguely stated as “therapist”	NR	1 – Pain: PPT(pressure pain threshold); VAS(2.5 kg/cm² of pressure on MTrP) 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	7/13
Zhang, W (2005) [240] China	NR	% male: 65.63 Mean age: NR	Cervical spondylopathy	1 – Acupuncture + Massage / Manipulation n = 64 2- Massage (Control) n = 32 Treatment provider: NR	3x/week, for 3 weeks	NR	0/13
Fernandes-de-las-Penas, C (2005)[291] Spain	40	% male: 42.5 Mean age: 28.7 years	At least 18 years old with mechanical NP for at least 2 weeks NR	1 – Ischemic compression technique by physiotherapist, n = 20 2 – Transverse friction massage, n = 20	NR	1 – Pain: PPT(pressure pain threshold); VAS(2.5 kg/cm² of pressure on MTrP) 2 – ADVERSE EVENTS: no harms reported Data measured immediately post intervention	7/13

Table 2. 27 Neck Pain - Massage - Mixed - Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Gemmell, H (2007)[292] England	45	% male: NR Mean age: 23.5 yrs	Between 18-55 yrs with non-specific NP of at least 30mm on a VAS, and upper trapezius TP and decreased cervical lateral flexion to the opposite side of the active upper trapezius TP	1 – Ischemic Compression (IC) by a 4th year chiropractic student trained by a chiropractor with 28 years clinical practice, n = 15 2 – Trigger Point Pressure Release (TrPPR), n = 15 3 – Sham Ultrasound (SUS), n = 15	One treatment session	1 – Pain: VAS (0-100); Pressure Pain Threshold (PPT-kg/cm²) 2 – ADVERSE EVENTS: no harms reported Data measures at end of treatment session	9/13
Hemmila, H (2005)[293]	42	Male (%): 30% Mean age: 46.5	Patients 18 - 64 years; diagnosis of tension neck syndrome for at least one month	1 – Massage by experienced folk healer, n = 22 2 – Control: neither offered nor denied any treatments, n = 20	5 sessions, 30 minutes each 5 weeks	1 – Pain (million scale adapted for neck pain) 2 – Pain drawings 3 – Health care utilization 4 – Sick leaves due to neck pain – Cervical ROM – self rated improvement of neck pain measured at immediate, short term, intermediate and long term follow ups	5/13

Table 2. 28 Neck Pain - Massage - Unknown - Specific Pain – No Studies

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Hanten, W (1997)[294] U.S.	60	Male (%): 30% Mean age: 30 years	Patients with one or more active or latent cervical and or scapular trigger points without any known orthopaedic cardiovascular or neurological conditions	1 – Massage: occipital release (traction), n = 20 2 – Massage: head retraction/retraction-extension, n = 20 3 – No treatment, n = 20 Treatment provider: NR ("Examiner")	One treatment session	1 – Pain: Pressure Pain Threshold (PPT-kg/cm²)	5/13
Hou CR (2002)[295] Taiwan	40	Male (%): NR Mean age: 43 years	clinically active, palpable MTrPs in a single side or both sides	1 - ischemic compression to pain threshold, 60 sec, n =8 2 - ischemic compression to pain threshold, 90 Sec, n =8 3 - ischemic compression to Average of Pain Threshold and Pain Tolerance, 30 sec, n= 8 4 - ischemic compression to Average of Pain Threshold and Pain Tolerance, 60 sec, n= 8 5 - ischemic compression to Average of Pain Threshold and Pain Tolerance, 90 sec, n=8 All treatments provided by an experienced physical therapist	One treatment session	1 – Pain: VAS (0-10);	2/13
Fryer (2005)[296] Australia	37	Male (%): 32.4 Mean age: 23.1 years	presence of latent MTrPs in the upper trapezius muscle	1 - myofascial release, n = 20 2 - sham myofascial release, n = 17 Treatment provider: NR	One treatment session	1 – Pain: PPT	5/13

Table 2. 29 Neck Pain - Massage - Unknown - Non-Specific Pain – No Studies

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Meseguerm, AA (2006)[297] Spain	54	Male (%): 30% Mean age: 38 years	Patients 19-41 years old with mechanical neck pain, tender point in the upper trapezius muscle either on the left or right side. (mechanical pain defined as a generalized neck and or shoulder pain with mechanical characteristics including symptoms provoked by maintained neck postures by movement or by palpation of the postures by movement or by palpation of cervical muscles)	1 - manipulation (stain/counter strain), n = 18 2 - modified manipulation (stain/ counter strain), n = 18 3 - no treatment, n= 18 Treatment provider: NR (clinician with experience in management of mechanical NP)	One treatment session	1 – Pain: VAS (0-10); Pressure Pain Threshold (PPT-kg/cm²)	6/13

Table 3.1- Thoracic Pain – Manipulation – Unknown – Non-Specific Pain

Study ID Year Country	Total sample size	Population (Gender, Age)	Eligibility	Randomized Groups (no. of patients)	Frequency and Treatment duration	Outcomes and post-treatment follow-up	Quality score
Schiller, L (2001)[298]	30	% male: 47 Mean age: NR	Subjects 16-60 years with diagnosis of mechanical thoracic spine pain	1 – Experimental group, n = 15 2 – Non-functional ultrasound, n = 15 Treatment provider NR	Maximum of 6 treatments 2-3 weeks	1 – Pain: McGill; NRS-101 2 – Disability: OSW Data measured at end of treatment and 1 month	2/13

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