

An introduction to

LIS

Less invasive surgery

This booklet provides general information on less invasive surgery (LIS). 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.



Spine surgery evolved. >>

NuVasive provides less invasive procedural solutions that enable shorter hospital stays and improved clinical benefits—ultimately getting you back on your feet sooner.¹

Visit [nuvasive.com/WhyLIS](https://www.nuvasive.com/WhyLIS) to discover the difference of LIS.

Why LIS?

LIS enables your surgeon to use techniques and accompanying technologies designed to reduce the size of your incision, reduce your length of stay at the hospital and potentially reduce the risk of intraoperative complications. Clinical data suggests that LIS may result in better patient outcomes in relation to traditional open procedures.²⁻⁶

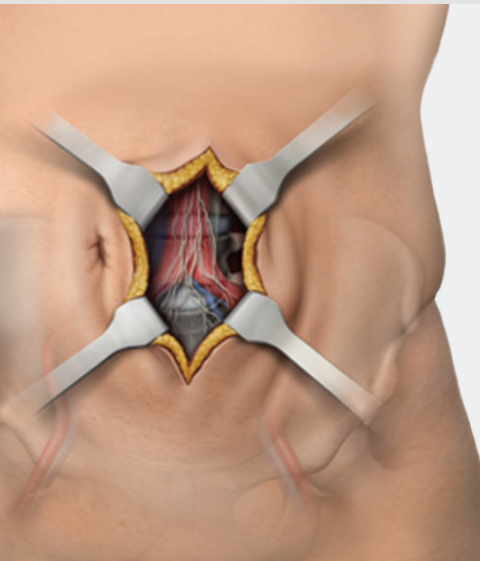
While the decision to receive spine surgery may be intimidating, we empower you to educate yourself on the benefits of LIS.

About traditional open procedures

Traditional open spine surgery may be appropriate for some patient pathologies; however, many scenarios may allow for a LIS procedure to be implemented.

Posterior approach

With posterior approaches, surgeons access the spine through the back of the patient. Open posterior approaches typically require a larger incision than LIS procedures and may damage stabilizing back muscles.⁷



Anterior approach

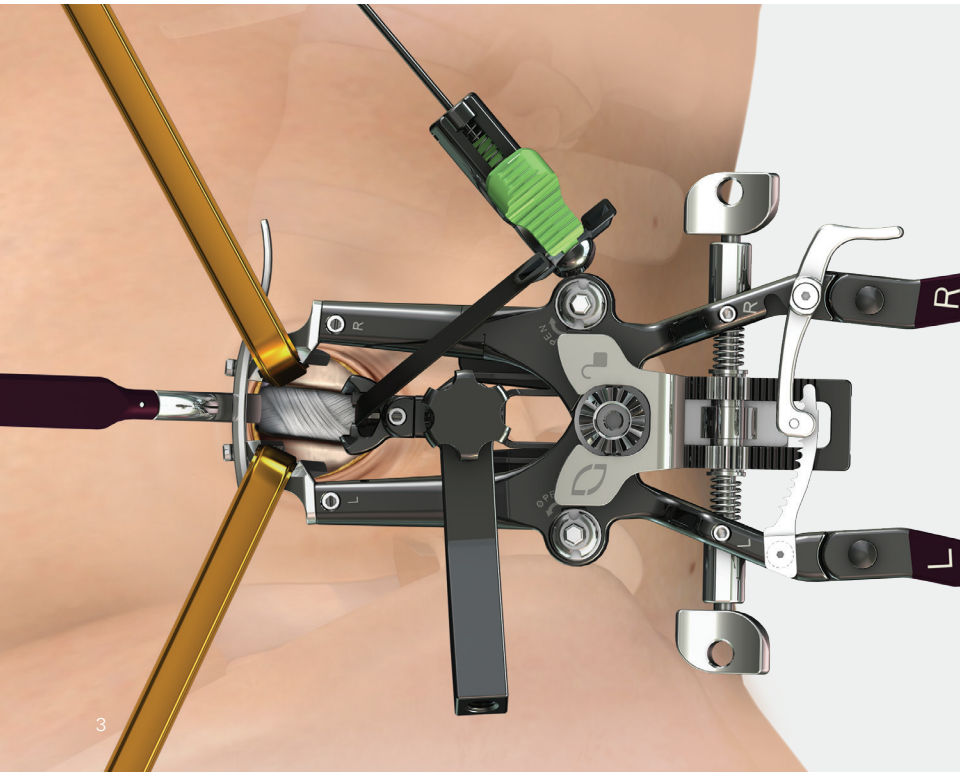
With anterior approaches, surgeons access the spine through the front of the patient. Open anterior approaches typically require a larger incision and have higher risks of vascular injury than LIS procedures.⁷

About NuVasive LIS procedures

NuVasive is an innovative medical device company that enables surgeons to **transform surgery, advance care and change lives** through the development of LIS spinal products and procedures. Procedures include the eXtreme Lateral Interbody Fusion (XLIF), Maximum Access Surgery transforaminal lumbar interbody fusion (MAS TLIF) and MAS Midline.

XLIF

The XLIF technique is a minimally disruptive surgical procedure performed through the side of the patient. Since this procedure may not require anterior or posterior exposure, it does not present the same risks of vascular and/or muscular injury as the traditional open approaches.

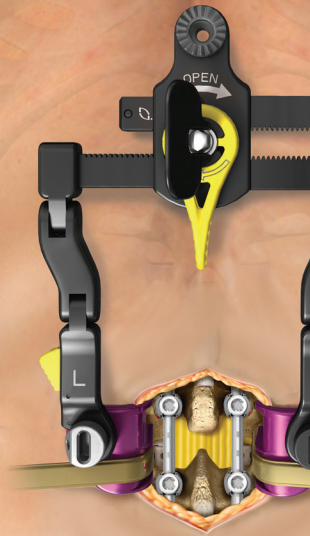


MAS TLIF

Rather than starting from the middle of the back and retracting (pulling back) the muscles laterally (toward the sides) as is done in an open TLIF, the MAS TLIF approach starts off to one side of the spine and allows the surgeon to navigate between the back muscles (without cutting them) in one direction.

MAS Midline

MAS Midline uses a medialized (toward the middle of the spine) approach designed to minimize the need to retract muscles laterally. This requires a smaller incision than an open posterior lumbar interbody fusion (PLIF) procedure, where the muscles are widely retracted laterally.



What are the potential benefits of a LIS procedure?

Benefits of a LIS procedure when compared to traditional lumbar interbody fusion surgery may include:

- smaller incision,
- less blood loss during surgery,⁸⁻¹⁴
- reduced hospital stay,^{8,10,12,15}
- reduced postoperative recovery time,^{1,12-14,16} and
- reduced operative time.^{12,17}

What are the potential risks of a spinal 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 with your recovery.

Potential risks following LIS include:⁷

- problems with anesthesia,
- infection,
- nerve damage,
- problems with the graft or hardware, and
- ongoing pain.

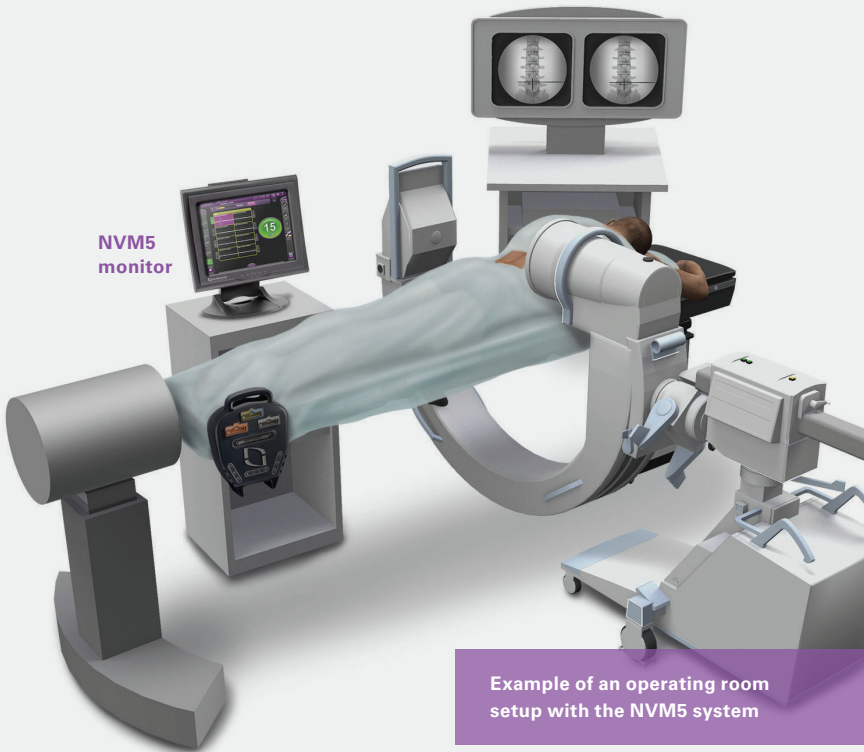
In addition to the risks above, traditional open surgery also has the following potential risks:⁷

- increase in blood loss,
- increase in length of stay,
- increase in perioperative morbidity, and
- longer recovery for patients.

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

How do enabling technologies play a role in surgery?

There are different enabling technologies that surgeons may choose to incorporate into your spinal procedure. Enabling technologies are software platforms that are designed to assist in navigating the unique requirements of spine surgery. NuVasive options include the NVM5 and Lessray systems.



If you have any questions about NVM5, LessRay or spine surgery in general, please call or see 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. It is important that you discuss the potential risks, complications, and benefits of spine surgery with your doctor prior to receiving treatment, and that you rely on your physician's judgment. Only your doctor can determine whether you are a suitable candidate for spine surgery.

What is NVM5 and why is it used in surgery?

NVM5 is a system that utilizes electromyography (EMG) monitoring, a diagnostic tool that helps assess the motor function of nerve roots.

During surgery the brain is unconscious and unable to tell the muscles via nerves to contract. In its place, a physician may choose to use NVM5 EMG to evaluate nerve health. To do so, electrodes are placed over muscles and responses to nerve stimulation are evaluated. Muscle twitches produce a signal on a recording machine, which indicates the health of the nerves that innervate it.

EMG can be used to inform the physician of nerve proximity and location to assist him/her in determining proper hardware and screw placement in fusion surgeries. This helps reduce the chance of nerve impingement.

While EMG monitoring is generally considered the standard of care for nerve root monitoring, other monitoring techniques may be used if other neural anatomy is at risk.



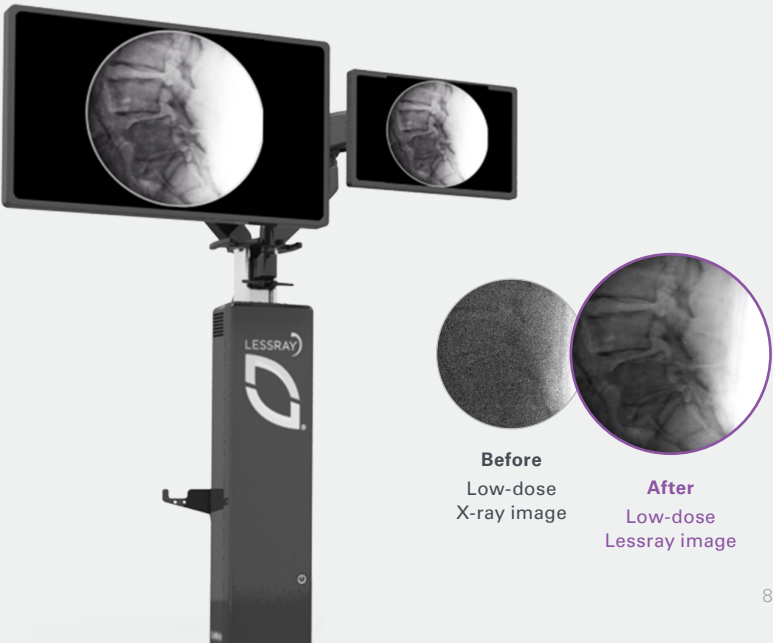
Example of an adhesive electrode placement and stimulated EMG recording using NVM5

What is Lessray and why is it used in surgery?

The Lessray system is an image-enhancement platform designed to help address over-exposure to radiation in hospital operating rooms, particularly in the case of less invasive spine surgery.

Certain types of imaging tests, such as X-rays, use radiation to take images of bones. During surgery, an X-ray image is taken of the patient's spine to identify the location of the operative vertebral disc space. Best practice to reduce radiation exposure has been to lower the amount of radiation used to take the X-ray image. However, the resulting image can be grainy and if lowered too much, unusable.

Lessray provides real-time image enhancement which allows even the lowest-dose images to be as useful and informative as full-dose images. Lessray has been shown to help reduce radiation exposure in the operating room by 75% when compared to standard X-ray imaging.¹⁸



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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**

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