

Spinal Fusion

Spinal fusion is a process in which pieces of bone, screws and rods are used to connect two vertebrae together. It is designed to stop painful motion between vertebrae. There are many different techniques and approaches to this surgery, but they all involve a bone graft between two or more vertebrae, and sometimes, extra supplementary hardware like screws and cages.

The bone for the graft comes from the patient (autograph), or a "bone bank" (allograph). The bone in autograph's tend to heal better, but allograph's alleviate the need for an extra incision in the patient to obtain a piece of bone. An allograph is associated with less pain while the autograph is more reliable and predictable. Currently there is research into synthetic bone substitutes that seem to be promising. (OP 1 , tricalcium phosphate)

Once the bone graft is inserted, it provokes a biological response that makes the vertebrae and the bone graft fuse into one long bone. This increases the stability of the segment of the spine and eliminates the motion between the two vertebrae that was causing pain.

A spinal fusion can be performed on many different "levels". This refers to how many vertebrae are fused together. A one-level fusion fuses two vertebrae and one disc together. A two-level fusion fuses three vertebrae and two discs together. A three-level fusion fuses four vertebrae and three discs together.

The operation can be performed in several different ways. The surgery can be done from the back (posterior), from the the front (anterior), or in some cases, both. The surgeon decides which approach is best based on tests and examinations done prior to surgery based on the patient's unique condition.

Indications

Fusion is used when abnormal or excessive motion in a segment of the spine is creating pain. Some of the conditions that commonly create pain that fusion could be helpful for are:

- Cervical disk herniations
- Spondylolisthesis (slipped vertebrae)
- Scoliosis (S shaped spine)
- Fractured vertebra
- Lumbar deformity
- Instability
- Pain

A patient could have one of these conditions concurrently with spinal stenosis. That is when a spinal fusion is coupled with a decompressive surgery such as a [laminectomy](#) or [laminotomy](#).

Risks

As with any other surgery, there are possibilities for complications but these tend to occur less than one percent of the time. The complications that do arise are the same type as in other surgeries, such as:

- Infection
- Bleeding
- Anesthetic problems

Other risks include:

- Urinary difficulties
- Absent or decreased intestinal function

There is also a five to ten percent chance that fusion will not occur. This is more likely in people who either: smoke, are obese, or have undergone radiation therapy for cancer. Also, in twenty percent of the surgeries, the lower back pain symptoms continue to occur. This becomes more likely the greater the number of vertebra fused. If too many vertebra are fused then this could create more pain from inflexibility than originally was present before the operation.

Success Rate

There have been several studies on the success rate of spinal fusion, and they all give general success rates above ninety percent. This means that ninety percent of the time successful fusion is obtained. However, even when fusion is successful, there is rarely a one hundred percent cure to all pain and discomfort. Patients can expect a long term solution to most if not all of their back pain problems. It is not a quick fix.

The healing process after the operation is prolonged. It takes weeks to recover from the pain of the surgery, and then months, maybe even a year, to regain mobility and abilities the patient had before the surgery. A well maintained physical rehabilitation schedule and good nutrition, as recommended by a physician, greatly increase the results and time it takes to obtain them.

Fusion does create more support and stability in the spine, but does not allow for natural movement between the two vertebrae after the procedure. This also puts more stress on the vertebra below and above the fusion.