

HOW IS THE SURGERY PERFORMED?

With the use of dilator tubes, the surgeon will access the lumbar spine through small skin incisions and tunnels created by separating muscle along its natural divisions.

Following placement of bone graft, the surgeon uses a special "live action" x-ray machine called a fluoroscope to visualize the spine and determine where to place the screws. A stiff wire (called a guidewire) is inserted through skin and muscle to the screw insertion point on one vertebra.

The dilator tubes are slowly passed down over the guidewire, creating tunnels through the muscle to the target screw placement area. A screw, attached to a screw extender, is inserted through the muscle to the vertebra. The process is repeated for the second screw placement.

A minimally invasive system is then used to insert the rods through the screws. The screw extenders and rod inserter are removed. The separated muscle flows back together, and the skin incisions are closed, leaving only thumbnail-sized skin incisions.

WHAT CAN I EXPECT AFTER SURGERY?

Ask your doctor about your specific recovery plan following surgery. It is important to follow your doctor's instructions carefully to recover from surgery as quickly as possible and increase your chance of a successful outcome. Recovering from back pain and surgery is an ongoing process. How fast you recover depends on the type of surgery you had, your commitment to working closely with your physical therapist, and moving and exercising correctly, as recommended by your surgeon.

In most cases, immediately after surgery your heart and lung function will continue to be monitored and your doctor may prescribe medication to control pain and nausea.

A nurse will show you how to care for your incisions before you are sent home and your doctor will discuss a program to gradually increase your activity. You may be required to wear a back brace after surgery and you may be told to avoid repetitive bending, lifting, twisting and athletic activities while you recover. You may

also be cautioned to avoid vibrations, such as those you might experience when driving a car, for a period of time after your surgery. Your doctor will schedule office visits to check on how you are doing and see if anything else needs to be done.

Contact your doctor immediately if:

- you get a fever
- the incision starts leaking fluids
- you have trouble swallowing or breathing
- you have trouble urinating
- you have new or increased back or leg pain or numbness

After surgery, your surgeon may refer you to a physical therapist who will teach you exercises to improve your strength and increase your mobility. The goal of physical therapy is to help you become active as soon as possible, using safe body movements that protect your spine. This often includes abdominal strengthening exercises. You may also be taught different ways of standing, sitting, or lifting to avoid reinjuring your spine.

WHAT POSSIBLE COMPLICATIONS COULD OCCUR?

Potential risks to any surgical procedure include unforeseeable complications caused by anesthesia, blood clots, undiagnosed medical problems, such as silent heart disease, and rare allergic reactions. Some risks of spinal surgery include incomplete pain relief, damage to the nerve roots, infection, and complications with the hardware. Most of these complications can be treated once they are detected, but sometimes they require a longer period of hospitalization or recovery, additional medications, and sometimes even additional surgery.

Depending upon the type of surgery you are having, these risks will be explained by the primary surgeon. In general, these complications happen very infrequently, but it is important to remember that surgery is a difficult process, and, therefore, unforeseeable complications do occur. As a patient, it is important to understand and follow your doctor's advice so that the best possible outcome can be achieved.

TALK TO YOUR DOCTOR.

While this brochure is meant to provide you with information you need to make an informed decision about your treatment options, it is not intended to replace professional medical care or provide medical advice.

If you have any questions about minimally invasive spine surgery, please call or see your doctor, who is the only one qualified to diagnose and treat your spinal condition. As with any surgical procedure, you should find a surgeon who is experienced in performing the specific surgery that you are considering.

For additional information visit: www.back.com

1. Schwender. Minimally invasive transforaminal lumbar interbody fusion. *Orthopedics Today*. Monograph to the August 2002 issue.
2. Khoo LT, Palmer S, Laich DT, Fessler RG. Minimally invasive percutaneous posterior lumbar interbody fusion. *Neurosurgery*. 2002 Nov;51(5 Suppl):S166-S181.
3. 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 Mar 1;32(5):537-543.
4. Righesso. Comparison of Open Discectomy with Microendoscopic Discectomy in Lumbar Disc Herniations: Results of a Randomized Controlled Trial. *Neurosurgery*. 61:545-549, 2007.

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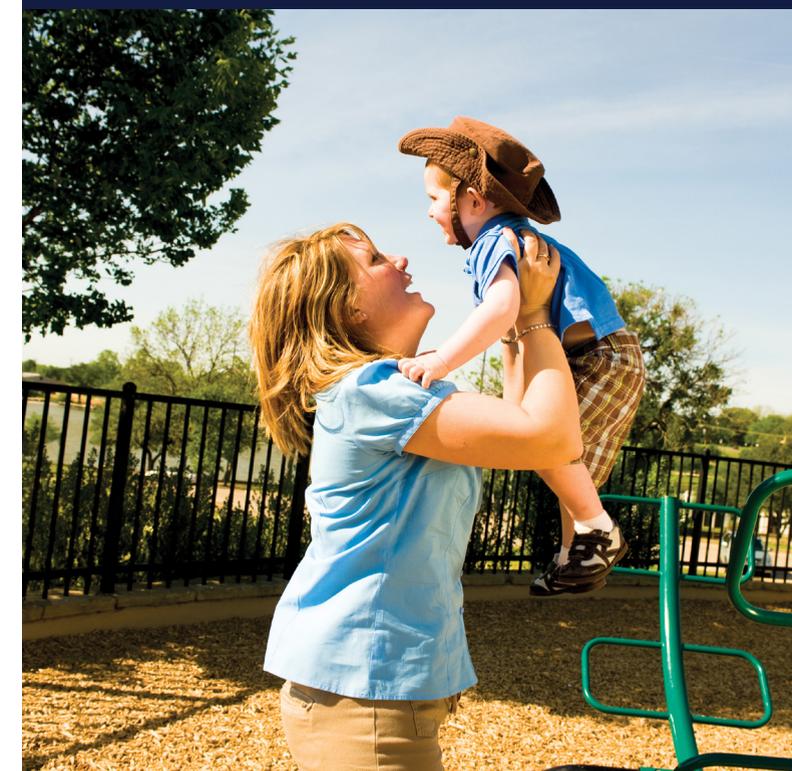
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Consult instructions for use at this website: www.medtronic.com/manuals.

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UNDERSTANDING MINIMALLY INVASIVE SPINE SURGERY AND ITS BENEFITS

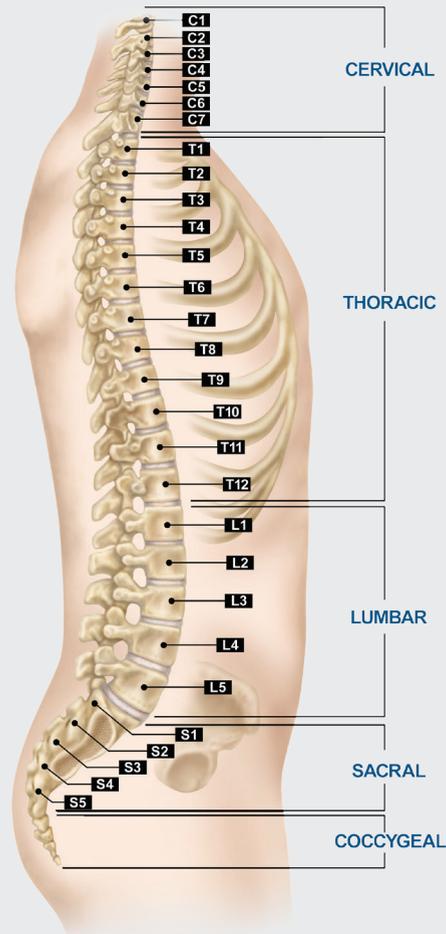


Patient Information

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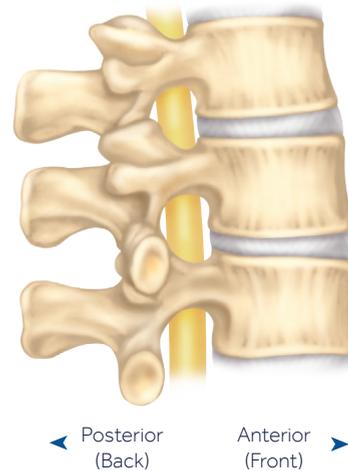
This brochure is designed to help you make an informed decision about treatment for your back pain and related conditions. To treat your condition, your doctor has recommended surgery using a minimally invasive spinal system.

Your doctor has decided that you need spinal surgery after carefully examining you, reviewing your history and x-rays, and taking into account the results of other diagnostic tests and previous non-surgical treatment. Specifically, your doctor has determined that you would benefit from having minimally invasive lumbar spinal fusion surgery.



HOW DOES THE SPINE WORK?

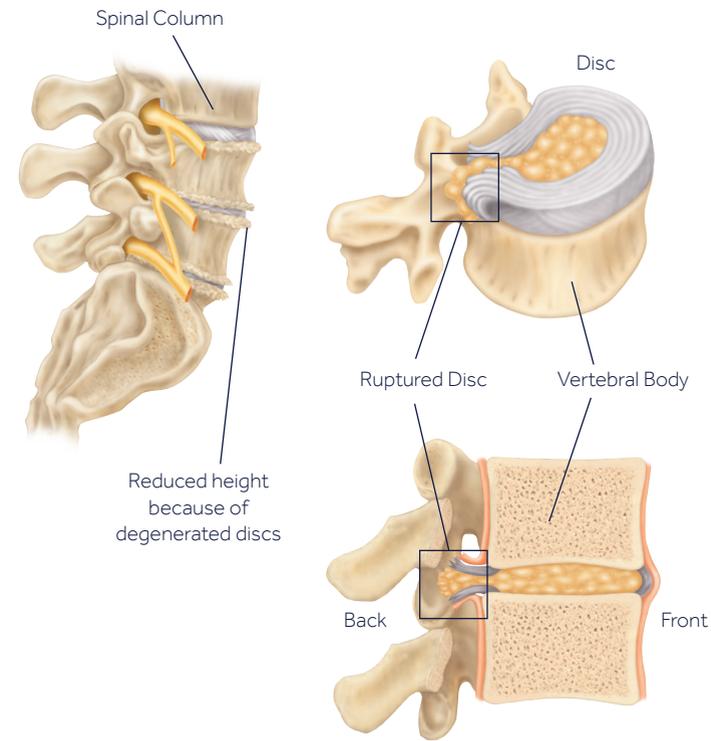
The spine is a column of bony vertebrae which supports your body, allows movement, and protects the spinal cord. The lumbar spine, where your symptoms are originating, has five vertebrae. Between the vertebrae are intervertebral discs. Each shock-absorbing disc has a spongy center, or nucleus, surrounded by tough outer rings. Besides cushioning the spine, these discs allow for flexibility. Nerves branching from the spinal cord pass through openings in the vertebrae to other parts of your body. Several of these nerves form the sciatic nerve, which runs down your leg.



WHAT CAUSES BACK PAIN?

As discs lose their water content because of disease or age, they lose their height, bringing the vertebrae closer together. As a result, the nerve openings in your spine become narrow and the discs don't absorb shock as well, particularly when you are walking, running or jumping. Wear and tear, poor posture and incorrect body movements can also weaken the disc, causing disc degeneration. Disc degeneration may cause pain, as well as functional problems such as tingling or numbness in your legs or buttocks, or difficulty walking. Doctors call this degenerative disc disease (DDD).

DISC DEGENERATION

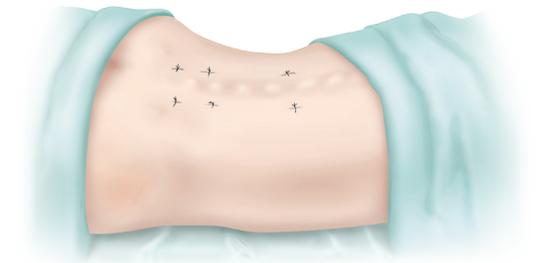


WHAT ARE THE POTENTIAL BENEFITS?

Traditional spinal surgery uses an open approach requiring incisions up and down the middle of the back. Large bands of back muscles are stripped from the spine and pulled to each side for visualization of the spine and easy access to the bones.

With a minimally invasive procedure, surgeons can achieve similar results and objectives of traditional surgery by using imaging systems, tiny cameras, and skin incisions about the size of a thumbnail. Surgeons are able to work precisely in smaller surgical fields with less tissue splitting. This type of procedure can offer patients physical and aesthetic advantages.

Potential patient benefits of minimally invasive surgery versus open surgery include:



- Less cutting of muscles and skin^{1,2,3}
- Smaller scars⁴
- Decreased blood loss^{1,2,3}
- Shorter length of hospital stay¹

WHO IS A CANDIDATE FOR MINIMALLY INVASIVE SURGERY?

Common conditions indicated for this procedure include severe disc degeneration, misaligned vertebrae, or traumatic fracture.