

### Description

The spine consists of five separate divisions: cervical (seven vertebrae), thoracic (12 vertebrae), lumbar (five vertebrae), the sacrum, and the coccyx. Each vertebra, interlocks with the segment above and below it through the superior and inferior articular processes. Between each vertebra is an intervertebral disc that provides cushioning for the spine. The lamina and pedicle, along with the vertebral body, provide the borders that create the spinal canal, which the spinal cord runs through to transmit nerve signals.

There are several different scenarios or conditions that may produce symptoms that would lead your physician to further investigate, and possibly recommend this surgery.

### Stenosis causing Radicular Pain

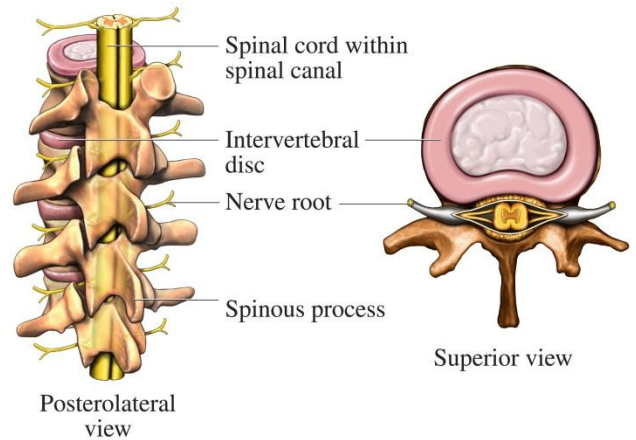
Spinal stenosis is the narrowing of the articular spaces within the spine; this may impinge on the nerves or the spinal cord. This is a degenerative process and may eventually lead to further changes on the spine over time. Radicular symptoms are pain, numbness, weakness, tingling, etc., that radiate along a specific nerve root (or dermatome) to other parts of the body outside of the spine.

Surgical correction of this problem may include a minimally invasive decompression (shaving bone away to create more space around the nerve), often referred to as laminectomy (removing part or all of the lamina in order to provide more space and relieve impingement). In some cases, movement of one vertebrae slipping against another (spondylolisthesis), may require a vertebral fusion. This may be performed open vs. minimally invasive.

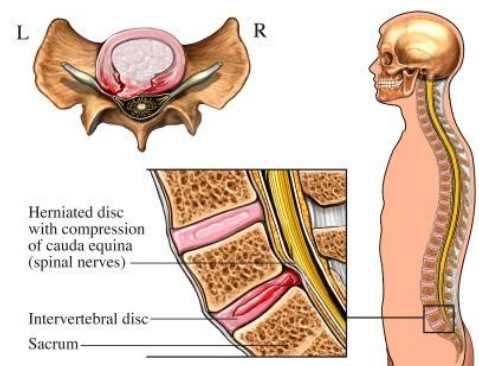
### Disc Herniation

Herniation of the intervertebral disc may be due to an acute traumatic incident. However, it is usually due to a degenerative process that creates a tear in the outer part of the disc called the annulus, causing it to impinge upon nerves, or the spinal cord itself. As the herniation becomes more of a chronic process, it causes increased narrowing, also known as stenosis. This in turn, may create instability in the vertebrae, causing them to slide against each other (spondylolisthesis). This movement can be very painful and if severe enough, requires surgical fusion to stabilize the area and relieve symptoms.

Surgical correction of a disc herniation requires a minimally invasive discectomy, or removal of the disc. Many times this is done in combination with a decompression/laminectomy in order to obtain the best results.



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### Deformities

Some deformities are congenital and some are acquired over time. One of the most common deformities encountered in spine surgery is scoliosis, or curving and/or twisting of the spine. In many cases this is first discovered by a primary care physician during annual health exams. Adolescents and young adults will show a curving and twisting of the spine. Acquired scoliosis is commonly a product of arthritic degeneration of the spine, causing only a curving of the spine. In each case, this deformity can cause pain, as well as visual deformity, and difficulty with movement and breathing. Surgical correction of these deformities will involve an open surgical procedure. Screws will be placed into the vertebrae at each necessary level. A metal rod will then be fit with the screws at each level in order to provide both correction and stabilization of the deformity.

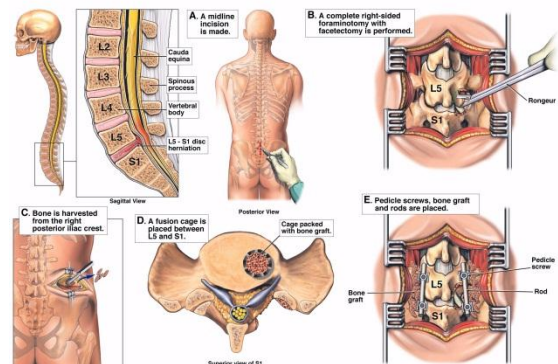
### Nature of Procedure

Lumbar posterior spinal fusion is a procedure used for treating several lower back conditions. It involves fusing two or more vertebra of the lumbar spine (lower back). Lumbar posterior spinal fusion can be used to treat scoliosis (abnormal curvature of the spine), spondylolisthesis (slippage of a lumbar vertebrae on another), lumbar fracture, painful degenerative disc disease (arthritis of the back), and recurrent disc herniation (slipped disc, recurrent sciatica).

Lumbar posterior spinal fusion can be performed several ways. The method of fusion chosen by the surgeon is tailored to each individual and dependent on several factors. These include the patient's disease, overall health, weight, spine anatomy and the surgeon's preference.

Most posterior spinal fusion surgeries involve one or more incisions in the back. The size or number of incisions is determined by the technique and the type of surgery chosen by the surgeon. Screws, rods and sometimes cages are usually inserted into the spine to facilitate fusion. The screws, rods and cages support the spine while the fusion heals.

Bone graft is also placed in the spine during a posterior spinal fusion. Bone graft is obtained from several sources. Most often, it is obtained from a donor (allograft). Bone can also be obtained from the patient (autograft). When autograft is used, the bone is typically obtained from the iliac crest (pelvic bone) or from the spine (bone removed from the spine during fusion surgery). If bone graft is taken from the iliac crest, a separate incision may be required.



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### Possible Complications and Instructions

Surgery is undertaken to improve your condition. In all procedures, there are anticipated benefits and inherent risks. While your surgeon and team will do everything possible to minimize those risks, it is important for you to be aware of the more common risks.

Many of these risks are altered by preexisting patient conditions such as diabetes, obesity, smoking, vascular disease, etc. You may have undergone preoperative medical evaluation to limit the effect of these conditions. The potential risks include, but are not limited to, complications associated with having anesthesia (for example, reaction to medications, and difficulty with airway). Your anesthesia provider will be able to give you further information regarding this matter.

The more common complications following any surgical procedure are urinary tract infections, atelectasis (collapsed airspaces in the lungs), pneumonia and wound infection or bleeding. Such complications may require surgical interventions.

Less frequent, but more serious complications include thrombosis or blood clots in the blood vessels of the arms, legs, or pelvis. They may lead to pulmonary embolus (clot to the lungs). Other such complications include blood loss, which may require transfusion of blood products, heart attack, stroke, or even death.

The risks of the surgery may include damage or irritation to the nerves that may be temporary or permanent. This may cause numbness, weakness, or pain in the involved arm or leg.

There is also the possibility of paralysis, loss of bowel or bladder function, sexual dysfunction, deep infections requiring chronic antibiotic therapy, meningitis, stroke, blindness, chronic pain and additional surgery.

You should be aware that surgery has no assurances and individual results are variable. Your participation with the post-operative instructions and your current health does influence the outcome of surgery. Certainly, your surgical team will try their best to get the most optimal result for you.

Some of the risks more specific to your surgical plan include:

Bone graft is used to accomplish a fusion. This bone can come from a donor, or it can come from the patient. Donor bone goes through a rigorous process of screening and sterilization and risk of disease transmission is extremely low. If your bone is being used, you can expect to have some numbness and pain over the area where the bone will be harvested. Pain from the donor site is expected, but it usually subsides with time.

Bone morphogenic protein is a protein which is sometimes used to help the donor bone in the fusion process. While this protein has been extensively tested, there has been some controversy around its use. Other potential side effects can occur, which you should discuss with your surgeon if you will be receiving bone morphogenic protein.

If you are having spinal instrumentation to stabilize your spine during fusion, the hardware may become loose or cause pain, which may require these to be removed at a later date.

There is a risk that your vertebrae will not fuse or heal. If this occurs, additional surgery may be required.

Manipulation of the spinal nerves includes a risk to the covering of the spinal nerves, which may cause a leak of spinal fluid. This may require repair, additional days of bed rest, or revision surgery. Scar tissue can form around/within the nerves, which may be painful and may require further treatment. After surgery, there is a chance that you may develop a disc herniation or further pressure on the nerves at the surgical level. This may require further treatment. Further surgery may be required to repair instability after your initial surgery.

There is also a low chance of injury to nerves from the instrumentation and hardware, which may require revision surgery.

Feel free to contact our office if you feel you are experiencing any of these complications.

### **Preparing for surgery**

#### **Medical Evaluation**

In preparing for your spine surgery, we may ask you to have a complete physical examination done by your primary care doctor before your surgical procedure. This is necessary to assess your health and identify any conditions that can interfere with your surgery or recovery. We may need additional clearances if you also receive medical care from a specialist like a cardiologist or urologist.

#### **Tests**

Several tests may be needed to help plan your surgery: blood and urine samples may be tested. An electrocardiogram (EKG) and chest x-rays (radiographs) may be obtained.

#### **Medications**

Tell your orthopedic surgeon about the medications you are taking. Your orthopedist or your primary care doctor will advise you which medications you should stop or can continue taking before surgery.

#### **Weight Loss**

If you are overweight, your doctor may ask you to lose some weight before surgery to minimize the stress on your joint and possibly decrease the risks of surgery.

#### **Dental Evaluation**

Although infections after spine surgery are not common, an infection can occur if bacteria enter your bloodstream. Because bacteria can enter the bloodstream during dental procedures, you should consider getting treatment for significant dental diseases (including tooth extractions and periodontal work) before your spine surgery. Routine cleaning of your teeth should be delayed for several weeks after surgery.

#### **Urinary Evaluation**

Individuals with a history of recent or frequent urinary infections and older men with prostate disease should consider a urological evaluation before surgery.

#### **Social Planning**

You will need some help with tasks such as cooking, shopping, bathing and laundry in the weeks following your surgery. Please arrange for a support team to help you with these tasks.

### **What to expect at surgery**

You will arrive at the surgery registration area where the registration clerk will check you in. All of your insurance information will be verified and you will be escorted to the pre-operative area. You will change into a hospital gown and support stockings. All of your personal items will be marked and placed in a bag for safekeeping. They will be returned to you after surgery.

Your nurse will usually check your blood pressure, heart rate, temperature, respiratory rate and oxygen level. You will also have a chance to empty your bladder before surgery. Your surgical site will be cleaned and an IV (intravenous) line will be placed to administer fluids. This line provides fluids to your body and allows access to administer medications during and after surgery.

You may find that you are asked to repeat information several times or be asked the same questions throughout your stay. This is for your safety. Every team member is dedicated to making your safety of primary importance.

### **Pre-Operative**

Your anesthesiologist will meet with you in the pre-operative area. He or She will discuss with you the available types of anesthesia and answer any questions you may have. Your surgeon will greet you and mark the area of your operative site. Once you have been prepared in the pre-operative area, you will be brought back to the operating room.

### **Operating Room**

You will meet many people in the operating suite, all of whom play an important part in your surgery. You will be assisted by your team onto the operating table and made comfortable. Your team will help to position you and prepare your surgical site. The anesthesiologist begins by giving the medications and you will fall asleep.

There will be a designated area for your family and friends to wait while you are having surgery. A member of our healthcare team will be available to keep your family and friends updated about your progress. Your surgeon will also talk with them when completing your surgery.

After your surgery has been completed, you will be transported to the post-anesthesia care unit (PACU).

### **Post Anesthesia Care Unit: PACU**

Here, the nursing personnel will place you on monitors to follow your blood pressure, heart rate, oxygen levels, alertness and will check your pain level. The PACU is an important transitional place before you go to your hospital room. Making sure you are comfortable and all of your vitals are stable is the PACU's main purpose. Pain medications will be administered as needed through your IV line. You may experience some nausea and medications are available to assist with your nausea. Warm blankets are also available to ensure your comfort.

Your family and friends will be notified of your progress. Once you are stable and your PACU team feels you are ready, you will be taken to your hospital room. Your family will be notified and may join you in your room.

### **Pain Management**

After surgery, it is normal to have pain or discomfort. Inform your nurse if you are uncomfortable and they can administer the appropriate medications. Your nursing team will also provide you with ice packs and instruct you on the amount of time you can ice the area. You may be asked to rate your pain on a scale of 1 to 10, with 10 being the worst pain. If your pain is not being relieved with the ordered medications, your surgeon will be notified. The goal is to control your pain so that you can begin therapy immediately after surgery and start the road to recovery.

If you are not nauseated after surgery, you will be able to start oral pain medications immediately. Otherwise, you may receive intravenous medications. By post-operative day one, it is preferred to manage your pain with oral pain medications. Your oral pain medications will give you longer lasting pain relief and allows you to feel less groggy and actively participate in therapy.

### **Therapy**

Therapy is an important part of your hospital stay and vital to your overall success after surgery. The therapy team will work with you during your stay. They will assist you with general mobility, improving your strength and overall condition. If surgery is uncomplicated, you will be encouraged to begin walking as soon as possible.

### **Care After Surgery**

You may be placed in a brace after surgery.

After a posterior spinal fusion, you usually stay in the hospital for one or more nights. The duration of hospital stay depends on the type of surgery and your health. When you are stable and your pain controlled, you can be discharged home. Certain patients may be discharged to a rehab center to recover further before they eventually go home.

You may shower on the third day after surgery as long as the wound is not draining. You should keep the incision clean and dry.

Follow up after surgery with your surgeon is required, and x-rays will be performed from time to time.

### **Physical Therapy and Activity**

You will slowly begin to increase your activities as tolerated.

You will be encouraged to walk often, being careful not to do any excessive bending, lifting, or twisting. Outpatient rehab usually starts six weeks after surgery. For specific instructions, speak to your surgeon.

### **Ice**

Ice therapy may continue to provide comfort, decrease swelling and help with pain control for up to two weeks following surgery. Be sure to place a towel between the skin and the ice bag. Ice the area for 20 minutes or less to prevent frostbite.

### **Blood Clot Prevention**

After an orthopedic surgery, patients are at an increased risk for developing blood clots or deep venous thrombosis (DVT). Upon discharge, you will be given a specific regimen that may include aspirin or prescription blood thinners. It is important to follow the instructions exactly and attend all scheduled follow-up appointments. You should wear the compression stockings (TED hose) for 3 weeks, or as directed. Staying active as reasonably possible will also decrease your chances of forming a blood clot and improve your overall health as well. Let pain be your guide when deciding on what activities you can participate in.

***Symptoms of deep venous thrombosis or pulmonary embolism may include*** swelling or tenderness in the calves, legs or arms, shortness of breath, increased heart rate or palpitations, or chest pain. If you experience any of these symptoms, notify your surgeon and go to an emergency room.

### **Wound Care**

You have a surgical wound that requires daily attention and monitoring. Your healthcare team will instruct you about how to care for your wound before you leave the hospital. Please keep your incision clean and dry at all times. Do not immerse your incision in water. This includes pools, hot tubs, lakes, and bath water. You may shower on the third day after surgery as long as the wound is not draining.

Do not apply any lotions, creams or ointments unless prescribed by your surgeon. Your healed wound is new skin and should be protected from the sun with sun block especially in the year following surgery. Monitor your incision daily for any signs of infection. Some swelling and redness is normal but if there is an increase or if you develop any of the symptoms below, notify your surgeon.

***Symptoms of a wound infection may include*** redness, drainage, swelling, warmth at/around the incision site or if you experience chills, shaking, an increase in pain or a fever over 101° orally. If you experience any of these symptoms, notify your surgeon immediately.

A follow-up appointment will have already been scheduled for you 10-14 days following surgery for an incision check and removal of any sutures.

### **Preventing Infection**

Following your surgery, antibiotics should be taken before any dental or invasive procedure (i.e. dental cleaning, oral surgery, bladder scopes, urinary catheterizations, colonoscopy, etc.). Your surgeon will give you exact instructions after surgery. Please feel free to contact our office with any questions.

**Symptoms of possible infection are** persistent fever (higher than 101° orally), shaking, chills, increased redness/tenderness/pain at surgical site.

### **Diet**

Some loss of appetite following surgery is common. Make sure you are eating a balanced diet rich in protein to promote muscle healing and strength. It may help to eat smaller meals more frequently and drink plenty of liquids. If you cannot manage solid foods, try a nutritional meal replacement drink. If you are still experiencing problems with your appetite after one week, call your surgeon. Some surgeries may require an altered diet for a short period of time after. Your healthcare team will assess your needs and provide education regarding specific recommendations.

### **Medications**

Resuming your home medications will be determined by your physician. Please follow up with your primary care physician to ensure you are back on your prior medication regimen.

### **Pain Medications**

After an orthopedic surgery, most patients will require prescription pain medications, including narcotics, to treat their post-operative pain. Narcotic pain medications are controlled substances and need to be monitored closely. With chronic use, they pose a risk for addiction. Patients should treat their pain only as needed with these medications and wean off narcotics in the first few weeks following surgery. These medications can cause side effects, which may include nausea, lightheadedness, confusion, sedation, urinary retention and constipation. To avoid constipation increase your water intake, eat well-balanced meals that include fruits and vegetables and incorporate an over-the-counter stool softener such as Docusate or Senna.

If you require a refill of your narcotic pain medication, please notify your surgeon early. Federal law prohibits filling most narcotics by phone; a written prescription is needed. Narcotic pain medications cannot be renewed after hours or on the weekends. If you have questions about your prescriptions, pain or find that your pain is not relieved by your medication, please notify your surgeon.

### **Questions**

The CORE Institute is dedicated to your outcome. If any questions or concerns arise, please call The CORE Institute at 1.866.974.2673.