

Back Pain



Cause

The vast majority of low back pain is mechanical in nature. In many cases, low back pain is associated with spondylosis, a term that refers to the general degeneration of the spine associated with normal wear and tear that occurs in the joints, discs, and bones of the spine as people get older. Some examples of mechanical causes of low back pain include:

- **Sprains and strains** account for most acute back pain. Sprains are caused by over stretching or tearing ligaments, and strains are tears in tendon or muscle. Both can occur from twisting or lifting something improperly, lifting something too heavy, or over stretching. Such movements may also trigger spasms in back muscles, which can also be painful.
- **Intervertebral disc degeneration** is one of the most common mechanical causes of low back pain, and it occurs when the usually rubbery discs lose integrity as a normal process of aging. In a healthy back, intervertebral discs provide height and allow bending, flexion, and torsion of the lower back. As the discs deteriorate, they lose their cushioning ability.
- **Herniated or ruptured discs** can occur when the intervertebral discs become compressed and bulge outward (herniation) or rupture, causing low back pain.
- **Radiculopathy** is a condition caused by compression, inflammation and/or injury to a spinal nerve root. Pressure on the nerve root results in pain, numbness, or a tingling sensation that travels or radiates to other areas of the body that are served by that nerve. Radiculopathy may occur when spinal stenosis or a herniated or ruptured disc compresses the nerve root.
- **Sciatica** is a form of radiculopathy caused by compression of the sciatic nerve, the large nerve that travels through the buttocks and extends down the back of the leg. This compression causes shock-like or burning low back pain combined with pain through the buttocks and down one leg, occasionally

reaching the foot. In the most extreme cases, when the nerve is pinched between the disc and the adjacent bone, the symptoms may involve not only pain, but numbness and muscle weakness in the leg because of interrupted nerve signaling. The condition may also be caused by a tumor or cyst that presses on the sciatic nerve or its roots.

- **Spondylolisthesis** is a condition in which a vertebra of the lower spine slips out of place, pinching the nerves exiting the spinal column.
- **A traumatic injury**, such as from playing sports, car accidents, or a fall can injure tendons, ligaments or muscle resulting in low back pain. Traumatic injury may also cause the spine to become overly compressed, which in turn can cause an intervertebral disc to rupture or herniate, exerting pressure on any of the nerves rooted to the spinal cord. When spinal nerves become compressed and irritated, back pain and sciatica may result.
- **Spinal stenosis** is a narrowing of the spinal column that puts pressure on the spinal cord and nerves that can cause pain or numbness with walking and over time leads to leg weakness and sensory loss.
- **Skeletal irregularities** include scoliosis, a curvature of the spine that does not usually cause pain until middle age; lordosis, an abnormally accentuated arch in the lower back; and other congenital anomalies of the spine.

Low back pain is rarely related to serious underlying conditions, but when these conditions do occur, they require immediate medical attention. Serious underlying conditions include:

- **Infections** are not a common cause of back pain. However, infections can cause pain when they involve the vertebrae, a condition called osteomyelitis; the intervertebral discs, called discitis; or the sacroiliac joints connecting the lower spine to the pelvis, called sacroiliitis.
- **Tumors** are a relatively rare cause of back pain. Occasionally, tumors begin in the back, but more often they appear in the back as a result of cancer that has spread from elsewhere in the body.

- **Cauda equina syndrome** is a serious but rare complication of a ruptured disc. It occurs when disc material is pushed into the spinal canal and compresses the bundle of lumbar and sacral nerve roots, causing loss of bladder and bowel control. Permanent neurological damage may result if this syndrome is left untreated.
- **Abdominal aortic aneurysms** occur when the large blood vessel that supplies blood to the abdomen, pelvis, and legs becomes abnormally enlarged. Back pain can be a sign that the aneurysm is becoming larger and that the risk of rupture should be assessed.
- **Kidney stones** can cause sharp pain in the lower back, usually on one side.

Other underlying conditions that predispose people to low back pain include:

- **Inflammatory diseases of the joints** such as arthritis, including osteoarthritis and rheumatoid arthritis as well as spondylitis, an inflammation of the vertebrae, can also cause low back pain. Spondylitis is also called spondyloarthritis or spondyloarthropathy.
- **Osteoporosis** is a metabolic bone disease marked by a progressive decrease in bone density and strength, which can lead to painful fractures of the vertebrae.
- **Endometriosis** is the buildup of uterine tissue in places outside the uterus.
- **Fibromyalgia**, a chronic pain syndrome involving widespread muscle pain and fatigue.

Treatment

Treatment for low back pain generally depends on whether the pain is acute or chronic. In general, surgery is recommended only if there is evidence of worsening nerve damage and when diagnostic tests indicate structural changes for which corrective surgical procedures have been developed.

Conventionally used treatments and their level of supportive evidence include:

Hot or cold packs have never been proven to quickly resolve low back injury; however, they may help ease pain and reduce inflammation for people with acute, subacute, or chronic pain, allowing for greater mobility among some individuals.

Activity: Bed rest should be limited. Individuals should begin stretching exercises and resume normal daily activities as soon as possible, while avoiding movements that aggravate pain. Strong evidence shows that persons who continue their activities without bed rest following onset of low back pain appeared to have better back flexibility than those who rested in bed for a week. Other studies suggest that bed rest alone may make back pain worse and can lead to secondary complications such as depression, decreased muscle tone, and blood clots in the legs.

Strengthening exercises, beyond general daily activities, are not advised for acute low back pain, but may be an effective way to speed recovery from chronic or subacute low back pain. Maintaining and building muscle strength is particularly important for persons with skeletal irregularities. Health care providers can provide a list of beneficial exercises that will help improve coordination and develop proper posture and muscle balance. Evidence supports short- and long-term benefits of yoga to ease chronic low back pain.

Physical therapy programs to strengthen core muscle groups that support the low back, improve mobility and flexibility, and promote proper positioning and posture are often used in combinations with other interventions.

Medications: A wide range of medications are used to treat acute and chronic low back pain. Some are available over the counter (OTC); others require a physician's prescription. Certain drugs, even those available OTC, may be unsafe during pregnancy, may interact with other medications, cause side effects, or lead to serious adverse effects such as liver damage or gastrointestinal ulcers and bleeding.

Consultation with a health care provider is advised before use. The following are the main types of medications used for low back pain:

- **Analgesic medications** are those specifically designed to relieve pain. They include OTC acetaminophen and aspirin, as well as prescription opioids such as codeine, oxycodone, hydrocodone, and morphine. Opioids should be used only for a short period of time and under a physician's supervision. People can develop a tolerance to opioids and require increasingly higher dosages to achieve the same effect. Opioids can also be addictive. Their side effects can include drowsiness, constipation, decreased reaction time, and impaired judgment. Some specialists are concerned that chronic use of opioids is detrimental to people with back pain because they can aggravate depression, leading to a worsening of the pain.
- **Nonsteroidal anti-inflammatory drugs (NSAIDs)** relieve pain and inflammation and include OTC formulations (ibuprofen, ketoprofen, and naproxen sodium). Several others, including a type of NSAID called COX-2 inhibitors, are available only by prescription. Long-term use of NSAIDs has been associated with stomach irritation, ulcers, heartburn, diarrhea, fluid retention, and in rare cases, kidney dysfunction and cardiovascular disease. The longer a person uses NSAIDs the more likely they are to develop side effects. Many other drugs cannot be taken at the same time a person is treated with NSAIDs because they alter the way the body processes or eliminates other medications.
- **Anticonvulsants**—drugs primarily used to treat seizures—may be useful in treating people with radiculopathy and radicular pain.
- **Antidepressants** such as tricyclics and serotonin and norepinephrine reuptake inhibitors have been commonly prescribed for chronic low back pain, but their benefit for nonspecific low back pain is unproven, according to a review of studies assessing their benefit.
- **Counter-irritants** such as creams or sprays applied topically stimulate the nerves in the skin to provide feelings of warmth or cold in order to dull the sensation of pain. Topical analgesics reduce inflammation and stimulate blood flow.

Spinal manipulation and spinal mobilization are approaches in which professionally licensed specialists (doctors of chiropractic care) use their hands to mobilize, adjust, massage, or stimulate the spine and the surrounding tissues. Manipulation involves a rapid movement over which the individual has no control; mobilization involves slower adjustment movements. The techniques have been shown to provide small to moderate short-term benefits in people with chronic low back pain. Evidence supporting their use for acute or subacute low back pain is generally of low quality. Neither technique is appropriate when a person has an underlying medical cause for the back pain such as osteoporosis, spinal cord compression, or arthritis.

Traction involves the use of weights and pulleys to apply constant or intermittent force to gradually “pull” the skeletal structure into better alignment. Some people experience pain relief while in traction, but that relief is usually temporary. Once traction is released the back pain tends to return. There is no evidence that traction provides any longterm benefits for people with low back pain.

Acupuncture is moderately effective for chronic low back pain. It involves the insertion of thin needles into precise points throughout the body. Some practitioners believe this process helps clear away blockages in the body’s life force known as Qi (pronounced chee). Others who may not believe in the concept of Qi theorize that when the needles are inserted and then stimulated (by twisting or passing a low-voltage electrical current through them) naturally occurring painkilling chemicals such as endorphins, serotonin, and acetylcholine are released. Evidence of acupuncture’s benefit for acute low back pain is conflicting and clinical studies continue to investigate its benefits.

Biofeedback is used to treat many acute pain problems, most notably back pain and headache. The therapy involves the attachment of electrodes to the skin and the use

of an electromyography machine that allows people to become aware of and self-regulate their breathing, muscle tension, heart rate, and skin temperature. People regulate their response to pain by using relaxation techniques. Biofeedback is often used in combination with other treatment methods, generally without side effects. Evidence is lacking that biofeedback provides a clear benefit for low back pain.

Nerve block therapies aim to relieve chronic pain by blocking nerve conduction from specific areas of the body. Nerve block approaches range from injections of local anesthetics, botulinum toxin, or steroids into affected soft tissues or joints to more complex nerve root blocks and spinal cord stimulation. When extreme pain is involved, low doses of drugs may be administered by catheter directly into the spinal cord. The success of a nerve block approach depends on the ability of a practitioner to locate and inject precisely the correct nerve. Chronic use of steroid injections may lead to increased functional impairment.

Epidural steroid injections are a commonly used short-term option for treating low back pain and sciatica associated with inflammation. Pain relief associated with the injections, however, tends to be temporary and the injections are not advised for long-term use. An NIH-funded randomized controlled trial assessing the benefit of epidural steroid injections for the treatment of chronic low back pain associated with spinal stenosis showed that long-term outcomes were worse among those people who received the injections compared with those who did not.

Transcutaneous electrical nerve stimulation (TENS) involves wearing a battery-powered device consisting of electrodes placed on the skin over the painful area that generate electrical impulses designed to block incoming pain signals from the peripheral nerves. The theory is that stimulating the nervous system can modify the perception of pain. Early studies of TENS suggested that it elevated levels of

endorphins, the body's natural pain-numbing chemicals. More recent studies, however, have produced mixed results on its effectiveness for providing relief from low back pain.

Surgery

When other therapies fail, surgery may be considered an option to relieve pain caused by serious musculoskeletal injuries or nerve compression. It may be months following surgery before the patient is fully healed, and he or she may suffer permanent loss of flexibility.

Surgical procedures are not always successful, and there is little evidence to show which procedures work best for their particular indications. Patients considering surgical approaches should be fully informed of all related risks.

Keeping your back healthy

Following any period of prolonged inactivity, a regimen of low-impact exercises is advised. Speed walking, swimming, or stationary bike riding 30 minutes daily can increase muscle strength and flexibility. Yoga also can help stretch and strengthen muscles and improve posture. Consult a physician for a list of low-impact, age-appropriate exercises that are specifically targeted to strengthening lower back and abdominal muscles.

- Always stretch before exercise or other strenuous physical activity.
- Don't slouch when standing or sitting. The lower back can support a person's weight most easily when the curvature is reduced. When standing, keep your weight balanced on your feet.
- At home or work, make sure work surfaces are at a comfortable height.

- Sit in a chair with good lumbar support and proper position and height for the task. Keep shoulders back. Switch sitting positions often and periodically walk around the office or gently stretch muscles to relieve tension. A pillow or rolled-up towel placed behind the small of the back can provide some lumbar support. During prolonged periods of sitting, elevate feet on a low stool or a stack of books.
- Wear comfortable, low-heeled shoes.
- Sleeping on one's side with the knees drawn up in a fetal position can help open up the joints in the spine and relieve pressure by reducing the curvature of the spine. Always sleep on a firm surface.
- Don't try to lift objects that are too heavy. Lift from the knees, pull the stomach muscles in, and keep the head down and in line with a straight back. When lifting, keep objects close to the body. Do not twist when lifting.
- Maintain proper nutrition and diet to reduce and prevent excessive weight gain, especially weight around the waistline that taxes lower back muscles. A diet with sufficient daily intake of calcium, phosphorus, and vitamin D helps to promote new bone growth.
- Quit smoking. Smoking reduces blood flow to the lower spine, which can contribute to spinal disc degeneration. Smoking also increases the risk of osteoporosis and impedes healing. Coughing due to heavy smoking also may cause back pain.