

# Spinal Stenosis Symptoms, Diagnosis and Treatment

The term “stenosis” comes from Greek and means a “choking”. **Spinal stenosis**, however, has little in common with choking. There are two primary types of spinal stenosis:

- In **lumbar spinal stenosis**, the spinal nerve roots in the lower back are compressed, or choked, and this can produce symptoms of **sciatic pain** -- tingling, weakness or numbness that radiates from the low back and into the buttocks and legs -- especially with activity.
- Spinal stenosis in the neck (**cervical stenosis**) can be far more dangerous by compressing the spinal cord itself and possibly leading to major body weakness or even paralysis. This is virtually impossible in the lumbar spine, however, as the spinal cord is not present in the lumbar spine.

In rare cases, **lumbar spinal stenosis** can go no further than to produce severe persistent disabling pain and even weakness in the legs. Most cases, however, have **pain that radiates into the leg(s) with walking, and that pain will be relieved with sitting**. This is called **claudication** which can also be caused by circulatory problems to the legs, as discussed later in this article.

Spinal stenosis is related to degeneration in the spine and usually will become significant in the 5th decade of life and extend throughout every subsequent age group. Most patients first visit their doctor with symptoms of spinal stenosis at about age 60 or so. Patients need only seek treatment for lumbar spinal stenosis if they no longer wish to live with significant activity limitations, such as leg pain and/or difficulty with walking.

Spinal stenosis can occur in a variety of ways in the spine. Approximately 75% of cases of spinal stenosis occur in the low back (lumbar spine), which is called lumbar spinal stenosis, and most will affect the sciatic nerve which runs along the back of the leg. When this happens, it is commonly called **sciatica**.

The vertebral column in the spine and sacrum (at the bottom of the spine) is like a stack of blocks that serve to support the structures of the body. Each of these bony structures has additional bony attachments that serve to help stabilize the spine and to protect the spinal cord or nerves passing downward from the brain to organs, muscles and sensory structures of the body. Each vertebral body and its attachments and the disc between the adjacent vertebrae are known as a **spinal segment**.

The entire length of the **spinal column** has a large central canal or passage through which the spinal cord descends, and holes to each side of the canal to allow emergence of spinal nerves at each level. The spinal cord stops at the upper part of the low back, and below that the tiny contained nerve rootlets descend loosely splayed out - like a horse's tail – and are protectively enclosed in a long sack. All central nerve structures are protected further by membranes, with a tough outer membrane called the **dura** (tough) mater (mother).

## Spinal Anatomy and the Major Types of Stenosis:

- **Foraminal stenosis**. As the nerve root is about to leave the canal through a side hole (lateral foramen), a **bone spur (osteophyte)** that has already developed from a degenerating disc can press on that nerve root. This type of stenosis is also called **lateral spinal stenosis**. This is by far the most common form of **spinal stenosis**. 72% of cases of foraminal stenosis occur at the lowest lumbar level, trapping the emerging nerve root (which comprises a major part of the **sciatic nerve**).

- **Central stenosis.** A choking of the central canal, called central spinal stenosis in the lumbar (low back) area can compress the sack containing the horse's tail (*cauda equina*, or *cauda equine*) bundle of loose nerve filaments. **Central spinal stenosis** is more common at the second from the lowest lumbar spinal level and higher and is largely caused by a bulging of the disc margin plus a major overgrowth or redundancy of a ligament (*ligamentum flavum*) which is there to help protect the dura. This overgrowth is caused by segmental instability usually from a degenerating disc between adjacent vertebrae. The ligament arises from under the flat laminae of the vertebrae and the inside part of the facet joints (stabilizing joints located on each side at the back of the spine segments).
- **Far lateral stenosis.** After the nerve has left the spinal canal it can also be compressed beyond the foramen by either a bony spur protrusion or a *bulging or herniated disc*. When this happens, it is called **far lateral stenosis**.

These differences in anatomy may result in similar symptoms, which is why all forms of stenosis are typically referred to as simply 'spinal stenosis'. However, if surgery is to be performed, the differences are very important in guiding the surgeon. That is, the bad spot(s) must be exactly known in advance to guide the approach for its proper treatment or removal.

## Spinal stenosis symptoms

Generally speaking, the various types of **spinal stenosis** produce similar symptoms. Leg pain (*sciatica*) often with some low back pain, leg numbness and tingling, with limitations, in walking are together the most common symptoms of lumbar spinal stenosis.

**Leg pain with walking** (claudication) can be caused by either arterial circulatory insufficiency (vascular claudication) or from spinal stenosis (neurogenic or pseudo-claudication). **Leg pain** from either condition will go away with rest, but with spinal stenosis the patient usually has to sit down for a few minutes to ease the leg and often low back pain, whereas leg pain from vascular claudication will go away if the patient simply stops walking.

Although occasionally the symptoms and leg pain from spinal stenosis will come on acutely, they generally develop over the course of several years. The longer a patient with spinal stenosis stands or walks the worse the leg pain will get.

Flexing forward or sitting will open up the spinal canal and relieve the leg pain and other symptoms, but they recur if the patient gets back into an upright posture. Numbness and tingling can accompany the pain, but true weakness is a rare symptom of spinal stenosis. An older person leaning over the handle of their shopping cart while making short stumbling steps often has spinal stenosis.

Overall, the symptoms of lumbar spinal stenosis are often characterized as follows:

- Develop slowly over time
- May come and go, as opposed to continuous pain
- Occurs during certain activities (such as walking) and/or positions (such as standing upright)
- Relieved by rest (sitting or lying down) and/or any flexed forward position

## Spinal stenosis diagnosis

Diagnostic imaging studies for spinal stenosis patients include either an **MRI scan** or a **CT scan with myelogram** (using an x-ray dye in the spinal sack fluid), and sometimes both. Unenhanced or plain CT scans are of limited value unless made with very fine segmental scan slices.

It can be shown that each form of spinal stenosis has a dynamic (changing) effect on nerve compression, such as when bearing weight. Due to this changing compression, the symptoms of spinal stenosis vary from time to time and the physical examination generally will not show any neurological deficits or motor weakness. Some recent scanning methods allow the upright body position to study the effects of spinal loading.

**Foraminal stenosis** can be pinpointed not only by the CT and MRI scans, but also by injecting the suspicious nerve with a small volume of about 2 dozen drops of local anesthetic (selective nerve root block). After the injection a remission of spinal stenosis symptoms when walking, along with true temporary weakness of the limb, is clinically diagnostic and helps the patient to decide about surgery.

Since a spinal stenosis at two or even three levels (sub-laminar, foraminal and far lateral) can affect a single emerging nerve, a combination of anatomical and clinical clarification is needed if surgery is contemplated in order to make sure that one surgical procedure will address all contributing components of that particular case.

## Non-surgical treatment for spinal stenosis

Depending on the severity of symptoms, **spinal stenosis** can often be managed through non-surgical means. The three most common treatments for spinal stenosis include:

- **Exercise Program.** Although a suitable exercise program in the hands of a good physical therapist may be helpful, it is not curative. Even though it is not a cure, however, it is very important for patients to remain active as tolerated and not additionally debilitated from inactivity, so an appropriate exercise program is a key part of any spinal stenosis treatment program.
- **Activity modification.** Patients are usually counseled to avoid activities that cause the adverse symptoms of spinal stenosis. Patients are typically more comfortable while flexed forward. Examples of activity modification might include: walking while bent over and leaning on a walker or shopping cart instead of walking upright; stationary biking (leaning forward on the handlebars) instead of walking for exercise; sitting in a recliner instead of on a straight-back chair.
- **Epidural injections.** An injection of cortisone into the space outside the dura (the epidural space) can temporarily relieve symptoms of spinal stenosis. While these injections can seldom be considered curative, they can alleviate the pain in about 50% of cases. Up to three injections over a course of several months can be tried. Although they are not considered diagnostic in and of themselves, generally, if the pain caused by spinal stenosis is relieved by an epidural steroid injection, then the patient can also be expected to have a good result if they later choose surgery.

**Anti-inflammatory medication (such as ibuprofen, aspirin)** may be helpful in treating spinal stenosis. Some physicians recommend a multiple B-complex vitamin with 1200 mg of folic acid daily, but this has not been substantiated as an effective treatment in the medical literature.

Some people may successfully manage the symptoms of spinal stenosis with the non-surgical therapies either for a period of time or indefinitely. **The key in choosing whether or not to have surgery is the degree of physical disability and disabling pain from lumbar spinal stenosis.** As a guideline, when the (usually elderly) patient can no longer walk sufficiently to care for himself or herself (such as to go shopping for essentials), then spinal stenosis surgery is usually recommended.

Surgery for spinal stenosis is mainly designed to increase a patient's activity tolerance, so he or she can do more activity with less pain. In most cases of advanced claudication (spinal or

vascular), **decompressive surgery** is required. There are several opinions and techniques used in [spinal stenosis](#) surgery, but there are key components common to all such approaches.

- **First and foremost**, a correct and very detailed anatomical diagnosis is required - knowing exactly where to go while considering the possibility of a double or triple location for choking of a nerve in its passages, on one or both sides.
- **Secondly**, the surgery should not create a new problem, such as nerve injury or a structural instability that might require additional surgeries.
- **Thirdly**, the approach to correcting spinal stenosis should be minimally destructive of normal structures. The surgeon should strive to leave as much as possible of the normal or slightly abnormal tissues alone. This again points to the importance of exactly identifying the offending stenosis.
- **Fourthly**, the metabolic and physical status of the patient is important. Even in the hands of an experienced surgeon a decompressive procedure - especially if more than one level and if bilateral procedures are needed - may require a few hours of anesthesia, and this is not well tolerated by some patients. Some surgeons will perform the spinal stenosis surgery under an epidural anesthetic instead of a general anesthetic.

Fortunately, a decompression surgery for spinal stenosis can be among the most rewarding surgical methods used on the spine (second only to removal of some herniated discs), because generally patients do well and are able to increase their activity and have a better walking tolerance postoperatively.

For more information on decompression surgery, please see [Lumbar Decompression Back Surgery](#).

More recently, a few new surgical approaches have also been introduced and other devices are in various stages of development and clinical trials. At least one has been approved for use in the treatment of central spinal stenosis.

- **Interspinous process devices.** The goal of these devices is to help take the bucking out of the ligaments and disc that together are pressing on the central canal and hopefully also a widening of the nerve foramen. In cases of true bone spur foraminal or far lateral stenosis, however, this method is less likely to help. This device does limit backwards bending at the segment thus limiting the ligament and posterior disc buckling. The [X-stop](#) is a device that has been approved for treatment of spinal stenosis, principally of the central type. See also [Interspinous process spacers](#).
- **Facet replacement or total element replacement.** This new class of devices is still principally investigational and hopes to replace the facet joints in the back of the spine (or the total segmental element of the back of the spine). Whether or not this will assist in spinal stenosis depends on the extent of the central decompression, as yet to be proven. It is more likely that they might be of benefit in degenerative arthritis of the facet joints, which can contribute to foraminal stenosis, however.