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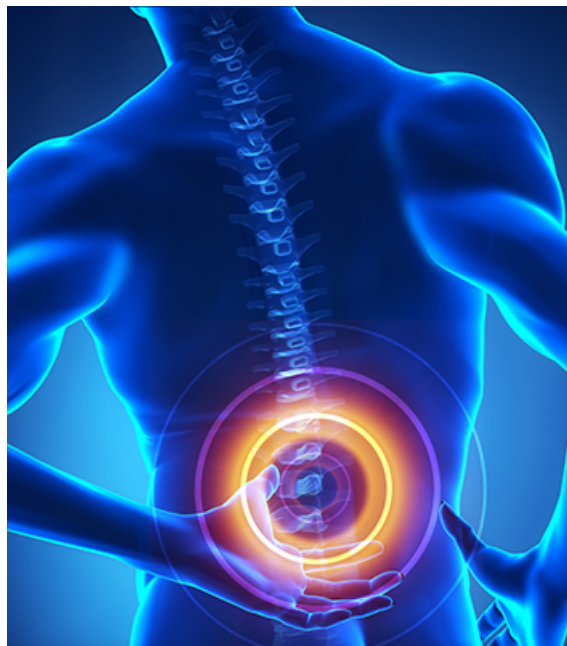
LUMBAR SPINAL STENOSIS

PATIENT INFORMATION

This resource, developed by neurosurgeons, provides patients and their families trustworthy information on neurosurgical conditions and treatments.

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The **lumbar spine** (lower back) consists of five **vertebrae** in the lower part of the spine, between the ribs and the pelvis. **Lumbar spinal stenosis** is a narrowing of the spinal canal, compressing the nerves traveling through the lower back into the legs. While it may affect younger patients, due to developmental causes, it is more often a degenerative condition that affects people who are typically age 60 and older.



Narrowing of the spinal canal usually occurs slowly, over many years or decades. The disks become less spongy with aging, resulting in loss of disk height, and may cause bulging of the hardened disk into the spinal canal. Bone spurs may also occur and ligaments may thicken. All of these can contribute to narrowing of the central canal and may or may not produce symptoms. Symptoms may be due to inflammation, compression of the nerve(s) or both.

Such symptoms may include:

- Pain, weakness or numbness in the legs, calves or buttocks
- Cramping in the calves with walking, requiring frequent short rests to walk a distance
- Pain radiating into one or both thighs and legs, similar to the lay term “**sciatica**”
- In rare cases, loss of motor functioning of the legs, loss of normal bowel or bladder function
- Pain may improve with bending forward, sitting or lying down

Degenerative spondylolisthesis and **degenerative scoliosis** (curvature of the spine) are two conditions that may be associated with lumbar spinal stenosis. Degenerative spondylolisthesis (slippage of one vertebra over another) is caused by **osteoarthritis** of the facet joints. Most commonly, it involves the **L4** slipping over the **L5 vertebra**. It is usually treated with the same non-surgical (“conservative”) and surgical methods as lumbar spinal stenosis.

Degenerative scoliosis occurs most frequently in the lower back and more commonly affects people aged 65 and older. Back pain associated with degenerative scoliosis usually begins gradually and is linked with activity. The curvature of the spine in this form of scoliosis is often relatively minor. Surgery may be indicated when nonsurgical measures fail to improve pain associated with the condition.

Diagnosis

Diagnosis is made by a neurosurgeon based on history, symptoms, physical examination and test results.

Imaging studies used may include the following:

- **X-ray**: Focuses radiation through the body to create an image and can show the structure of the bones, alignment of the spine and outline the joints.
- **CT scan or CAT scan**: Creates images by combining multiple X-rays together and can show the shape and size of the spinal canal, its contents and the structures around it with details of the bony anatomy.
- **MRI**: Creates images by using powerful magnets and computer technology and can show the spinal cord, nerve roots and surrounding areas, as well as enlargement, degeneration and tumors.
- **Myelogram**: Injects contrast dye into the spinal fluid space (cerebrospinal fluid) to outline the nerves and spinal cord, and show evidence of any pressure affecting these areas; seen on X-ray, sometimes done with a CT scan.

Nonsurgical Treatment

A combination of time, medications, posture management, stretching and exercise can be helpful to many patients for pain flare-ups. Weight management, nicotine cessation and bone-strengthening endeavors may also be indicated.

- Anti-inflammatory medications can be used to reduce swelling and pain, and **analgesics** can be used to relieve pain. Most pain can be treated with non-prescription medications, but if the pain is severe or persistent, prescription medications may be provided.
- **Epidural** injections of medications may be prescribed to help reduce swelling.
- Physical therapy and/or prescribed exercises may help to stabilize and protect the spine, build endurance and increase flexibility. Therapy may help the patient to resume a normal lifestyle and activities. Typically, four to six weeks of therapy is encouraged.

Surgical Treatment

A doctor may recommend surgery if non-surgical management (as described above) does not improve symptoms. There are different types of spinal surgeries available, and depending on the specific case, a neurosurgeon will help to determine what procedure might be appropriate for the patient. As with any surgery, a patient's risks include age, overall health and other issues, which are all taken into consideration beforehand.

A patient may be considered a candidate for surgery if:

- Back and leg pain limits normal activity or impairs quality of life;
- Progressive neurological deficits develop (leg weakness, foot drop, numbness in the limb);
- Loss of normal bowel and/or bladder functions;
- Difficulty standing or walking;
- Medications and physical therapy are not effective;
- The patient is in reasonably good health.

There are several different surgical procedures that can be utilized, the choice of which is influenced by the severity of the case. In a small percentage of patients, spinal instability may require that spinal fusion be performed — this decision generally is determined prior to surgery. Spinal fusion is an operation that creates a solid union between two or more vertebrae. Spinal fusion may assist in strengthening and stabilizing the spine, and may thereby help to alleviate severe and chronic back pain.

Types of Surgeries

The most common surgery in the lumbar spine is called **decompressive laminectomy**, in which the **laminae** (roof) of the vertebrae are removed to create more space for the nerves. A neurosurgeon may perform a laminectomy with or without fusing vertebrae or removing part of a disk. A spinal fusion with or without spinal instrumentation may be used to enhance fusion and support unstable areas of the spine.

Other types of surgeries or techniques/methods to treat lumbar spinal stenosis include:

- **Laminotomy**: Creates an opening in the bone (in the **lamina**) to relieve pressure on the nerve roots.
- **Foraminotomy**: Surgical opening or enlargement of the bony exit for the nerve root as it leaves the spinal canal; can be done alone, or along with laminotomy/laminectomy.
- **Medial Facetectomy**: Removal of part of the facet (bony joint) which may be overgrown, to create more space in the spinal canal.
- **Anterior Lumbar Interbody Fusion (ALIF)**: Removal of the degenerative disk by going through the lower abdomen. A structural device, made of bone, metal, carbon filter or other materials, is placed to take the supportive place of the removed disk and packed with bone, so that ultimately fusion between the bone (body of the vertebrae) above and below occurs.
- **Posterior Lumbar Interbody Fusion (PLIF)**: Removal of the degenerative disk by going through the skin on the back, removal of the posterior bone of the spinal canal, retraction of the nerves to get to the disk space. A structural device, made of bone, metal, carbon filter or other materials, is placed to take the supportive place of the removed disk and packed with bone, so that ultimately fusion between the bone (body of the vertebrae) above and below occurs. Similar to TLIF, this is often done on both sides of the spine.
- **Transforaminal Lumbar Interbody Fusion (TLIF)**: Removal of the degenerative disk by going through the skin on the back, removal of the posterior bone of the spinal canal, retraction of the nerves to get to the disk space. A structural device, made of bone, metal, carbon filter or other materials, is placed to take the supportive place of the removed disk and packed with bone, so that ultimately fusion between the bone (body of the vertebrae) above and below occurs. Similar to PLIF, this is often done on only one side of the spine.
- **Posterolateral Fusion**: Places bone graft on the back and side(s) of the spine to achieve a fusion.
- **Instrumented Fusion**: Using "hardware" (hooks, screws, other devices) to add stability to the construction for fusion.

The potential benefits of surgery should always be weighed carefully against the risks of surgery and anesthesia. Although a large percentage of lumbar spinal stenosis patients who ultimately undergo surgery report significant pain relief after surgery, there is no guarantee that surgery will help every individual.

The AANS does not endorse any treatments, procedures, products or physicians referenced in these patient fact sheets. This information is provided as an educational service and is not intended to serve as medical advice. Anyone seeking specific neurosurgical advice or assistance should consult his or her neurosurgeon, or locate one in your area through the AANS' Find a Board-certified Neurosurgeon online tool.