

Overview of Back Pain

Back pain is one of the most common medical problems in the United States. It can range from a dull, constant ache to a sudden, sharp pain that may shoot down the leg. Sometimes it can come on suddenly – from an accident, a fall, or lifting something heavy, or it can develop slowly because of age-related degenerative changes in the spine. In some cases, inflammatory arthritis disorders or other medical conditions cause back pain.

Treatment varies depending on the cause and symptoms, and often there are several contributing factors. However, there are steps you can take to improve your health and lower your chance of developing chronic or long-lasting back pain.

Understanding the Anatomy of the Back

There are many different structures in the anatomy of the back that work together to support your body. Problems with any one of these structures can cause back pain.

- There are four regions of the spine:
 - Cervical spine.
 - Thoracic spine.
 - Lumbar spine.
 - Sacrum and coccyx.
- Parts of the spine and back include:
 - Vertebrae – small bones stacked on top of one another, which protect the spinal cord.
 - Spinal cord – long bundle of nerves that run down the back through a canal in the vertebrae.
 - Intervertebral discs – cushion-like pads between the vertebrae that act like shock absorbers and spacers for the spine.
 - Ligaments – short bands of tough, flexible tissue that hold the vertebrae in place.
 - Tendons – cord of tissue that connects muscle to bone.
 - Muscles – a bundle of dynamic fibers that support your spine and upper body and help you move.

Who Gets Back Pain?

Anyone can have back pain, and almost everyone will experience back pain at some point in their life. Several factors increase your risk of developing back pain and can include:

- **Fitness level:** Back pain is more common among people who are not physically fit. For example, weak back and stomach muscles may not properly support the spine (core strength). Back pain is also more likely if you exercise too strenuously after being inactive for a while (overdoing it).
- **Weight gain:** A diet high in calories and fat, combined with an inactive lifestyle, can lead to obesity. This can put stress on the back.
- **Job-related risk factors:** Jobs that require heavy lifting, pushing, pulling, or twisting can injure the back. A desk job may also play a role, especially if you have poor posture or sit all day in an uncomfortable chair.
- **Stress level:** If you chronically have poor sleep, depression, or anxiety, back pain can be more frequent and more severe.
- **Age:** Back pain becomes more common with age, particularly after the age of 45.
- **Heredity:** Genetics play a role in some disorders that cause back pain.

Types of Back Pain

Doctors and researchers describe the types of back pain in the following ways:

- **Acute back pain** happens suddenly and usually lasts a few days to a few weeks.
- **Subacute back pain** can come on suddenly or over time and lasts 4 to 12 weeks.
- **Chronic back pain** may come on quickly or slowly and lasts longer than 12 weeks and occurs daily.

Symptoms of Back Pain

Back pain can range from local pain in a specific spot to generalized pain spreading all over the back. Sometimes the pain radiates away from the back to other areas of your body, such as the buttocks, legs, or abdomen. The intensity of back pain varies for each person. Depending on the type, causes, and location of your back pain, you may experience:

- Increasing pain with lifting and bending.
- Worsening pain when resting, sitting, or standing.
- Back pain that comes and goes.
- Stiffness in the morning when awakening and lessened back pain with activity.
- Pain that radiates away from the back into the buttocks, leg, or hip.
- Numbness or weakness in your legs or feet.

You should see a doctor if your pain does not improve after a few weeks or if any of the following symptoms happen with your back pain:

- Numbness and tingling.
- Severe back pain that does not improve with medication (see Treatment section).
- Back pain after a fall or injury.
- Back pain along with:
 - Trouble urinating.
 - Weakness, pain, or numbness in your legs.
 - Fever.
 - Weight loss that you did not intend.

Causes of Back Pain

Back pain can be caused by many different factors, which may all be present at the same time and interact to result in chronic low back pain. These could include mechanical or structural problems with the spine, inflammatory conditions, and other medical conditions. It is also possible that no specific cause can be identified for the start of back pain.

Mechanical/Structural Problems

Back pain can happen when mechanical or structural problems develop in the spine, discs, muscles, ligaments, or tendons in the back, or compress a nerve.

- [Sprain](#): an injury to the ligaments that support the spine (which connect the different bones together), often occurring from twisting or lifting improperly.
- [Strain](#): an injury to a muscle or tendon.
- Degenerative disc disease: aging causes the discs between the vertebrae of the spine to break down. It is associated with other degenerative changes in the spine, such as arthritis or spinal stenosis.
- Herniated or ruptured discs: an event causing a disc to compress and irritate nearby nerves. This often occurs at the lumbar level but can be present in the cervical spine as well.
- Spondylolisthesis: a vertebra in the spine slips out of place or gradually moves out of alignment.
- [Spinal stenosis](#): a narrowing of the spinal canal that puts pressure on the spinal cord and nerves.
- Fractured vertebrae.
- [Scoliosis](#) or other congenital changes to the spine.
- Myofascial pain: tightness and pain of the muscles supporting the spine due to damage to the muscles or a result of the nerve input to the muscles coming from the spine.

Inflammatory Conditions

- [Ankylosing spondylitis](#), a specific type of arthritis of the spine.
- Other types of inflammatory arthritis of the spine.

Other Medical Conditions

- [Osteoporosis](#), which can lead to painful fractures of the vertebrae.
- [Fibromyalgia](#), a condition of widespread muscle pain and fatigue.
- Kidney stones or infections.
- Endometriosis, which is the buildup of uterine tissue in places outside the uterus.
- Infections that involve the bones of the spine or the discs between these bones, which can cause back pain.
- Tumors, in rare cases, that develop on the spine or other areas of the back.
- Pregnancy.

Diagnosis of Back Pain

Doctors use various tools to help diagnose the possible cause for your back pain, which helps determine the best treatment plan.

Medical and Family History

Your doctor will ask questions about your medical and family history to help determine if an injury or underlying medical condition is the source for the back pain. Some questions your doctor may ask:

- Can you describe your pain? (e.g. sharp, aching, burning)
- Where is the exact location of your back pain?
- When did the pain start and how long have you had the pain?
- What were you doing when you first noticed the pain?
- How severe or bad is the pain?
- What makes the pain worse or better?
- Does chronic pain run in your family (such as arthritis or back pain)?

Your doctor may ask you to rate your pain on a scale from 1 to 10 to gauge the severity of the pain and talk to you about your ability to perform activities of daily living.

Physical Exam

Your doctor will likely perform a physical exam, which may include:

- Examining your spine and posture to look for changes in the bony structure.

- Asking you to bend or lift your legs to determine how movement affects your pain.
- Testing your reflexes, muscle strength, and sensation.

Imaging and Blood Tests

Most people do not need additional testing; however, sometimes doctors order tests to rule out a specific cause for your pain or to confirm a cause for your back pain. Your doctor may order the following.

- X-rays only show bones and can help diagnose:
 - Broken bones or fractures.
 - Changes due to aging.
 - Changes in the alignment of the spine.
- MRI (magnetic resonance imaging) uses energy from a powerful magnet to produce signals that create a series of cross-sectional images. These images or “slices” are analyzed by a computer to produce an image of the back. MRI can help diagnose damage or disease of the soft tissues, such as the discs, ligaments, and nerve roots in and around the spine.
- Computerized axial tomography (CAT) uses a scanner to take images of the back at different angles. The images are analyzed by a computer to create three-dimensional views of the back. As with MRI, CAT scans help diagnose problems with the spinal canal and the surrounding tissues.
- Electrophysiological tests, such as an electromyography or EMG, which helps measure the electrical activity in muscle. This test helps doctors check for problems with the muscles and nerves.
- Bone scans use small amounts of radioactive materials to help doctors see more details in the spine, such as fractures and infections.
- Blood tests help identify a possible cause for the back pain, such as inflammatory or medical disorders.

Treatment of Back Pain

Doctors treat back pain with various options, including medications, nonsurgical treatments, and surgical treatments.

Medications

- Over-the-counter pain relievers taken by mouth or applied to the skin.
- Anti-inflammatory drugs taken by mouth to relieve pain and inflammation.
- Muscle relaxants for some types of chronic back pain from muscle tension.
- Anti-inflammatory or numbing injections for certain types of back pain, such as for pain that travels down the leg due to nerve compression or irritation.

- Neuromodulatory agents that affect how the nervous system processes pain.
- Prescription pain relievers for severe acute back pain.

Other Treatments

- Use cold packs to help relieve some back pain and hot packs to increase blood flow and promote healing in the muscles and tissues of the back.
- Avoid bedrest; instead, limit activities or exercise that cause pain. Gradually increase physical activity as tolerated.
- Get physical therapy to help strengthen the muscles that support the back, which can improve mobility, posture, and positioning. Strengthening exercises can also help decrease pain. Check with your doctor or physical therapist before starting any exercise routine.
- Lifestyle changes teach you to:
 - Move your body properly when performing daily activities, especially those involving heavy lifting, pushing, or pulling. Avoid any activities that cause or increase pain.
 - Practice healthy habits such as exercise, relaxation, regular sleep, healthy diet, and quitting smoking.
- Complementary and alternative treatments may help relieve pain. Some examples include:
 - Manipulation of the spine and nearby tissues. Professionals use their hands to adjust and massage the spine and muscles.
 - Transcutaneous electrical nerve stimulation (TENS) sends mild electrical pulses to the nerves through a device and electrodes or pads that are placed on the skin. TENS treatments are not always effective for reducing pain.
 - Acupuncture is a Chinese practice that uses thin needles that may relieve pain in some patients.

Surgical Treatments

Surgery for back pain may be suggested if all other treatments tried have not relieved your pain. However, not everyone is a candidate for surgery, even if the pain persists. The type of surgery your doctor recommends depends on the cause of your pain and your medical history. In addition, your surgeon will review the risks and possible benefits of the surgery or procedure.

- Laminectomy is a surgery that doctors perform to treat spinal stenosis by removing the bony spurs and the bone walls of the vertebrae. This helps to open up the spinal column and remove the pressure on the nerves.
- Discectomy and microdiscectomy are surgeries that remove part of a herniated disc to relieve pressure on a nerve root or the spinal canal. The only difference between the procedures is a microdiscectomy uses a smaller incision than the discectomy. Doctors may also include a

laminectomy.

- Spinal fusion is a surgery that helps treat degenerative disc disease and spondylolisthesis by joining two or more vertebrae in the spine that have slipped from their normal position. During this procedure, the surgeon removes the disc between the vertebrae and uses bone grafts or metal devices to secure bones together.
- Foraminotomy is a surgery that cleans out and widens the area where the nerve roots leave the spinal canal. By opening up this area, the pressure on the nerves from spinal stenosis can be relieved.
- Disc replacement surgery replaces a damaged disc with a synthetic one. This procedure is limited to patients who do not have complicating factors.
- Laser surgery uses a needle that produces bursts of laser energy to reduce the size of a damaged disc. This relieves pressure on the nerves.
- Radiofrequency lesioning of the affected nerves blocks inputs of the pain signals outside the spinal cord from entering the spinal cord.
- Spinal cord stimulation stimulates the spinal cord with levels of electricity that are not felt and that can block some of the pain signals going from the spinal cord to the brain.

The recovery time from surgery depends on the type of procedure and your overall health. Research shows that surgery can be helpful for people with herniated discs, spinal stenosis, and spondylolisthesis.

Who Treats Back Pain?

Different types of health care providers treat back pain, depending on the cause:

- Pain specialists, who are physicians including anesthesiologists with specialized training in evaluation, diagnosis, and treatment of all different types of pain.
- Family or primary care doctors.
- Orthopaedists, who treat and perform surgery for bone and joint diseases.
- Neurologists, who treat disorders and diseases of the spine, brain, and nerves.
- Neurosurgeons, who perform surgery for disorders and diseases of spine, brain, and nerves.
- Physiatrists, who also treat disorders and diseases of the spine, brain, and nerves.
- Rheumatologists, who specialize in treating musculoskeletal diseases and autoimmune disorders.
- Physical therapists, who specialize in movement and strengthening muscles.

Living With Back Pain

Living with back pain can be challenging; however, most people find relief within 6 weeks. Remember to follow the recommendations of your health care providers. The following may make it easier for you

to manage your pain and recover:

- Add exercises gradually and talk to your doctor about the types of exercises that are best for you. There may be certain activities or exercises you should avoid.
- When sitting for a prolonged period; get up, move around, and switch positions frequently.
- Wear comfortable shoes with a low heel.
- When driving long distances, try adding some support behind your back, and stop frequently to stand up and walk around.
- Sleep on your side, and place a small pillow between your knees. If you tend to sleep on your back, place a pillow under your knees. If possible, try to avoid sleeping on your stomach.
- Limit the amount you carry. Instead of carrying more items at once, make a few extra trips to avoid carrying too much weight.
- Think about how you can cope and deal with pain. Does it control your life or can you work to distract yourself from it or accept that you may have pain but can still do meaningful activities?

Prevention of Back Pain

You may be able to prevent back pain from overuse or improper body mechanics. The following recommendations can help you have a healthy back and lifestyle:

- Perform regular exercise that keeps your back muscles strong. Exercises that increase balance and strength can decrease your risk of falling and injuring your back or breaking bones. Exercises such as tai chi and yoga – or any weight-bearing exercise that challenges your balance – are good ones to try. Remember to warm up before exercise or other physical activities.
- Eat a healthy diet that includes enough calcium and vitamin D, nutrients that keep your spine strong.
- Maintain a healthy weight. Being overweight can put unnecessary and injury-causing stress and strain on your back.
- Practice good posture and avoid slouching. Try to remember to support your back when sitting or standing.
- Avoid lifting heavy items whenever possible. If you do lift a heavy item, use your leg and abdominal muscles instead of your back.

Research Progress Related to Back Pain

Research on back pain focuses on:

- Managing chronic low back pain. The NIH **Back Pain** Research Consortium (BACPAC) is a patient-centered research initiative to improve understanding of the condition and generate new tools for better targeting of existing and new therapies.