

An introduction to

XLIF®

eXtreme Lateral Interbody Fusion

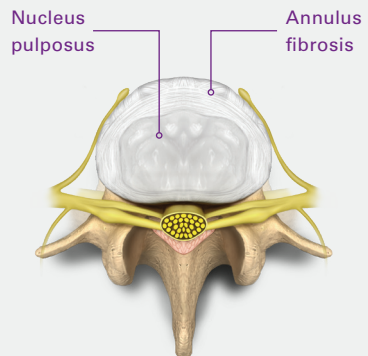
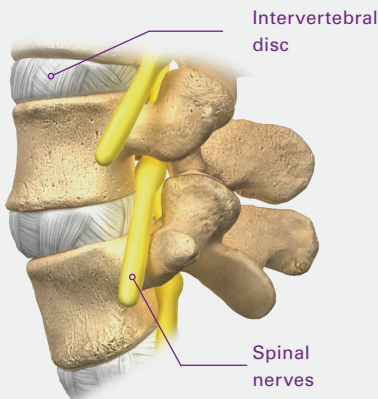
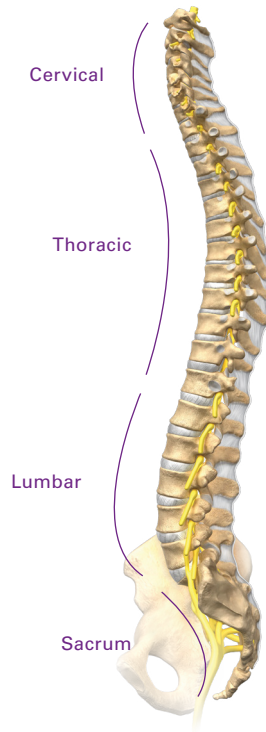
This booklet provides general information on XLIF. It is not meant to replace any personal conversations that you might wish to have with your physician or other member of your healthcare team. Not all the information here will apply to your individual treatment or its outcome.



About the spine

The human spine is made up of 24 bones or vertebrae in the cervical (neck) spine, the thoracic (chest) spine, and the lumbar (lower back) spine, plus the sacral bones.

Vertebrae are connected by several joints, which allow you to bend, twist, and carry loads. The main joint between two vertebrae is called an intervertebral disc. The disc is made of two parts, a tough and fibrous outer layer (annulus fibrosis) and a soft, gelatinous center (nucleus pulposus). These two parts work in conjunction to allow the spine to move, and also provide shock absorption.

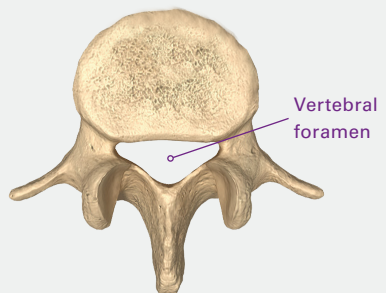
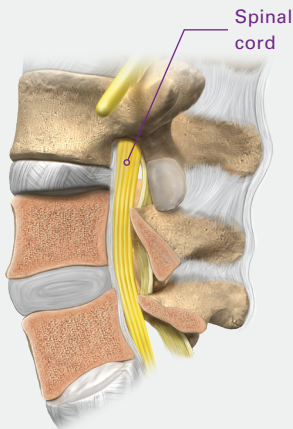
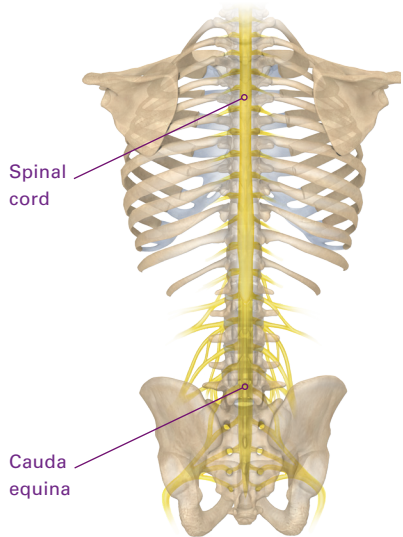


About the spinal cord and cauda equina

Each vertebra has an opening (vertebral foramen) through which a tubular nervous structure travels. Beginning at the base of the brain to the upper lumbar spine, this structure is called the spinal cord.

Below the spinal cord, in the lumbar spine, the nerves that exit the spinal cord continue to travel through the vertebral foramen as a bundle known as the cauda equina.

At each level of the spine, spinal nerves exit the bony spine then extend throughout the body.



What can cause pain?

There are several primary causes of spine problems. The majority of the symptoms are caused by either instability or by disc, bone, or ligaments pressing onto the nerve roots and/or spinal cord.

Degenerative Disc Disease (DDD)

During the natural aging process, the discs between each vertebral body can lose their flexibility, height, and elasticity which can cause a tear in the tough outer layer of the disc, causing the disc to herniate, bulge, or leak the gelatinous core. The bulges or leakages can end up compressing the nerve roots and/or spinal cord, causing symptoms including, but not limited to lower back and/or leg pain.

Degenerative Spondylolisthesis

Degenerative spondylolisthesis is a condition where one vertebra has slipped forward over another one below it. This instability typically occurs as a result of degenerative changes but may also be caused by stress fractures, or congenital abnormalities (birth defects), and in rare cases from a tumor or trauma.

Degenerative Scoliosis

Adult degenerative scoliosis is a condition where a right-left or lateral curve develops in a previously straight spine. This curvature occurs as a result of deterioration of the disc and joints in the back of the spine. As the joints degenerate they create a misalignment in the back, resulting in a bend or curvature, causing symptoms including lower back and/or leg pain.

What are the treatment options?

Many symptoms can be treated without surgery including rest, heat, ice, medication, injections, and physical therapy. It is important to speak with a physician about the best option.

If symptoms do not improve with conservative treatment, physicians may recommend spinal surgery. Surgery is reserved for those who do not gain relief from non-operative forms of treatment, patients whose symptoms are increasing or worsening, and/or patients that present with a spinal condition which indicates the need for surgery. Many symptoms can be treated without surgery including rest, heat, ice, medication, injections, and physical therapy. It is important to speak with a physician about the best option.

What is an eXtreme Lateral Interbody Fusion (XLIF®)?

The eXtreme Lateral Interbody Fusion (XLIF) technique is a minimally disruptive surgical procedure performed through the side of the body. It is designed to treat a range of spinal pathologies. Using nerve monitoring technology, the surgeon gains lateral (side) access to the spinal column, avoiding any major nerves in the area between the incision and the column. The XLIF procedure does not require an anterior (front) or posterior (back) exposure, and thereby does not present the same risks of vascular and/or neural injury as traditional approaches.

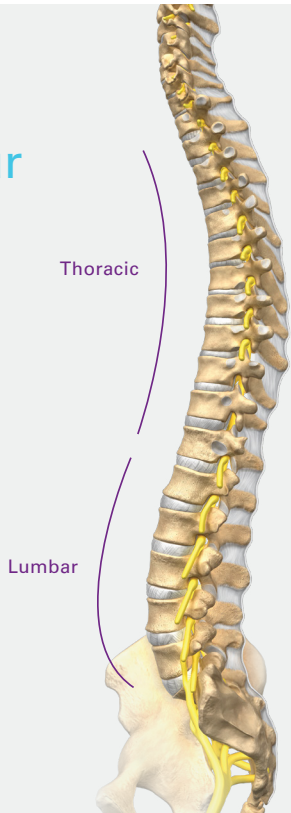
Can an XLIF® be right for me?

If you require spinal surgery, your physician may determine that the XLIF procedure is a good option for you. Some examples of pathologies (conditions) that may benefit from the XLIF procedure include:

- Degenerated discs and/or facet joints that cause unnatural motion and pain
- Slippage of one vertebra over another (degenerative spondylolisthesis)
- Change in the normal curvature of the spine (degenerative scoliosis)

Conversely, your physician may determine that an XLIF procedure is not a good option for you. It is important to discuss this with your physician in order to determine the best course of treatment for you.

XLIF procedures occur in the thoracolumbar spine, which is made up of 17 vertebrae.



What to expect

Before surgery

Your physician will review your condition and explain treatment options, including medications, physical therapy, and other surgeries. Should you have any questions regarding the procedure, do not hesitate to ask your surgeon. Your physician will provide thorough preoperative instructions.

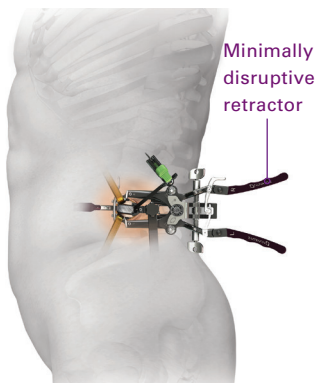


During surgery

After you are sedated, positioned on your side, and surrounded by the appropriate surgical draping, an x-ray image is taken of your spine to identify the location of the operative disc space.

Step 1: Approach

Your surgeon will make a small incision on the lateral (side) of your body. Dilators will be used to direct the path to the affected disc space while monitoring the local nerves. Once the optimal path has been determined, a retractor will be utilized to hold the skin incision open, providing access and visibility to the affected area.



Step 2: Disc removal

The diseased or damaged disc is removed to reduce pressure from the cord or symptomatic nerve root.

Step 3: Implant

An appropriate implant, chosen by your surgeon, will be placed into the disc space to restore the proper disc height and provide support while bone grows between the vertebral bodies during the fusion (bone-healing) process. That segment of your spine will eventually stabilize once fusion occurs.

Step 4: Fixation

Generally, some method of internal fixation will be used to act as a stabilization device (internal brace) to help hold everything in place while fusion occurs. This could be a combination of screws and plates that are affixed to the adjacent vertebrae. Your surgeon will determine what, if any, kind of fixation is necessary during the procedure.

What implants are used?

Below are some examples of the implants that may be used during your XLIF® procedure:

Interbody
implant



Pedicle
screws and
rods



Postsurgical view



Two-level lumbar XLIF
with pedicle screw
and rod fixation



Single-level lumbar
XLIF with plate

After surgery

After surgery you will wake up in the recovery room, where your vital signs will be monitored and your immediate postoperative condition will be carefully observed. Once the medical staff feels that you are doing well, you will be returned to your room in the hospital.

Your physician will determine the best postoperative course for you. The day after your surgery, your physician may instruct you to use a brace for a period of time to assist with the spinal fusion process. Supervised by trained medical professionals, your physician may ask you to carefully sit, stand, or walk. Your physician will also discuss with you any medications to take home, as well as a prescribed program of activities. Your physician will provide instructions on wound care, exercises, and limitations to postoperative activity.

Frequently asked questions

Can I shower after surgery?

Depending on your surgical incision, you may have showering restrictions. Ask your physician for appropriate instructions.

Will I have a scar?

Your physician will discuss the incisions that will be made during an XLIF® surgery.

When can I drive?

For a period of time after your surgery, you may be cautioned about activities such as driving. Your physician will tell you when you may drive again.

Can I travel?

The implants used in the XLIF procedure may activate a metal detector. Because of increased airport security measures, please call your local airport authority before traveling to get information that might help you pass through security more quickly and easily. Ask your physician to provide a patient identification card.

What are the potential benefits of an XLIF[®] procedure?

Benefits of an XLIF procedure, when compared to traditional lumbar interbody fusion surgery, may include:

- Smaller incision
- Less blood loss during surgery
- Reduced operative time
- Reduced hospital stay
- Reduced postoperative recovery time

Benefits	XLIF surgery	Traditional lumbar interbody fusion surgery
Blood loss	< 100 cc/level ^{1,2}	500-1,000 cc/level ^{3,4}
Hospital stay	1-3 days ^{1,5}	3-6 days ³⁻⁵
Walking	Same day ⁶	3 days ⁷

The above data represents typical outcomes of patients being treated for degenerative disc disease, spondylolisthesis, and scoliosis.

What are the potential risks of an XLIF[®] procedure?

Keep in mind that all surgery presents risks and complications that are important to discuss with your surgeon prior to your surgery. Listening to your physician's guidance, both before and after surgery, will help your recovery.

Potential risks following XLIF surgery include:

- Problems with anesthesia
- Infection
- Nerve damage
- Problems with the graft or hardware
- Ongoing pain

This is not intended to be a complete list of the possible complications. Please contact your physician to discuss all potential risks.

References

1. Oliveira L, Marchi L, Coutinho E, et al. The use of rh-BMP2 in standalone eXtreme Lateral Interbody Fusion (XLIF®): clinical and radiological results after 24 months follow-up. *WscJ* 2010;1(1):19-25.
2. Dakwar E, Cardona RF, Smith DA, et al. Early outcomes and safety of the minimally invasive, lateral retroperitoneal transpsoas approach for adult degenerative scoliosis. *Neurosurg Focus* 2010;28(3):E8.
3. Dhall SS, Wang MY, Mummaneni PV. Clinical and radiographic comparison of mini-open transforaminal lumbar interbody fusion with open transforaminal lumbar interbody fusion in 42 patients with long-term follow-up. *J Neurosurg Spine* 2008;9:560-5.
4. Whitecloud TS 3rd, Roesch WW, Ricciardi JE. Transforaminal interbody fusion versus anteriorposterior interbody fusion of the lumbar spine: a financial analysis. *J Spinal Disord* 2001;14(2):100-3.
5. Lucio JC, VanConia RB, DeLuzio KJ, et al. Economics of less invasive spinal surgery: an analysis of hospital cost differences between open and minimally invasive instrumented spinal fusion procedures during the perioperative period. *Risk Manag Healthc Policy* 2012;5(5):65-74.
6. Ozgur BM, Agarwal V, Nail E, et al. Two-year clinical and radiographic success of minimally invasive lateral transpsoas approach for the treatment of degenerative lumbar conditions. *SAS J* 2010;4:41-6.
7. Park Y, Ha JW. Comparison of one-level posterior lumbar interbody fusion performed with a minimally invasive approach or a traditional open approach. *Spine* 2007;32(5):537-43.

Notes

Notes

Resources

For more information about XLIF®, please visit:

[nuvasive.com](https://www.nuvasive.com)

If you would like to learn more about patient support and education for chronic back, leg, and neck pain sufferers and their loved ones, please visit:

thebetterwayback.org



If you have any questions about XLIF or spine surgery, please call or visit your physician, who is the only one qualified to diagnose and treat your spinal condition. This patient information brochure is not a replacement for professional medical advice.

About **The Better Way Back**[®]

The Better Way Back[®] is a nationwide patient support program created by NuVasive[®], a leader in developing minimally invasive, procedurally-integrated spine solutions. The Better Way Back is a free community built on the power of empathy, and is dedicated to providing hope, support, and information to individuals suffering from chronic back, leg, or neck pain.

Through its Patient Ambassador Program, The Better Way Back pairs patients considering spine surgery with patients who have previously undergone a spine procedure. Ambassadors volunteer their time to discuss their experiences in order to provide additional, first-hand perspectives.

To learn more about The Better Way Back, please



call **1-800-745-7099**



visit **thebetterwayback.org**



text "TBWB" to **858-360-8292**

XLIF®

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