

Low Back Pain

Low back pain is extremely common. Almost every person will have at least one episode of low back pain at some time in his or her life.

Anatomy: There are 24 vertebrae in three upper segments of the spinal column; the neck area (*cervical*), chest area (*thoracic*), and lower back (*lumbar*). The lower segments of the spine (*sacrum and coccyx*) are made up of a series of vertebrae that are fused together.

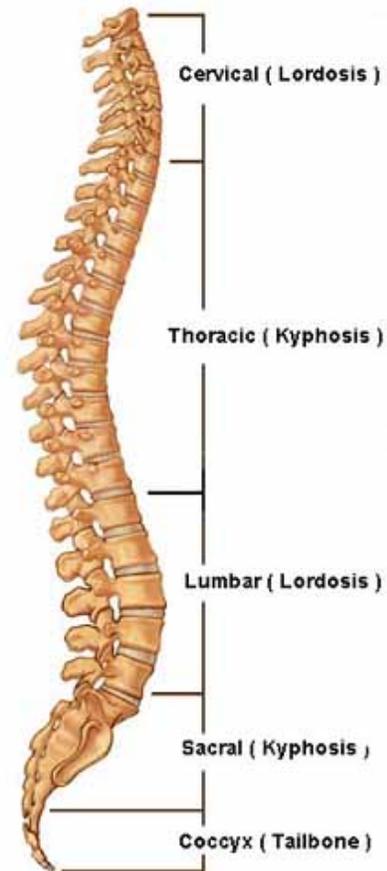
Lumbar vertebrae are five cylindrical bones stacked one upon the other, connecting the upper spine to the pelvis. Disks act as shock absorbers between the vertebrae, and allow for spine movement. Spinal cord and nerves are the "electrical cables," which travel through a central canal in the lumbar vertebrae, connecting the brain to the leg muscles. There are small joints between vertebrae, they allow movement and provide stability, and muscles and ligaments provide strength and power, as well as support and stability.

Causes of Pain: Doctors have many ideas about what causes low back pain, but no single explanation applies to everyone. Occasionally, it happens with no cause. Doctors do not know why some people with acute back pain go on to suffer from long term (chronic) low back pain. They also don't know why some people go on to feel quite well between episodes of severe pain.

Low back pain may be related to aging of the disk. As a result of wear and tear on the spine, ligaments, and disks, a disk may begin to protrude or collapse and put pressure on the nerve root leading to a leg or foot, causing pain in those areas (*sciatica*). The problem can be aggravated by associated conditions, such as narrowing (*stenosis*) of the canal or shifting of the vertebra (*spondylolisthesis*), one upon the other.

Low back pain is sometimes caused by; excessive stress to the back (such as lifting something heavy), minimal movement (such as bending or reaching for something), arthritis of the spine, problems with tendons or ligaments in and around the spine, or malpositioning of vertebrae.

Lateral (Side) Spinal Column



Symptoms: The symptoms of low back pain vary in some ways and are similar in others. Most people find that reclining or lying down will improve their pain and after their initial severe episode. Many will be able to rest at night without severe pain. Most people experience more severe pain when they bend over to pick something up. Some get relief from arching backward (extending the back).

Leg pain also can be part of the problem. The pain is most common in the back or outer side of the thigh and can go all the way to the foot. Pain that goes to the foot is called sciatica because it is pain that follows the course of the sciatic nerve. Sciatica is often made worse by coughing or sneezing.

With an acute episode, back pain can be very severe for a few days or a week and then will often improve. By 2 weeks to 4 weeks, most people are much better. The length of time between episodes varies greatly from person to person, as does the length of each episode, the intensity of each episode, and how well each individual copes with the pain.

Diagnosis: See your doctor to diagnose low back pain. Tell him or her your complete medical history. The doctor may check for evidence of nerve problems by evaluating strength, sensation and reflexes, or check for poor blood circulation. Significant weakness on physical examination could also indicate problems. If a person is having trouble controlling their urine or bowels, the doctor will usually order X-rays and other studies more quickly. Although not related to the spine, poor blood circulation can lead to back pain. Tell the doctor what motions or positions hurt and what helps relieve the pain.

X-rays and other imaging studies are more likely to be helpful when low back pain does not get better on its own after a few weeks or when a person has evidence of more severe problems. Many X-ray findings are considered nonspecific -- they may or may not be related to the pain. Tell the doctor if you have a history of a previous cancer, fevers or chills that may be caused by an infection, or a significant trauma like a fall or car accident that may have caused a fracture.

MRI (Magnetic Resonance Imaging) is often the next imaging test ordered if the physician feels it is indicated. With MRI, the doctor can see the disks and the nerves. He or she can see the level of degeneration of the disks and whether there is any material that has gone outside of the normal confines of the disk (herniation). MRI is also very good at showing infections, tumors, and fractures.

Additional Diagnostic Tests

Other tests your doctor may conduct to determine the cause of your back pain:

- **CT (computed tomography) scans** are similar to three-dimensional X-rays.
- **Bone scans** look for areas of possible infection, tumor, or fracture.

- **Electromyography [EMG] and nerve conduction velocity [NCV] tests** see how well the nerves in the arms and legs conduct electrical signals.
- **Bone density studies** may be ordered if osteoporosis is a concern. Osteoporosis by itself should not cause back pain, but fractures due to osteoporosis can cause back pain.

Nonsurgical Treatment

Counseling and Education: At times, counseling and education about the problem to ease a person's anxiety is enough to make it tolerable until the episode resolves.

Rest: A few days of rest can often calm the pain down. Prolonged bed rest (more than 2 days to 3 days) is no longer generally recommended for people with low back pain.

Medication: Nonsteroidal anti-inflammatory drugs (NSAIDs) or acetaminophen can be helpful. Occasionally, stronger medications such as muscle relaxants and narcotics are used for a short period.

Braces: Although there is minimal scientific evidence of their effectiveness in treating low back pain, back braces are commonly used. Most common is a corset type brace that can be wrapped around the back and abdomen. People who use corset type braces sometimes report feeling better and more comfortable.

Passive Modalities: The application of heat or cold, massage, ultrasound, electrical stimulation, traction, and acupuncture. How long the benefit will last or what the chances are of receiving benefit from any of these treatments is not completely known.

Spinal Manipulation: There are many different practitioners of spinal manipulation, each with their own style of manipulation. This has also at times improved symptoms of low back pain.

Injections: The most commonly used injections are local anesthetic and/or steroids. They are usually given either in the area that is believed to be the source of the pain, such as into a muscle or facet joint, or around the nerves of the spine (an epidural or nerve root injection). Injections are occasionally placed into the disk, but this is done far less frequently.

Exercise and Stretching: Exercising to restore motion and strength to a painful lumbar spine can be very helpful in relieving pain. Although there is controversy as to which are the most effective spine exercises, it is generally agreed that exercise should be both aerobic (aimed at improving heart and lung function) and specific to the spine. Aerobic exercises include walking, jogging, swimming, and bicycling.

Proper Lifting Techniques: Instruction in lifting techniques can be helpful as well. Improperly bending over to lift can cause a large increase in strain on the low back. Proper lifting keeps the back straight while you bend with the knees.

Surgical Treatment Options

Spinal Fusion: Historically, the most commonly performed surgical procedure for low back pain has been spinal fusion. There are a variety of ways this is done, but the basic idea is to take the painful segment of the spine and get it to become a solid piece of bone. This will eliminate motion and, in theory at least, if it does not move, it should not hurt.

The results of spinal fusion for low back pain vary. A good result is a decrease in pain. It is very rare for a patient to be completely pain-free after spinal fusion. Full recovery can take more than a year.

Disk Replacement: A newer technique that has recently been introduced in the United States is disk replacement. The procedure involves removing the disk and replacing it with artificial components, similar to what is done in the hip or the knee.

The goal of disk replacement is to allow the segment of the spine to keep some flexibility and maintain more normal motion. The recovery time may be shorter than with spinal fusion because the bone does not have to solidify.

Although disk replacement has been used in Europe for years, it has only recently been used in the United States.

Prevention: Low back pain caused by lifting can be prevented by using proper lifting techniques and by exercising regularly to improve muscle strength and overall physical condition. Maintain proper body weight; being overweight puts a strain on the back muscles. The normal effects of aging that result in loss of bone mass and decreased strength and elasticity of muscles and ligaments can't be avoided. However, the effects can be slowed by maintaining a proper posture when standing and sitting; don't slouch.

Research on the Horizon: A great deal of research is being performed to help doctors understand and treat low back pain. Some of the more exciting research includes new forms of disk replacement that some day may be injectable, and research into gene therapy that may some day allow doctors to alter the aging process of the spine.