

Chronic Back Pain

Description of the Disability

Although it seems simplistic, the defining characteristic of chronic back pain is pain in the back that lasts longer than 3 months. Back pain less than 3 months is defined as acute.

Chronic back pain is, in some ways, a loose construct. In many instances, physicians do not know why a person has back pain. X-rays and other imaging techniques often do not show any major abnormalities that might cause the pain. In many other instances, physicians cannot explain why a person does NOT have pain when their X-rays show significant problems. In addition, when there is a detectable abnormality in the spine, the amount of pain an individual feels is not correlated to the medical severity of the spinal problem. Very significant problems may not cause much pain at all, and minor problems may be extremely painful.

Also see the entry on Chronic Pain in this handbook.

Part of the problem with determining the cause of back pain is the length of the spinal nerves, which stretch from the skull, down the spinal canal, and out through joints in the vertebrae to the limbs and other parts of the body. Because nerves detect and transmit signals (such as pain, touch, hot/cold, etc.) at their ends, the middle part of the nerve, which is buried in the spine, can be relatively insensitive. Pinching and inflammation of these nerve "roots" (the long arms of the nerve that stretch out from the nerve body) are just as likely to cause numbness, pain, or motor problems in the legs or arms to which they connect than to cause back pain at the site of the pinching.

Another reason for the loose definition is that back pain can be caused by injuries in the large muscle sheets in the back, which may or may not be associated with vertebrae and disk problems. Unfortunately, the body does not distinguish between back pain from minor muscle damage or more significant spinal problems - they can feel nearly identical. One of the main treatments for back pain is strength and flexibility exercises to improve these muscles, which can in turn support the spine better. One treatment that is usually avoided is extensive bed rest, since that can allow these muscles to lose strength and tone.

Physicians distinguish three main patterns of back pain:

- Axial Pain (or mechanical) - pain localized to the back. This is the most common type of back pain and it usually gets better with simple, non-invasive treatments such as physical therapy and pain medications. Usually certain activities make it worse and rest makes it better. An exact diagnosis of the cause is not important to treatment, and may not be possible. Surgery is rarely used for this kind of back pain.

- Referred Pain - achy, dull pain that extends from the back down into the extremities along the nerve path. The pain can move around some, vary in intensity, and come and go over time. The cause is usually the inflammation of a set of interconnected sensory nerves for some reason. As with axial pain, treatment is usually simple, non-invasive techniques that let the tissues calm down and recover. Surgery is rarely helpful.
- Radicular Pain - Deep, steady pain that radiates from the back down into the extremities and is associated with particular activities, such as standing, walking or sitting. Numbness, tingling, and muscle weakness may accompany the pain. Sciatica is the most common version of radicular pain and involves the large sciatic nerve that runs down the back of the leg into the foot. This type of pain is usually related to a compressed, inflamed nerve in the spine due to disk herniation, spinal stenosis, (see below) or nerve root damage.

Most of the time, back pain is localized to the lower back. You may recall that there are 7 cervical vertebrae in the neck, 12 thoracic vertebrae in the upper back, 5 lumbar vertebrae in the lower back, and 5 fused sacral vertebrae at the base of the spine. The thoracic vertebrae are all anchored to the rib cage and are held rigidly in place, so they are rarely injured. Most of the body's flexing and bending occurs lower down, in the 5 lumbar vertebrae and the hips. A large part of the low back motion is in the L4-L5-S1 range, so these are the vertebrae and disks most commonly damaged and most commonly involved in back pain.

Between each pair of vertebrae is a shock-absorbing disk of spongy protein. Spinal disks are sometimes compared to jelly doughnuts because outer part of the disk is stiff and the inner part is gelatinous. The very outer edge of the stiff outer part of the disk has some nerves that can cause pain. The inner part does not have any nerves, but it contains proteins that irritate any nerves they touch. As we age, the inner part gradually loses its fluid and turns stiffer. The disks grow thinner and wear down. Past age 60, this increasing stiffness seems to help prevent back pain by limiting motion. The prime years for back pain are the mid 30s to about age 60.

Common sources of chronic low back pain in adults between age 20 and 60 include:

- Herniated Disks (also called a ruptured disk, slipped disk, radiculopathy, disk protrusion, or bulging disk) - If the outer part of a disk is damaged, it can "herniate" or bulge out into the spinal canal where the nerves are. This can pinch and inflame the nerve roots running past the disk and cause RADICULAR PAIN (see above). Generally, the herniated disk does not actually rupture and allow the inner proteins out to inflame the nerves. Instead, the outer part weakens and bulges, losing its symmetrical shape, but it still safely encloses the inner core of the disk. Alternatively, the nerves on the outside of the herniated disk itself may become irritated, causing localized AXIAL PAIN. In some cases, surgery to relieve the pressure on the nerve can help (microdiscectomy).
- Degenerative Disk Disease - As discussed above, the disks flatten and weaken with age. This can lead to some instability in the movement of the disk (called micromotion) and

allow the inner proteins to emerge and inflame the nerves. In spite of the name Degenerative Disk Disease, this condition does NOT lead to ever increasing pain over time (so it isn't degenerative in that sense) and it is not distinctly different from normal aging (so it isn't exactly a disease). A degenerative disk can cause REFERRED PAIN (see above) by inflaming the sensory nerves. It may also lead to AXIAL PAIN from muscle spasms (as the muscles try to stabilize the instability) or from irritation of the nerves in the outer part of the disk. Sitting, lifting, and twisting will often make the pain worse. Standing, walking, or running may make it better. In extreme cases, surgery to fuse the vertebrae (spinal fusion) can help by stopping the micromotion.

- Isthmic Spondylolisthesis - Sometimes during childhood the lowest lumbar vertebrae acquires a stress fracture (not a traumatic fracture) and actually slips forward and out of place. 80% of the time when this happens, it never causes any pain for the person. In the remaining individuals, the situation leads to back pain later in life, usually starting in young adulthood. The condition can lead to disc degeneration (see above) or to pinching of the nerve (see the symptoms of herniated disk, above). It is usually treated similarly to degenerative disc disease.
- Unknown - it is important to remember that in many instances physicians simply do not know the cause of chronic back pain. Different specialists may give different diagnoses and MRIs may not show anything abnormal. Fortunately, chronic back pain is generally not progressive with age, is generally not life threatening, and generally cannot lead to paralysis. Also fortunately, most treatments for back pain do not require a definitive diagnosis. So an individual can get effective medical treatment for back pain even when physicians do not understand the cause of the pain. However, surgery is usually not an option without a clear diagnosis.

After age 60, common sources of chronic low back pain include:

- Facet Joint Osteoarthritis - The vertebrae have two main pieces that move relative to each other - one part that sits between the disks and one part that covers the rear portion of the spinal canal and loosely hooks to the next vertebrae. The parts of the vertebrae that surround the spinal canal (where the nerves run up and down) are called facets and the places they touch each other and flex are called facet joints. Normally these joints are coated with cartilage and fluid filled sacks for smooth flexing. Osteoarthritis can damage the cartilage and increase friction in the facet joint, leading to pain and reduced motion. The pain is usually worse in the morning - as the person moves, fluid will build up in the joints and ease the friction. The pain may return towards evening after the accumulated activity of the day. The osteoarthritis may be caused by cumulative trauma to the spine from work or recreation. Surgical fusion is not usually appropriate because the problem is spread over so many vertebrae.

- Lumbar Spinal Stenosis - This involves the narrowing of the spinal canal, putting pressure on the nerves. As the facet joints (see above) wear with age, the body tries to compensate for the wear by depositing more bone, making the surfaces larger to spread the stress over a bigger area. Unfortunately, these facet joints are sitting right next to channels where the spinal nerves emerge from the spinal canal and spread into the body. If the facet joints get too large, they can pinch the nerves emerging at that vertebra, or simply crowd them and block the blood flow to the nerves, which enflames the nerves. Standing up straight further shrinks the channels for the nerves, increasing the pain. Sitting is more comfortable, and walking bent over (with a walker or cane) is more comfortable. When it is used, surgery involves removing some of the extra bone to relieve the pressure.

- Degenerative Spondylolisthesis - this is a disk slippage similar to the spondylolisthesis seen in younger adults (see above) but the movement of the disk is caused by instability from osteoarthritis in the facet joints instead of a childhood stress fracture. In addition, it usually involves the L4 disk rather than the L5 disk. The body tries to restabilize the disk by enlarging the facet joints, pinching the nerves (see lumbar spinal stenosis above). Treatment is usually identical to lumbar spinal stenosis.

- Bone Spurs - Despite their name, bone spurs in the back are not bony points or knobs off the vertebrae. Instead they involve the sheets of ligaments located in the tough, fibrous outer portion of the disks and attaching to the vertebrae above and below. As the disks degenerate with age, the spine can become less stable. One way the body compensates for this is by thickening the ligaments in the disks. Eventually, these thickened ligaments can calcify, slowly fusing the vertebrae together. This results in flecks of bone inside the ligaments called bone spurs or osteophytes. As the ligaments thicken and calcify, they can sometimes squeeze the nerves emerging from the spine and cause pain (see lumbar spinal stenosis). However, most of the time bone spurs are not the direct cause of pain. It is more common that the bone spurs are simply markers for overall wearing of the spine, including osteoarthritis - which is a more likely cause of pain than the bone spurs themselves.

Coexisting Conditions:

- Depression
- Substance abuse

Incidence Statistics

- 80% of the population will experience back pain during their lives
- 50% of people with acute (short-term) back pain will have a recurrence within a few years

- Back pain is one of the top five most common disabilities among VR applicants nationally
- People in poor physical condition are at higher risk, but even very active individuals can get low back pain. Others at risk include people doing heavy labor and people who sit or stand for long periods of time.
- Individuals between the ages of 30 and 50 are more likely to have back pain than individuals over 50
- Back pain accounts for 25% of all workman's compensation claims
- The lumbar disks experience 3 times as much pressure when sitting than when standing.
- Back pain is the leading cause of disability in men more than 45 years old
- 90% of back problems originate in the lumbar region
- There does not seem to be a significant genetic component in back pain
- More than 90% of all back pain is treated successfully without surgery
- 30% of all 30 year olds have signs of disk degeneration on MRI scans but have no associated pain

Common Treatments, Medications, and Side Effects

As discussed above, treatments for back pain can frequently proceed even without a precise diagnosis of underlying medical causes. 90% of all treatment for back pain is "conservative", meaning it does not require surgery. Many treatments focus on temporary relief from the pain, allowing the back to recover or allowing the individual to participate in physical therapy to strengthen back muscles. In some cases, such as TENS and epidural injections, there is no precise explanation for how the treatment relieves pain, but it seems to be effective for many individuals. Consequently, treatment often consists of trying several approaches to see which ones help the individual manage their pain.

Drug Therapy - drugs used to control back pain include:

- Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) (Ibuprofen) See drug entry on NSAIDs for side effects
- Adjuvant Analgesics (antidepressants and anticonvulsants). See drug entry on antidepressants and anticonvulsants for side effects.
- Narcotics – see drug entry on narcotics for side effects.
 - codeine (e.g. Tylenol #3)
 - propoxyphene (e.g. Darvocet)
 - hydrocodone (e.g. Vicodin)
 - oxycodone (e.g. Percocet, Oxycontin)

- Muscle relaxants - drugs with overall sedative effect on the entire body - including Carisoprodol (Soma), Cyclobenzaprine (Flexeril), Diazepam (Valium)
- Oral Steroids - suitable for short-term use. Long-term use leads to significant side effects. See drug entry on steroids for side effects

Other Therapies

- Traction.
- Epidural Steroids - injected into the spine. They probably work by flushing away inflammatory proteins and by fighting inflammation directly. Helps 50% of individuals, but duration of relief varies from 1 week to 1 year.
- TENS (Transcutaneous Electrical Nerve Stimulation) - there are several variations on the idea of electrical stimulation, and why they work is unclear. The cost varies and some can be quite expensive. The treatment is mildly uncomfortable.
- Massage
- Biofeedback
- Acupuncture
- Ultrasound
- Meditation
- Herbal remedies
- Chiropractic manipulation
- Hot and cold packs.

Surgery is generally used only when the back pain is very debilitating and when there is a clear diagnosis of its cause. There are various names for the surgeries used, but they typically fall into three categories:

- Disk removal - removing part of a herniated disk to relieve pressure on a nerve.
- Bone removal - removing bony growths that are pinching nerves
- Fusion - fusing vertebrae together to eliminate movement at that joint

Possible Functional Issues

- Limited range of motion
- Drowsiness from pain medication
- Difficulty concentrating during flare-ups
- Fatigue
- Difficulty sitting (or standing) for long periods of time

- Inadvertent disclosure during job interviews from casual comments or excessive shifting in chair

(see Chronic Pain Entry for more)

Initial Interview Considerations

Initial Questions

- Which if any specific movements or activities trigger the pain?
- How has the pain affected their ability to work? What activities has it limited?
- How has the pain affected their home life?
- How much trouble do they have sleeping? If any, do they feel drowsy during the day?
- How often does the pain flare up?
- In what pattern if any does pain occur or flare up?
- How often and severe is pain in between flare-ups?
- How often are they able to drive? Are there times when they cannot drive?
- What treatments have helped with the pain?
- Are there any side effects to the treatment? Does it make them tired?
- How often do they drink to relieve the pain?
- How often do they get depressed because of the pain?
- How long can they sit comfortably?
- How long can they stand comfortably?
- At what point does it hurt to walk?
- Is there a specific kind of chair or other equipment that seems to help?
- How do they pass the time when they are having a flare-up? (gets at other aspects of their life, at activities they can perform during pain)
- Are they able to lift a grocery bag without difficulty?

Initial Observations

- Do they shift in their chair excessively during the interview.
- How well do they walk? Do they seem to be in pain?
- Are they able to reach for objects on a desktop?
- Do they seem depressed?

Interview Accommodations (if any)

- Ask if they would rather stand than sit
- Provide an opportunity to get up and move around partway through the interview

Possible Accommodations and Assistive Technology

- Flexible work schedule to accommodate flare-ups
- Arrange workspace to minimize reaching, bending, or other painful motions
- Arrange a jobsite visit by a rehabilitation engineer to assess the workspace
- Provide a private area for the person to rest or stretch if needed
- Ergonomic chair
- Wireless phone headset (to allow answering the phone without long periods sitting)

Career Planning Issues

- Prior work history may be focused on blue collar, heavy labor jobs
- Cognitive functions should not be affected
- Social skills should not be affected
- Learning skills should not be affected
- The back pain will usually not get worse with age and it may actually decrease, so range of motion and functional abilities are probably stable.
- Long periods standing or sitting may be a problem

Emerging Issues

- Effective treatments
- Surgical techniques
- Psychological components of back pain

Additional Information Resources

- Spine-Health.com, www.spine-health.com
- StopPain.org (Beth Israel Medical Center), www.stoppain.org
- American Academy of Orthopaedic Surgeons, orthoinfo.aaos.org

- Backsaver.com
- [IMPACC USA](http://IMPACCUSA.com). - a group of industrial physical therapists specializing in back pain,
www.impaccusa.com