Spinal Fusion

(Spinal Arthrodesis; Vertebral Interbody Fusion; Posterior Lumbar Interbody Fusion; Transforaminal Lumbar Interbody Fusion; Anterior Lumbar Interbody Fusion; Posterolateral Lumbar Fusion)

Definition

A spinal fusion is a surgery to weld together two or more vertebrae. Vertebrae are the bones that make up the spine.

There are several different types of spinal fusions based on factors, such as the part of the spine involved, placement of the incisions, and the parts of the vertebra that are initially fused. All fusion surgeries include the use of a graft that is made of bone material. It stimulates healing and encourages the two bones to heal together into one solid bone. The graft may be a piece of bone from the hip, a piece of bone from a cadaver, or artificial bone material.

Reasons for Procedure

Spinal nerves exit the spine between the vertebrae. Damage to the vertebra and the disc that sits between them can put extra pressure on these nerves. The irritated nerves can cause pain and weakness in the areas of the body affected by the nerve. Spinal fusion may be considered if all other methods of treatment (medication, rest, physical therapy) have not been able to relieve pain or disability. A spinal fusion removes damaged tissue and locks the two vertebra in place to prevent irritation of the spinal nerve between the vertebrae.

Medical conditions that may lead to spinal fusion include:

- **Spinal stenosis** —narrowing of the canal that the spinal cord runs through
- Spinal injury, including vertebral fractures
- **Spondylolisthesis** —vertebra is out of line with the others
- **Scoliosis** —abnormal curve in the spine
- Weak or unstable spine, usually due to infection or tumors
- **Herniated disc**

Possible Complications

Problems from the procedure are rare, but all procedures have some risk. Your doctor will review potential problems, like:

- Bleeding
• Infection
• Incomplete fusion of the bones
• Blood clots
• Hematoma—a build-up of blood in the wound
• Nerve damage causing pain, numbness, tingling, or paralysis
• Impaired bowel and/or bladder function
• Reaction to anesthesia

Before your procedure, talk to your doctor about ways to manage factors that may increase your risk of complications such as:

• Smoking
• Drinking
• Poor nutrition
• Chronic disease such as diabetes or obesity

**What to Expect**

**Prior to Procedure**

Your doctor may do the following:

• Physical exam, especially of the back and neck
• Imaging studies to examine the structures and plan surgery, including:
  • X-ray
  • MRI scan
  • Myelogram
  • CT scan

Before your surgery:

• Talk to your doctor about your medications. You may be asked to stop taking some medications up to 1 week before the procedure.
• Arrange for a ride home and for help at home.
• Eat a light meal the night before surgery. Avoid eating or drinking anything after midnight.

**Anesthesia**

*General* or *spinal anesthesia* may be used. With general anesthesia, you will be asleep. Spinal anesthesia will numb an area of your body, but you will be awake.

**Description of Procedure**

Spinal fusion can be done by open surgery or using a minimally invasive technique. The exact steps will depend on the type of spinal fusion that is being done. Some examples include:

**Interbody fusion** uses the surfaces in between the vertebra for fusion. The disc in between the vertebrae is either partially or completely removed. A cage (spacer) will be placed between the vertebra where the disc was removed. The cage may be made of plastic or metal. It may also contain graft material that will help the bones heal and fuse
together. Metal screws and plates may then be placed on the outside of the vertebra to help stabilize the bones. There are 3 types of interbody fusion based on the approach to the area:

- **Posterior lumbar interbody fusion (PLIF)**—the incision is made in the back. To access the spinal bones, the surgeon must move muscles and nerves out of the way. Part of the spinal bone covering the spinal column, called the lamina, may be removed so the surgeon can access the area between the vertebra. The cage is inserted from the back of the spine.

- **Transforaminal lumbar interbody fusion (TLIF)**—the incision is made from the side. This allows access to the vertebra without a lot of movement to the muscles and nerves. It also does not require removal of any bone covering the spinal column.

- **Anterior lumbar interbody fusion (ALIF)**—the incision is made in the lower abdomen. Organs and blood vessels are moved aside so that the surgeon can access the vertebra. The muscles and nerves of the spine do not have to be moved. The cage is inserted through the front part of the spine. No surgery is done on the outside of the vertebra.

Another option called **posterolateral fusion** starts the fusion on the outer surface of the vertebra. An incision is made in the back. The muscles are pushed aside to access the vertebra. Damaged bone and structures may be removed to relieve pressure on spinal nerves. A graft material will be placed along the outside of the vertebra to encourage bone healing and growth, and stimulate the fusion. Titanium screws and rods may also be used to help stabilize the bones while they heal. This option may also be used to treat scoliosis.

With all surgeries, the incision will be closed with stitches or staples.

**Lumbar Fusion**

![A metal cage filled with bone graft is placed between lumbar vertebrae.](image)

*Copyright © Nucleus Medical Media, Inc.*

**How Long Will It Take?**

4-6 hours (sometimes longer)

**How Much Will It Hurt?**

Anesthesia will prevent pain during surgery. Pain and discomfort after the procedure can be managed with medications.
Average Hospital Stay

3-4 days (sometimes less, sometimes more, depending on age, overall health, and extent of surgery)

Post-procedure Care

At the Hospital

You may receive the following care at the hospital:

- Pain medication
- Back brace or cast
- Lessons on how to properly move, sit, stand, and walk
- Lessons on how to turn in bed without twisting the spine
- Physical therapy
- Special socks or boots to help prevent blood clots
- You will be shown how to move and exercise your legs while in bed
- You will be encouraged to get up and walk around several times a day

During your stay, the hospital staff will take steps to reduce your chance of infection such as:

- Washing their hands
- Wearing gloves or masks
- Keeping your incisions covered

There are also steps you can take to reduce your chances of infection such as:

- Washing your hands often and reminding visitors and healthcare providers to do the same
- Reminding your healthcare providers to wear gloves or masks
- Not allowing others to touch your incisions

At Home

It will take several months to a year for the bones to fully fuse, but symptoms may improve earlier. During recovery, it is important to follow posture and activity recommendation to help the bones stay in proper alignment.

Certain activities like heavy lifting, twisting, or strenuous activities will need to be avoided during recovery. Assistance with daily activities may be needed. Physical and occupational therapists can demonstrate how to do certain activities without placing stress on the back. Some limitations may need to be followed even after recovery. The fusion will limit some flexibility of the spine but the difference should not make a significant impact on daily activities.

Time off from work ranges from 4-6 weeks to 4-6 months. The length of time depends on your age, overall health, and the physical demands of your job.

Rehabilitation

Rehabilitation may be done in a hospital or at an outpatient clinic. The program will likely include:

- Education on tools or devices to help with daily activities during recovery
Exercises to strengthen your back
Low-impact aerobic exercises, such as walking or swimming

Following your rehabilitation program will speed your recovery and reduce discomfort.

Call Your Doctor

It is important for you to monitor your recovery after you leave the hospital. Alert your doctor to any problems right away. If any of the following occur, call your doctor:

- Signs of infection, including fever and chills
- Redness, swelling, increasing pain, excessive bleeding, or discharge from the incision site
- Persistent nausea and/or vomiting
- Pain that you cannot control with the medications you've been given
- Cough, shortness of breath, or chest pain
- Joint pain, fatigue, stiffness, rash, or other new symptoms
- Numbness, tingling, pain, or weakness, especially in the arms, hands, legs, or feet
- Pain, swelling in your feet, legs, or calves
- Loss of bladder or bowel function
- Pain, burning, urgency, frequency of urination, or persistent blood in the urine

If you think you have an emergency, call for emergency medical services right away.

Last Reviewed: November 2015 Warren A. Bodine, DO, CAQSM
Updated: 12/20/2014