

# Minimally Invasive Lumbar Fusion

## What Is A Minimally Invasive TLIF?

Transforaminal lumbar interbody fusion (TLIF) is a surgical procedure that involves decompressing nerves in the lumbar spine and inserting metal screws and rods to fuse the spine. The name of the procedure is derived from: transforaminal (through the foramen), lumbar (lower back), interbody (implants and bone graft placed between two vertebral bodies) and fusion (spinal stabilization).

In a TLIF, the surgeon accesses the lumbar spine through an incision(s) in the back. The nerves are decompressed by removing nearly all the disc and the facet joints (In a decompression alone, only part of the disc is removed and the facet joints remain intact). The patient's own bone and cadaver bone are then placed around a plastic cage between the vertebral bodies in place of the disc. Screws and rods are inserted to stabilize the spine and allow the bones to fuse both in the front and back of the spine. Terming the procedure a "fusion" is a little bit of a misnomer because the bones do not immediately fuse during or after the procedure. Fusion, or growth of the bones together, does not actually occur for 6 to 12 months following the procedure.

The TLIF procedure avoids anterior access and associated complications, decreases manipulation of neural structures, reduces damage to ligamentous elements, minimizes excessive bone removal, enhances biomechanical stability, and provides early mobilization.

Depending on your condition and specific surgical goals, Dr. Smith may choose to perform this procedure using a minimally invasive approach.

Traditional, open spine surgery involves making a large incision and cutting or stripping the muscles from the spine. This damages the muscles. Instead, a TLIF may be performed using minimally invasive spine techniques. This involves two small incisions and muscle dilation, allowing Dr. Smith to gently separate the muscles surrounding the spine rather than cutting them. This attempts to preserve the muscles. In multiple studies, a minimally invasive procedure has been proven to have a smaller scar, decrease blood loss, lower the risk of infection and other complications, reduce pain, and shorten the hospital stay and overall recovery. In nearly every aspect of the surgery, minimally invasive techniques are better.

## Why Do I Need This Procedure?

A spinal fusion procedure such as a TLIF may be recommended as a surgical treatment option for patients with pain in the lower back, such as degenerative disc disease, spondylolisthesis or spinal stenosis, which has not responded to conservative treatment measures (rest, physical therapy or medication) and cannot be treated with a decompression procedure alone.

The symptoms may include pain, numbness and/or muscle weakness in the low back, hips and legs.

Dr. Smith will take a number of factors into consideration before recommending a TLIF, including the condition to be treated, your age, health and lifestyle and your anticipated level of activity following surgery.

It is extremely important to understand that as we get older, we all develop “changes” in our spines but not all of us have pain or neurologic problems. Your MRI report may mention many of these changes, but not all of them may explain your pain or neurologic problems. Dr. Smith will discuss which of the changes are causing problems and which are not causing problems. As a result, surgery is not intended to make your spine look “perfect” but instead to only address the changes that are causing your problem.

### **How Do I Prepare For This Surgery?**

- 1) **Stop smoking.** If you smoke, try to stop before your surgery. People who smoke have more disc problems and back/ leg pain than people who don't. The complications of surgery are lower and recovery is quicker in non-smokers. Smoking may prevent fusion from occurring.
- 2) **Stop certain medications.** If you are on blood thinners such as Coumadin (Warfarin), Plavix, Pradaxa, Xarelto, Eliquis, notify Dr. Smith and your primary care physician. These medications will need to be stopped prior to surgery and you will need to remain off them for a period following surgery.
- 3) **Weight loss.** If you are overweight, then weight loss before surgery may lower complications and improve your recovery. Discuss with Dr. Smith and your primary care physician if it is recommended for you to try weight loss before surgery and how to go about the weight loss.
- 4) **Ask for time off work.** You will need to be off work for at least 4 to 8 weeks following surgery. It may be longer in certain circumstances. Make arrangements with your employer. We understand the financial constraints of many patients and the need to return to work as soon as possible. But please understand that if you return too early this may impair your healing and limit the beneficial effects of surgery.
- 5) **Stop eating and drinking the night before surgery.** It is standard to stop all food and drink the midnight before your surgery, even if your surgery is not first thing in the morning. You may also be asked to stop certain medications as well. If you are allowed to take some of your medications, you may take them with small sips of water. Definitely no coffee or juices the morning of surgery.

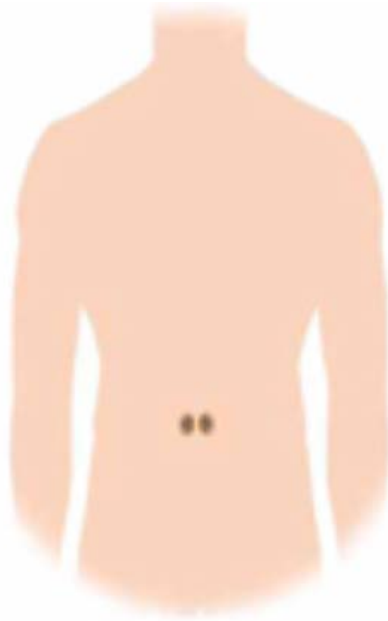
- 6) **Be a little early to the hospital.** The hospital will call you the day before surgery to notify you when to arrive at the hospital. Please be a little early. Dr. Smith performs many surgeries in a day and so your surgery time may be moved earlier than scheduled. Please be near your phone the day before and the day of surgery in case you are called of scheduling changes. Unfortunately, your surgery may also be delayed and we will notify you of this as well.
- 7) **Ask someone to drive you home and be available after surgery.** You will be admitted to the hospital for a few days following surgery, but when you are discharged you cannot drive yourself home. You need to make these arrangements ahead of time.

## How Is A Minimally TLIF Performed?

### The Operation

The operation is performed with the patient positioned on his or her stomach. You are completely asleep for the procedure, which usually lasts for 3 or more hours, depending on how many levels are addressed.





Minimally invasive procedure through two 3cm

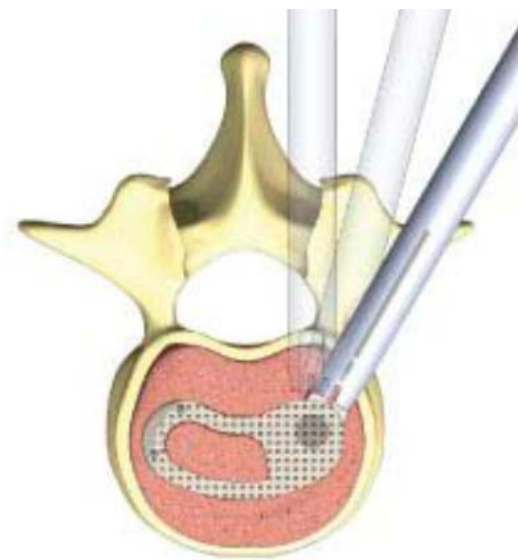


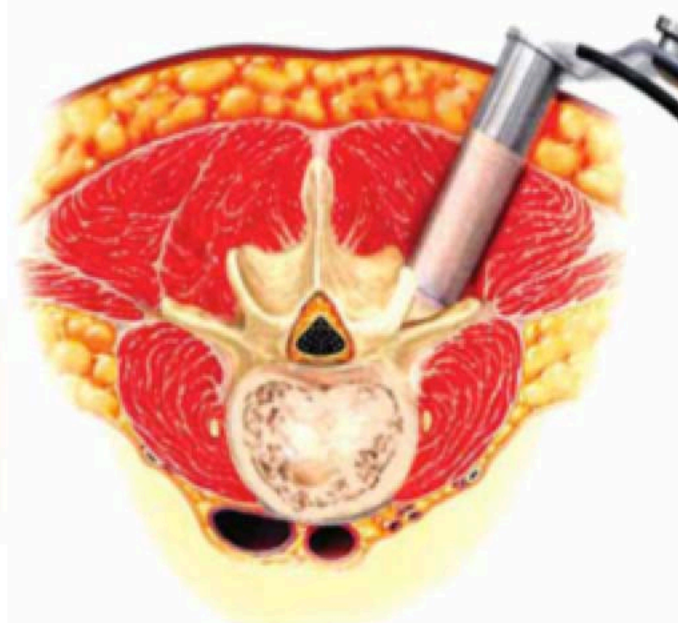
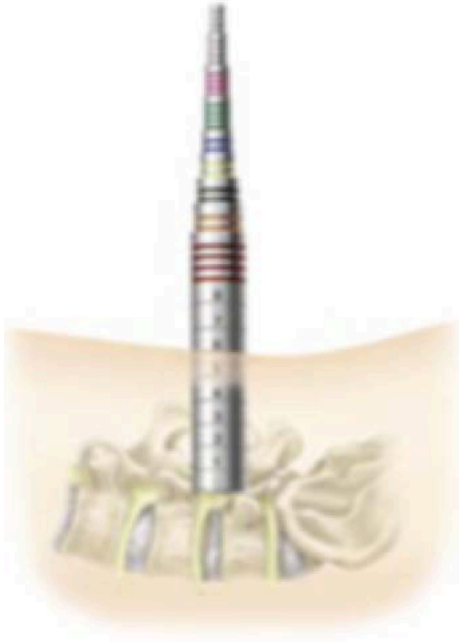
Traditional open procedure through large incision

## Decompression and Fusion

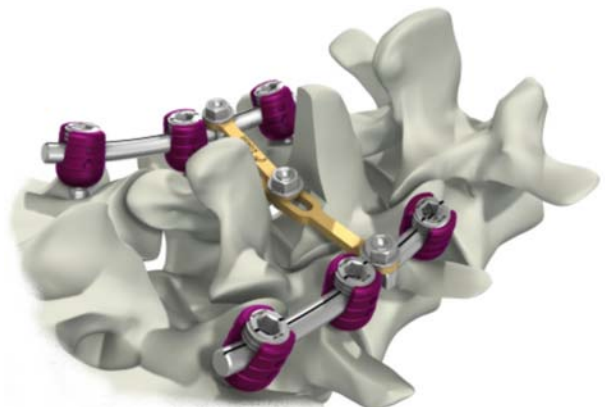
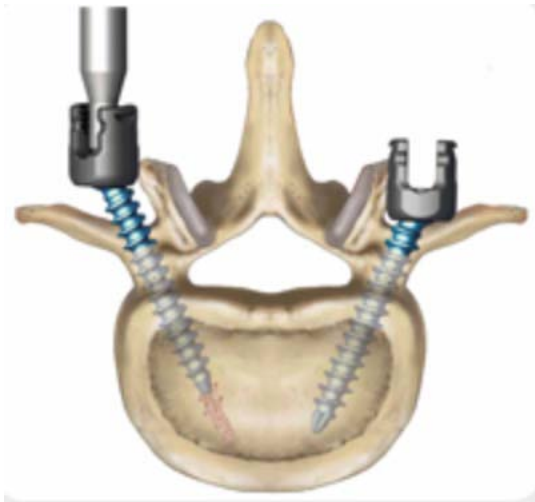
After two small ~ 3cm incisions are made, the muscles of the spine are dilated, or gently separated, and a tubular retractor is inserted through which Dr. Smith may perform surgery. Through the tubular retractor, the bone covering the nerve and the facet joint(s) are removed to decompress the nerves.

The majority of the disc is then removed. Some of your own bone collected from your hip will be mixed with cadaver bone and potentially other materials that promote bone growth. These materials are packed into a plastic cage, which is placed between the vertebra in place of the disc. This acts as a bridge, or scaffold, between the vertebra on which new bone can grow.

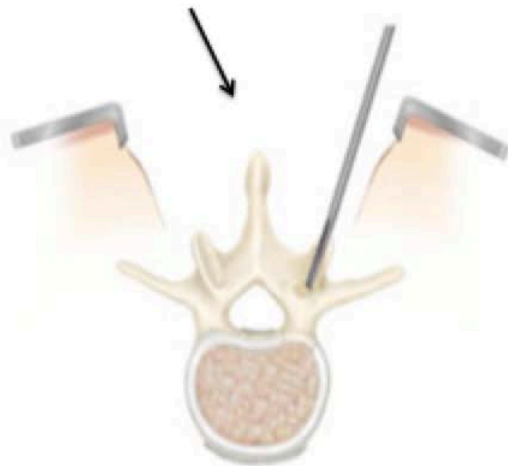




Screws and rods are then inserted to stabilize the spine to act as a “cast” while the bones grow, or fuse, together. It takes 6-12 months after the procedure for the bones to grow together or “fuse”.

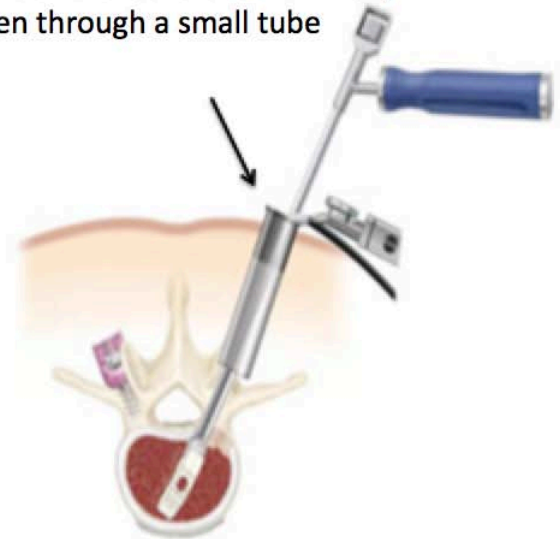


Muscles ripped off the bone and widely spread open



"Open" TLIF

Muscles left on the bone and minimally dilated open through a small tube



Minimally Invasive TLIF

The traditional "open" procedure involves cutting and ripping the muscle off the bone, potentially leading to muscle injury. The new "minimally invasive" version separates your muscle, allowing the muscle to return to its normal position after the tubular retractor is removed at the end of the procedure.

### **What Happens After Surgery??**

You will wake up from surgery in the operating room or recovery area. After about 45 minutes, your family will be allowed to see you. Often the pain you are experiencing before surgery will be better but that is not always the case and sometimes takes longer to improve. You will experience a new soreness and muscle spasms around the incision from the surgery itself. This will improve with time and controlled with pain medications and muscle relaxers. Weakness and numbness often take days to weeks to months to improve. This is an inpatient procedure so you will be admitted to the hospital for 2-3 days. You will be up and walking the day after surgery with your brace.

### **What Happens When I Get Home??**

After 2-3 days you will be discharged home. Sometimes you will need to go to rehab first. You still will be sore following surgery but it is important to be active following, walking and leaving your house occasionally. It will be much harder to fully recover if

you stay in bed or sit in chairs all day. However you must not be too active. You cannot drive a car while in pain or on narcotics. You must avoid bending, twisting or turning and you must wear your brace whenever you sit in a chair or walk. No lifting anything heavier than a gallon of milk. You must leave your bandage on the incision. You may shower the day following surgery but leave the bandage alone, do not remove the bandage and do not submerge the bandage under water. If your bandage comes off on



its own, do not attempt to cover it with your own bandage at home. If you start to see any redness or drainage call our office. You must avoid constipation following surgery. Pain medications and muscle relaxers may make you constipated so start taking a stool softener. If after a few days you still have not had a bowel movement, you may need to take a laxative, enema or even a suppository. It sounds trivial, but prolonged constipation will make you feel awful quickly. You need to make an appointment to see Dr. Smith ~2 weeks after surgery. If you were taking NSAIDs (ibuprofen, advil, aleve, aspirin, etc) before surgery, you must stop them for at least 6 months following surgery as this could prevent the bones from fusing. It is also imperative to completely stop smoking after surgery as this also will prevent your bones from fusing.

If you have any questions after surgery, please call our office between 8:30 and 5pm. If you need medications, remember you need to come to our office to pick them up. We cannot legally call in narcotic or muscle relaxing medications to your pharmacy. So if you are getting low on these medications, call our office ahead of time between 8:30 and 5pm Monday through Friday so you can pick up a prescription. If you take your medication more than we prescribe, we will not refill it early.

### **How Long Will It Take Me To Recover?**

Dr. Smith will explain your recovery program. You will be in the hospital for 2-3 days. Most patients go home but some require rehab. After your 2 week office visit Dr. Smith will discuss how you are progressing. At one month it is possible for you to return to work depending on what type of work and if it can be light duty desk work. You will wear your brace for 2-3 months after surgery and even after the brace is removed we ask you do not bend, twist or turn for up to 6 months. We often do not start formal therapy after surgery until after 3 months when you can be more mobile.

### **Are There Any Potential Risks Or Complications?**

All treatment and outcome results are specific to the individual patient. Results may vary. Dr. Smith cannot guarantee pain or neurologic deficit improvement. It is important to understand the risks to surgery and we have listed some below. Additionally, there may be risks we have not listed.

Risks:

- 1) **Blood loss.** Blood loss is usually very small. But as with any surgery, there is the potential for major or even life-threatening blood loss.
- 2) **Infection.** Even with antibiotics and careful technique, there is still a small risk of developing infection. This could require antibiotics or even further surgery to resolve. Infections may result in residual pain or neurologic deficits including weakness, sensory changes or bowel/bladder incontinence. Unfortunately this could become permanent.
- 3) **Reaction to anesthesia.** Anytime you are given medications you can experience an adverse reaction. Even if given medications you have tolerated in

the past, you can develop new reactions.

- 4) **Cerebrospinal Fluid (CSF) leak.** Your nerves sit in a sac, which contains your nerves and spinal fluid. During surgery the sac may accidentally be punctured or opened. When Dr. Smith observes this he will attempt to fix it during surgery. However the fluid may still leak or Dr. Smith may not see it leaking. This may lead to headaches after surgery. At the surgery site a bump under your skin may occur or the fluid may even leak out of the incision. This could lead to infection or other problems requiring further surgery.
- 5) **Damage to the spinal cord or nerves.** The surgery is performed around your nerves. In the process of decompressing your nerves, injury to the nerves can occur including pain, weakness, sensory changes or bowel/bladder incontinence. Unfortunately this could become permanent. It may require additional surgery to improve.
- 6) **Pseudoarthrosis, hardware failure, or migration.** After surgery the screws and rods could break or loosen in the bone. This may prevent the bones from fusing, or growing together. Sometimes a lumbar fusion is performed unilaterally, or just on one side, which may increase the risk of non-fusion. This is called pseudoarthrosis. Not everyone has symptoms if they do not fuse, but some do including recurrence of pain or neurologic deficits. Sometimes additional procedures are required to help the bones fuse. Sometimes the interbody cage may migrate out of the interspace and this could press into your nerves or surrounding blood vessels. The interbody cage may need to be repositioned or removed.
- 7) **Loss of range of motion.** You will lose some range of motion.
- 8) **Hematoma.** There is always bleeding during surgery and unfortunately a small amount of blood can collect and press into the nerves. This sometimes requires further surgery to decompress.
- 9) **Adjacent level disease.** The surgery involves inserting rods and screws and attempting to make the bones fuse together. This may result in other spinal levels degenerating faster and need for additional surgery.
- 10) **Failure to relieve symptoms.** Dr. Smith will do everything possible to give you the best results with the surgery. However, surgery may not relieve all or any of your symptoms.
- 11) **Reoperation.** As listed above, there are numerous scenarios which may require additional surgery in the future. Whether for reasons listed above or reasons not listed, undergoing surgery now does not preclude you from potentially needing surgery in the future.
- 12) **Death.** As with any surgical procedure, there is a risk of death. This is rare.