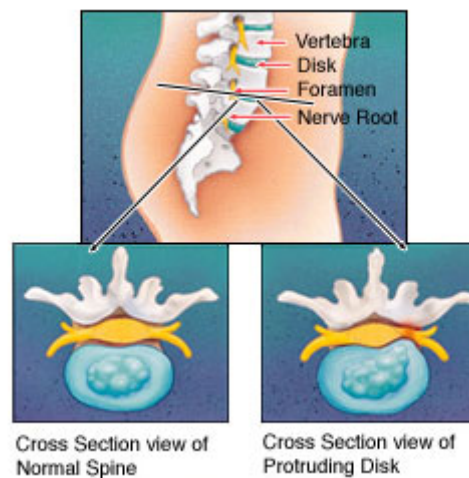


Spinal Fusion

Spinal fusion is a surgical procedure used to correct problems with the bones (vertebrae) of the back (spine). The spine is stabilized by fusing together two or more vertebrae, using bone grafts and metal rods and screws.

Spinal fusion is used to treat:

- Injuries to spinal vertebrae
- Protrusion and degeneration of the cushioning disk between vertebrae (sometimes called slipped disk or herniated disk)
- Abnormal curvatures of the spine (such as scoliosis or kyphosis)
- Weak or unstable spine caused by infections or tumors



Cross-section of a normal spine (inset left) and cross-section of a protruding disk (inset right).

Spinal fusion eliminates motion between vertebral segments, which can be a significant source of pain in some patients. The surgery also stops the progress of spinal deformity, such as scoliosis.

Spinal fusion will take away some spinal flexibility. But most spinal fusions involve only small segments of the spine and thus do not limit motion very much.

More than 325,000 spinal fusions were performed in 2003. About 137,000 procedures involved the upper (cervical) spine. About 162,000 involved the lower (lumbar) spine.

Technique

Bone Grafting

Bone is the most commonly used material to help promote fusion of the vertebrae. Generally, small pieces of bone are placed into the space between the vertebrae to be fused. Sometimes larger solid pieces are used to provide immediate structural support.

The bone is either supplied by the patient (autogenous bone) or harvested from other individuals (allograft bone).

Autogenous bone is generally better at promoting fusion, but it requires extra surgery to remove bone from the patient's hip. Allograft bone, on the other hand, is readily available from bone banks. Bone-graft substitutes are being developed, but have yet to be proven as cost-effective substitutes for autogenous bone graft for general use.

Immobilization

After bone grafting, the vertebrae are held together to allow fusion to progress. The bones are held immobile with metal rods and screws. External bracing or casting may also be used. Both forms of immobilization may be necessary in some patients.

Is Low Back Surgery for You?

If you have persistent back pain or pain in your thigh, buttock, or leg; numbness or tingling in your leg; and/or weakness in your leg, and it does not respond to conservative, nonsurgical treatment, your family doctor can refer you to an orthopaedic surgeon for an evaluation.

You and your orthopaedic surgeon will determine whether you would benefit from low back surgery that relieves pressure on the nerves in the spinal cord and/or stabilizes the spine.

The Orthopaedic Evaluation

The orthopaedic evaluation consists of four components:

- **A medical history**, in which your orthopaedic surgeon gathers information about your general health and asks about your symptoms.
- **A physical examination** to assess the stability, strength, alignment and motion of your back, as well as a neurologic evaluation.
- **Diagnostic tests** such as radiography (X-rays), which may be obtained to evaluate the bones and structure of your spine. MRI (magnetic resonance imaging) may be arranged to provide more detailed information about the spine. MRI, unlike radiography, uses no radiation to create images. A myelogram also may be requested. (Myelography uses X-ray imaging and an injected dye to define bony and soft-tissue structures affecting the nerve root.) Other imaging studies such as CT (computed tomography) may also be arranged; CT provides details about the bones and soft tissues not seen on regular X-rays.
- **Discussion** by you and your orthopaedic surgeon of the findings of the physical examination and diagnostic evaluation and the treatment for your condition. Initially, medication and physical therapy may be prescribed to reduce inflammation at the site of the pain and to strengthen the muscles supporting the spinal column. If you are overweight, a weight reduction program may be suggested. In addition, you will be encouraged to begin a regular aerobic exercise program once your problem has been corrected.

Preparing for Surgery

You may be asked to stop taking certain medicine or to stop smoking to prepare for surgery. Depending on your age and general medical fitness, you may be asked to undergo a general medical checkup by your family doctor.

Medication

Some medicines may interfere with or affect the results of your surgery. They may cause bleeding or may interfere with the effects of your anesthesia. These medications include aspirin and nonsteroidal anti-inflammatory drugs. Your doctor may ask you to stop taking the medication before your surgery.

Donating Blood



Donating blood usually is not necessary for most low back surgery that does not include fusing vertebrae together. However, there is always a chance that some blood loss will occur during surgery. Your doctor will discuss the advantages and disadvantages of donating your own blood compared with using someone else's blood. If you decide to donate your own blood, your doctor may prescribe an iron supplement to help build up your blood before surgery.

Advance Planning

You will be able to walk after surgery, but you may need to arrange for some help with washing, dressing, and household activities, such as cleaning, laundry, and shopping, for a few days after your return home. Your orthopaedic surgeon will probably recommend that you do not drive a car for a period of time after surgery. You will need to arrange for transportation to and from your hospital appointments and to other places that you need to go during this time. You should consult your doctor before taking car trips.

Considerations

The incidence of complications after low back surgery is low. Risks for any surgery include bleeding and infection. For spinal fusion surgery, complications include difficulties with urination (retention) and temporary decreased or absent intestinal function. Major complications that can occur include, but are not limited to:

- Infection
- Heart attack
- Stroke
- Blood clots
- Recurrent disk herniations

Although rare, new nerve damage can occur as a result of this surgery. These complications may result in pain and prolonged recovery time.

Your Surgery



Patients usually are admitted to the hospital on the day of surgery. After admission, you will be taken to the preoperative preparation area where you will be interviewed by a doctor from the anesthesia department, who will review your medical history and physical examination reports. You and your doctor will discuss the type of anesthesia to be used. (Sometimes this is done during an outpatient visit up to 7 days before your surgery.) The most common types of anesthesia used for low back surgery are general (you are asleep for the entire operation) or *spinal* (you may be awake but have no feeling from your waist down).

The surgical procedure usually takes from 1 to 3 hours, depending on your problem. Your orthopaedic surgeon will remove a portion of bone and ligament overlying the nerve roots and will remove displaced disk material to relieve pressure on the nerve roots. Fusion is sometimes done at the same time, if an instability (*spondylolisthesis*) is present.

When your surgery is completed, you will be moved to the recovery room, where you will be observed and monitored by a nurse until you awake from your anesthesia. You will have an intravenous (IV) line inserted into a vein in your arm. You also may have a catheter inserted into your bladder to make urination easier.

When you are fully awake and alert, you will be taken to your hospital room. Your IV line and catheter will be removed soon after.

Rehabilitation

There is usually pain for the first few days after surgery. Pain medication will be given regularly, perhaps by a patient-controlled analgesia. You will probably require a urinary catheter.

The fused spine must be kept in proper alignment. You will be taught how to move properly, reposition, sit, stand, and walk.

While in bed, you will be instructed to turn frequently using a "log rolling" technique. This maneuver allows your entire body to move as a unit, avoiding twisting of the spine.

You may be discharged from the hospital with a back brace or cast. Your family will be taught how to provide care at home.

Your Recovery at Home

After your discharge from the hospital, you will need to follow your doctor's orders exactly to ensure a successful recovery. You should arrange for transportation home that will allow you to ride in a leaning

back or lying down position. You may do as much for yourself as you can as long as you maintain a balanced position of your spine. You should not stay in bed during the day. Do not hesitate to ask for help from your family members or friends if it is needed. If necessary, arrangements can be made for a home health aide.

Wound Care



Your wound may be closed with stitches (*sutures*) or staples, which will be removed approximately 2 weeks after surgery. If the wound is clean and dry, no bandage is needed. If drainage continues after you are home, the wound should be covered with a bandage and a call made to your surgeon.

Diet

Some loss of appetite is common. Eating well-balanced meals and drinking plenty of fluids are important. Your doctor may recommend an iron supplement or vitamins before and after your surgery.

Activity

Loss of energy is frequently experienced after major surgery, but this improves over time. An exercise program designed to gradually increase your strength and stamina may be prescribed. Initially, your doctor will recommend that you should only participate in walking. Later, your doctor will encourage you to swim or use an exercise bike or treadmill to improve your general physical condition.

Avoiding Problems After Surgery

It is important that you carefully follow any instructions from your doctor relating to warning signs of blood clots and infection. These complications are most likely to occur during the first few weeks after surgery.

Warning signs of possible blood clots include the following:

- Swelling in the calf, ankle or foot
- Tenderness or redness, which may extend above or below the knee
- Pain in the calf

Occasionally, a blood clot will travel through the blood stream and may settle in your lungs. If this happens, you may experience a sudden chest pain and shortness of breath or cough. If you experience any

of these symptoms, you should notify your doctor immediately. If you cannot reach your doctor, someone should take you to the hospital emergency room or call 911.

Infection following spine surgery occurs very rarely. Warning signs of infection include:

- Redness, tenderness, and swelling around the wound edges
- Drainage from the wound
- Pain or tenderness
- Shaking chills
- Elevated temperature, usually above 100°F if taken with an oral thermometer

If any of these symptoms occur, you should contact your doctor or go to the nearest emergency room immediately.

After Recovery



After you have recovered from your low back surgery, you may continue to have some achy pain in your lower back; this may be persistent. You can reduce the pain by staying in good physical condition. If you are overweight, you should enroll in a program to help you lose weight and keep it off.

Your doctor will evaluate you after your surgery to make sure that your recovery is progressing as expected.

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