

The following is a sampling of products offered by Zimmer Spine for use in Minimally Invasive (MIS) Lumbar Fusion procedures.



FlexPosure

The *FlexPosure*[®] Portal allows surgeons to perform a range of minimally invasive lumbar spine surgeries including discectomy, decompression, fixation and fusion. The same posterior implants from an open procedure can be placed using a muscle and tissue preserving access, all through two 30mm incisions.



PathFinder

PathFinder[®] Minimally Invasive Pedicle Screw System is a device used in lower back surgery for spinal fusion procedures that requires only two small incisions approximately 2-3cm in length. A pioneer in MIS surgery, the *PathFinder* system's muscle sparing approach was designed with both the patient and surgeon in mind by making the procedure simple, intuitive and reproducible by combining the familiarity of a traditional open procedure with the benefits of a minimalist approach.

Making an Informed Decision

The decision to have surgery is sometimes difficult. This publication is not intended to replace the experience and counsel of a physician. Rather, it is meant to educate and empower you as a patient. Your surgeon will be happy to answer any questions you might have. You may also call your surgeon's office and arrange to speak with someone who has had lumbar surgery and can share that experience with you. It's just another way you can learn about the procedure and what to expect.

Your results may vary. The outcomes of spinal fusion depend on each patient's personal circumstances. As with any surgery, the outcome can depend on individual factors like weight, activity level, bone quality, and how well the physical therapy routine is followed after surgery. All patients may not experience every potential benefit. These points should be discussed with the surgeon before the operation.

¹ Data on file Zimmer Spine, Inc.

Patient Guide to Lower Back Surgery

Minimally Invasive (MIS) Lumbar Fusion



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Our Commitment to Patient Education

Welcome to the Patient Guide to Lower Back Surgery, focusing on minimally invasive surgery (MIS) lumbar fusion.

At Zimmer Spine, we are committed to helping you learn more about back pain and spinal fusion surgical procedures. The information presented here is for educational purposes only and is not intended to diagnose or recommend treatment for your back condition. Only your surgeon can recommend lumbar fusion as a treatment option. Any questions or concerns you have should be discussed with your surgeon.

If you experience any of the following, you may not be a good candidate for lumbar fusion surgery. Please talk to your doctor about your specific situation.

- Poor bone quality
- Pregnancy
- Obesity
- Infection
- Allergies to the implant or any of the implant materials
- Inability to follow the instructions of your doctor

Living with Lumbar Pain

It is estimated that as many as 80 percent of Americans will suffer from lower back pain at some point in their lives.¹ For most people, the pain will get better with conservative treatments. However, if you have persistent, severe or chronic pain that radiates down your legs, or significant weakness, numbness or tingling in your legs, your doctor may recommend surgery.



You may have difficulty walking, standing or even sitting for long periods. Back pain could be interfering with your job and the activities you love. In some cases, bladder and bowel problems may occur.

Back pain has many causes, including among others, degenerative disc disease, spinal deformity, trauma and tumors. Degenerative disc disease refers to a wide range of changes occurring in the spine resulting from aging and wear and tear. These changes in the discs can lead to other problems such as herniated or slipped discs and spinal stenosis. These terms will be discussed in detail in the following pages.

Lumbar Spine Anatomy

Low back pain comes from the lumbar region of the spine. These are the five vertebrae that curve down from about the level of your waist.

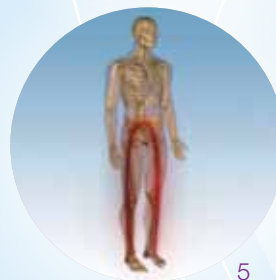
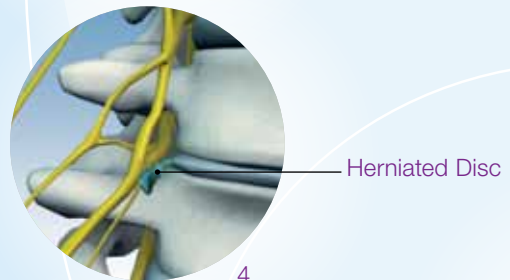
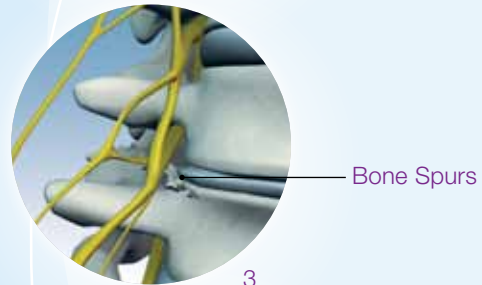
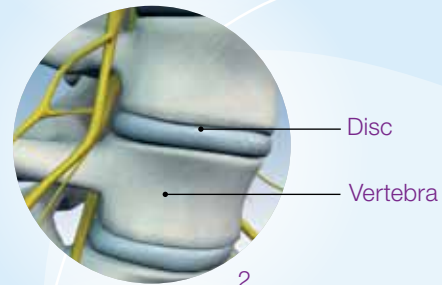
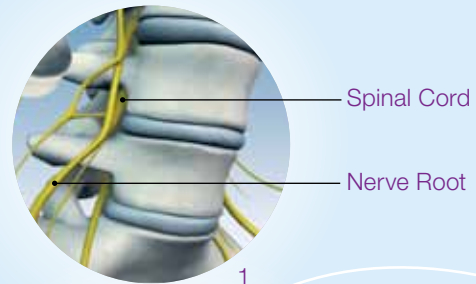
Lumbar region



- 1 Each **vertebra** has a space called the spinal canal, which protects the **spinal cord** and the nerve roots. The nerve roots exit the spinal canal through the openings between the vertebrae on the side of the spine.
- 2 In a healthy spine, the vertebrae are separated by **discs** that act as cushions and allow the spine to move smoothly. Over time, with wear and tear, the discs may lose their cushioning effect and the ability to move freely. This is called **degenerative disc disease**. As the disc collapses, the spine may lose its normal alignment.

Discs do not have the ability to repair themselves like some other tissues in the body. That's why degenerative disc disease often continues to progress as time goes by.

- 3 **Bone spurs** may form which can grow into the spinal canal or openings and pinch the cord or nerve roots. This is called **spinal stenosis**.
- 4 A collapsed disc may also bulge, or **herniate**, through its outer layer. How much it protrudes will determine whether it bulges, herniates or separates from the rest of the disc, causing a **prolapse** or **sequestered fragment**. These terms refer to degrees of herniation and are associated with an increasing severity of symptoms.
- 5 This may press on the nerve roots as they exit the spinal canal and cause pain, numbness or tingling in the leg. This is commonly referred to as **sciatica**.



MIS Lumbar Fusion

If you're already considering surgery, you've probably been through a host of nonsurgical treatments, including pain medications, exercise programs and physical therapy or chiropractic care. You might even have had an epidural injection to reduce inflammation and pain.

If these have failed to relieve your symptoms, your surgeon may recommend lumbar fusion surgery.

Potential Advantages of Minimally Invasive Surgery (MIS)¹

The ultimate goals of lumbar fusion surgery are to help reduce pain, relieve swelling, irritation and pinching of nerves and restore function. By stabilizing the spine, the intent is to enable you to return to many of the activities you enjoy.



Minimally invasive lumbar fusion surgery is an innovative approach with more than a decade of clinical history.¹ More and more surgeons are recommending minimally invasive surgery for their patients.

MIS offers a number of potential advantages over traditional open lumbar fusion. Minimally invasive procedures are generally associated with:

- Smaller incisions
- Less trauma to back muscles and soft tissue
- Reduced blood loss
- Shorter hospital stays
- Fewer complications
- Reduced postoperative pain
- Quicker recovery time

Please remember that not all back problems are potentially helped with MIS.

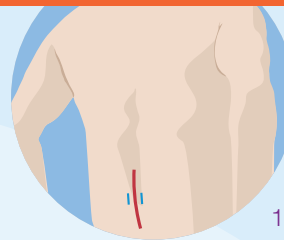
Possible Complications

While unusual, complications can occur during and after surgery. Possible complications include, but are not limited to infection, bleeding, continued pain and failure of fusion. Some patients still experience stiffness and pain.



MIS Lumbar Fusion Procedure

- 1 In minimally invasive lumbar fusion surgery, your surgeon makes a **small incision** and uses special instruments to perform the surgery.
- 2 During the procedure, your surgeon may remove the disc and any part of the vertebra or bone spurs that are pinching the nerves. Removing the disc is called a **discectomy**.
- 3 A **spacer and/or bone graft** is then added in place of the removed disc, so the vertebrae will fuse and form a solid union. The bone graft is sometimes taken from your own bone, called an autograft. Or, your surgeon may choose to use bone from a bone bank. This is called allograft. Synthetic bone graft or other man-made materials may also be used. This can occur in any combination.
- 4 **Special screws** secure the vertebrae until the bone graft has a chance to fuse together. The bone graft should set within the first 12 weeks after surgery, and in six months to a year, the fusion of the vertebrae should be complete, although in some cases fusion may take up to 18 months.¹



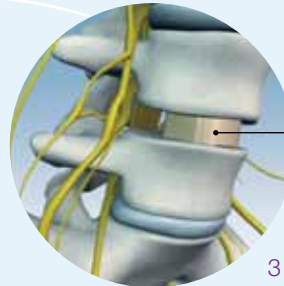
Incision Comparison

Minimally invasive surgery utilizing PathFinder®

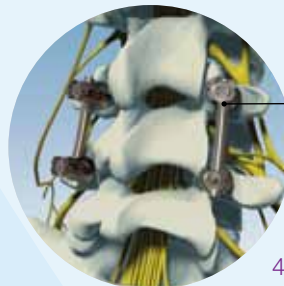
Traditional open lumbar fusion



Removal of Disc



Spacer and/or Bone Graft



Special Screws



"I'm glad to see him back.
He's so much better!"

Before and After Your Surgery

Before the Procedure

Before the surgery, your surgeon may ask you to do a number of things to help make the procedure go smoothly and help your body heal:

- If you smoke cigarettes, you will be expected to stop for a period before and after your surgery, because smoking can interfere with a successful bone graft fusion.
- You'll be encouraged to eat healthy, well-balanced meals.
- And, of course, you'll want to follow all of your doctor's instructions.

You'll also want to make preparations around your home. Make sure the things you use every day are placed where you can reach them without having to bend. This includes clothes, shoes, toiletries, kitchen utensils and groceries. It's also important to remove any throw rugs, loose cords and other objects that could cause you to trip and fall.



What to Expect After Your Surgery

After the surgery, you can expect to be in the hospital for several days. You will be encouraged to walk with assistance the first day after surgery and you will begin a program designed to help you get in and out of bed and care for your personal hygiene. You may be asked to wear a brace post-op for a period of time by your surgeon. You will be shown how to apply and remove the brace.

Because the bone graft takes a period of time to set, you will need to restrict activities that involve lifting, twisting or bending the lower back for a period of time after the surgery. You will not be able to drive until your pain has subsided to a moderate level, typically 10-14 days after the surgery. Once the fusion is set, you will need to continue the rehabilitation and exercise programs designed for you. Your surgeon will tell you when it is safe to resume more strenuous activities. Patients are typically able to return to many of the activities they enjoy.



The goal of minimally invasive lumbar fusion is to help relieve your symptoms and restore your quality of life.