



American
Association of
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Surgeons

Low Back Pain: Getting to the Root of the Problem

A persistent ache in the lower back. Shooting pains down the legs. Muscles so tight you can't even stand up straight. For the more than 65 million Americans who suffer from low back pain every year, the symptoms come in different forms, but the problem is frequently the same: a nerve root near the spine is irritated.

"It's actually quite simple," said Robert F. Heary, MD, Neurosurgery Today Spine Editor and a neurosurgeon in New Jersey. "In about 90 percent of all low back pain cases, a nerve that travels from the spinal cord through the bones of the spine gets pinched or irritated, the muscles tense up and the patient experiences low back pain. The solution depends on why the nerve is irritated in the first place."

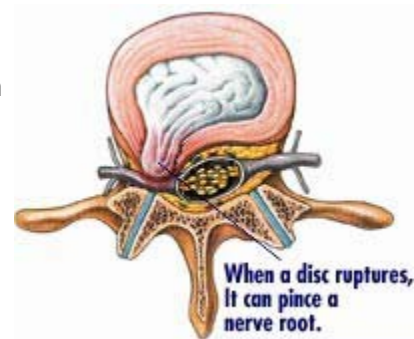
The spinal column is an intricate network of nerves, discs and bones. The spinal cord begins in the brain and is protected by the spinal column as it runs most of the way down the back. Every movement and function of the body is controlled by the spinal cord. Motor nerves lead out of the spinal cord to control movement in the body while sensory nerves enter into the spinal cord communicating messages from the body back to the brain. Together, the motor and sensory nerves form more than 50 nerve roots, which run through holes, called foramina, in the bones of the spinal column. Each one of these nerve roots has the potential to become irritated and cause back pain.

A soft flexible disc that acts as a shock absorber and further protects the spinal cord separates each of the bones, or vertebra, in the spine. These discs have a rigid outside rim, but are soft and gel-like inside. The discs can bulge and press on a nerve root, causing irritation.

"Activity, stress or a mechanical problem in the spine can cause one of the discs to bulge and become misshapen just as a rubber tire might with pressure on it," Dr. Heary said. "When this happens, the disc may pinch or put pressure on a nerve root and the patient experiences pain. This is what frequently happens in a mild or moderate case of low back or leg pain."

Occasionally, the disc will bulge to the point where it herniates or ruptures and puts even greater pressure on the nerve root. In the lower back, the nerve roots lead to the legs and irritation may cause not only back pain, but also pain that radiates down one or both of the legs. There also can be muscle weakness, numbness or changes in the reflexes in the legs if a nerve root in the lumbar spine is irritated.

"It's common to develop a back sprain like a sprain in the ankle," explained Stewart Dunsker, MD, President Elect of the American Association of Neurological Surgeons



and a neurosurgeon practicing in Ohio. "Even mild episodes of low back pain usually involve some sort of irritation of the nerves in the spine. The key to that initial treatment is to relieve the nerve irritation."

Although low back pain can be quite debilitating and severe to patients, in 90 percent of cases the pain improves without surgery. However, 50 percent of all patients who suffer from an episode of low back pain will have a recurrent episode within one year. If low back pain occurs with a fever or can be related to a specific recent injury, like a car accident, fall or sports injury, patients should call their primary care physician (PCP) immediately or visit the emergency room. If not, patients can begin conservative treatment at home for two or three days.

"In the first couple of days the goal is stop the irritation of that nerve," Dr. Dunsker said. "Patients should take anti-inflammatory medications like ibuprofen, not aspirin or acetaminophen, and restrict activities for a few days."

Because the nerve root is being irritated, patients can either get relief or feel intense aggravation in various positions like sitting, lying, or standing. It is important to find a position that relieves the pain, Dr. Dunsker said. If the low back pain gets worse or does not improve after two or three days of home treatment, a primary care physician (PCP) should be the next step. The PCP can evaluate the patient for any serious conditions. Once those are ruled out, the doctor can do a series of movement tests in the office to determine which nerve root is being irritated. If there are signs the nerve root is being compromised, the primary care physician can prescribe medications to relieve the pain, swelling and irritation and may also recommend limited activities. If these treatment options do not provide relief within two weeks, it may be time to consider other options.

Consulting a Back Specialist

"At this point, many patients start to become frustrated and it is time for them to make some choices about who should be coordinating their care," Dr. Heary said. "In my practice, I like to see patients at this stage so I can evaluate their condition and prescribe the best treatment options for them. I want to see their progress, or lack of progress, through each stage so I can determine what should be done next."

For patients with a history of back pain and who are currently experiencing symptoms that are interfering with activities, the first step is proper diagnostic testing to determine the cause of the symptoms and the severity of the problem. Imaging studies, including CT scans and magnetic resonance imaging (MRI), help the neurosurgeon determine the diagnosis and the degree of the disease. Standard x-rays are also useful to look for signs of instability in the spine.

"Imaging studies are helpful, but they aren't the only factor in determining what treatment options are available," added Richard Toselli, MD, a frequent lecturer on spine care and a neurosurgeon in North Carolina. "It's common for patients over 60 to have abnormal MRI findings, but no symptoms. Therefore, neurosurgeons must correlate the patient's symptoms with their imaging studies before considering a procedure."

Neurosurgeons are the only physicians who treat the entire spine -- both the spinal cord itself as well as the structures which can exert pressure on the spinal cord and

nerve roots such as herniated discs or bony overgrowths from degenerative arthritis of the spine. Because neurosurgeons spend about 70 percent of their time treating spine problems and have been trained on diseases of the spine throughout their seven-year residency, they are familiar with all treatment options and can determine which option will be the most effective for each patient.

Conservative Treatment

Depending on the patient's imaging studies, symptoms and lifestyle, conservative treatment is most likely the course of action for most patients. Treatment options include physical therapy, weight control, steroid injections, non-steroidal anti-inflammatory medications, rehabilitation and limited activity. Neurosurgeons often work closely with physical therapists or physiatrists to coordinate treatment.

"All of these treatment options are still aimed at relieving the inflammation around the nerve," Dr. Toselli said. "In 90 percent of cases, one of these treatment options, or time itself, will help heal the problem. I usually pursue eight to 12 weeks of conservative therapy before considering surgery."

If Surgery is Recommended

If surgery is recommended, neurosurgeons have a variety of options available to help relieve the pressure on the nerve. The most common procedure is a discectomy, which involves removing the soft gel-like material in the disc. This procedure returns the disc to a more normal shape, relieving the pressure on the nerve.

Neurosurgeons sometimes also remove a small piece of bone near the disc and irritated nerve to gain access to the disc or to give the area more space to expand and swell in the future. If the nerve is being pinched as it goes through the opening in the bone on the way to or from the spinal cord, the neurosurgeon can also perform a foraminotomy, which is a procedure designed to expand the opening the nerve travels through.

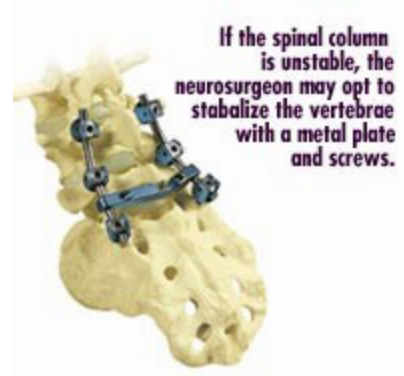
With the spinal cord and nerves millimeters away, precision and delicacy are keys to a successful and safe procedure. Neurosurgeons often use an operating microscope to help magnify the nerves and discs. The neurosurgeon performs the procedure while viewing the affected area through a large microscope and this technique allows for better precision and a smaller incision.

Surgery is Recommended When

- Leg pain limits your normal activity, resulting in diminished quality of life.
- You feel weakness or numbness in your legs.
- It is difficult to walk or stand.
- Medication and physical therapy are ineffective.

"The operating microscope has been used by neurosurgeons for years to increase visibility and accuracy while operating in the brain," Nevan Baldwin, MD, a frequent faculty member for courses on neurosurgical spine surgery and a neurosurgeon in New Mexico, said. "The technique translates beautifully in spine surgery and is a huge safety advantage for neurosurgeons and their patients."

If several nerves and discs are the cause of the pain or there is degeneration and instability in the spinal column, the neurosurgeon may opt to fuse the bones together with bone grafts and stabilize the vertebra with instrumentation, including metal plates, screws, rods and cages.



"Fusion will prevent the disc from bulging or herniating again," Dr. Baldwin said. "However, because of the metal instruments we use, there will be a limited loss of movement in the spine. The effect depends on where in the spine the fusion is done."

After any type of spine surgery, patients will continue to work with their neurosurgeon on an extensive rehabilitation program, including physical therapy, medications and reduced activity.

Survey

- 75 to 85 percent of all people will experience some form of back pain during their lifetime.
- Back pain is the second most frequently reported reason for visiting a doctor, the fifth most frequent cause of hospitalization and the third most frequent reason for surgery.
- The highest rate of back pain occurs in the 45 to 64 year old age group.
- Although the overall occurrence of back pain similar in men and women, a greater percentage of men (61.1 percent) experience low back pain than women (51.2 percent), while more women (9.6 percent) suffer from upper back pain than men (6.6 percent).

Source: National Health and Nutrition Examination Survey III