

My Aching Back!

Lower Back Pain

Part I: Structure and Problems



Almost everyone experiences low back pain at some time. 80% of adults will experience lower back pain at some point in their lives.^{1,2,3,5} About one in six Americans had back pain every single day during the past month, according to a national survey.² The *average* length of time people suffer with back pain is 14 days per month, and often these people don't seek the advice of trained professionals to treat or improve their condition.²

Ironically, the severity of the pain is often unrelated to the severity of the damage. A muscle spasm can be excruciating, while a herniated disc or completely degenerated disc can be painless.³ The causes of pain can be very complex because there are so many structures in the lower back.³ To add to the challenge, when you are suffering back pain, it's hard to decide what type of treatment to seek. Doctors rarely agree on how to treat back pain since they often don't understand what causes it, or if it's not something they are specialized to correct, they offer no suggestions or referrals to other types of practitioners who may help.⁴ Who you see determines what type of treatment you get. From rheumatologist to neurosurgeon, from chiropractor to massage therapist, each has a different view of what causes lower back pain and will treat you accordingly.⁵ If a surgeon doesn't find a problem he can fix, he will probably not refer you to a physical therapist or an ergonomist.⁴ 65 million Americans with low back pain spent \$27 billion last year on a wide variety of cures including back surgery, drugs, back classes, and assorted gizmos.⁵

In this three part series, we will discuss the common causes of lower back pain, how to avoid it, and what to do if you experience it.

Should you see a physician?

Most lower back pain can be treated without advice from a doctor. However, there are a few symptoms that are potential indications of a serious medical condition. You should seek medical attention immediately if you experience:^{3,7}

- Sudden bowel and/or bladder incontinence
- Progressive weakness or pain in the legs, feet or toes
- Severe, continuous abdominal and back pain
- Fever and chills
- History of cancer with recent weight loss
- Severe trauma or accident

As with upper back pain, lower back pain in children should be treated seriously. Young children rarely experience back pain, so if there has been no injury, back pain could signal a serious condition such as a spinal tumor, growth, or an infection of the spine.⁸ Older children tend to be more aggressive in activities and sports, and carry heavy back packs, which increases the possibility of compression fractures and

occasional disc injuries. Tumors and infection of the spine may occur in teens, but back pain in teens is most often caused by sports injuries or overuse syndromes.⁸ Scoliosis - curvature of the spine - is not uncommon among teenagers, but it rarely causes back pain.⁸

You don't have to suffer and it could be shrinking your brain!

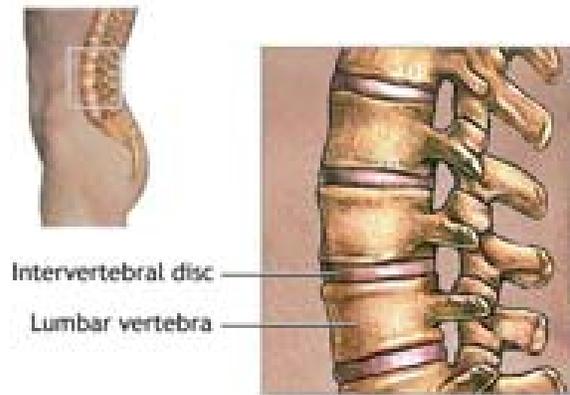
Less than 1% of back pain sufferers need surgery.⁷ Most back pain is caused by sprains and strains.¹⁰ Even chronic back pain is often due to a lack of conditioning, excess weight, or other things that can be treated by yourself.

It's well known that chronic back pain decreases the quality of life and increases anxiety and depression. Another consequence was recently reported by Northwestern University researchers. The study found that chronic back pain actually shrinks the brain by as much as 11%, about the same as aging 10 to 20 years.¹⁰ Specifically, it shrinks the part of the brain responsible for memory and information processing.¹⁰ Those with chronic back pain and sciatica had the largest decrease in gray matter.¹⁰ The more years someone has chronic back pain, the more brain loss they suffered.¹⁰ The reason for this is still not known, but the association was clear.

Anatomy of the Lower Back

The lower back, called the lumbar region, is a complex structure of vertebrae, discs, spinal cord, nerves, ligaments and muscles. The lumbar region of the back supports the weight of the upper body. The lumbar region consists of:^{1,5,11}

- 1) **Five vertebrae**, called the lumbar vertebrae (labeled L1-L5).
- 2) **Six discs**, made of spongy pads of cartilage, that cushion and stabilize the lumbar vertebrae. 80% of the disc is water. The disc with the attached part of the vertebra above and below is considered an intervertebral joint, allowing movement of the back.
- 3) **Facet joints** that connect the two lower projections of one vertebra to the two upper projections of the vertebrae below it.
- 4) **Ligaments** that hold the vertebrae in place and attach the muscles to the spinal column. Together with the muscles, they provide strength, support, power and stability to the lower back.



ADAM

Illustration courtesy of Reference 12.

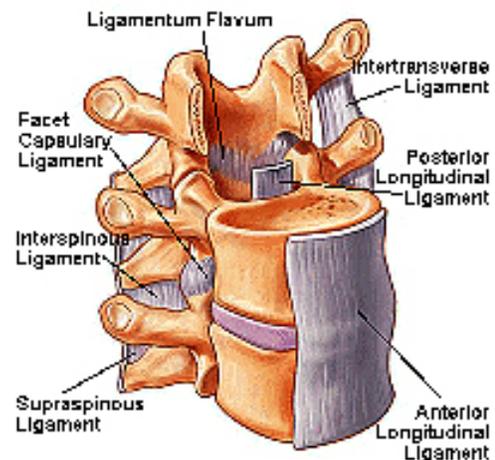


Illustration courtesy of Reference 13.

5) **Muscles and tendons** that support the spine, much like the guide ropes that support a tent. The muscles of the back connect each vertebral segment to the next and are responsible for controlling the movement of the lower back for such activities as straightening the back, bending forward at the waist, and bending backward. The abdominal muscles, located at the front and side of the abdomen, are very important in supporting and protecting the abdominal internal organs and also play an important role in protecting movement of the vertebral column in backward, forward and side bending.

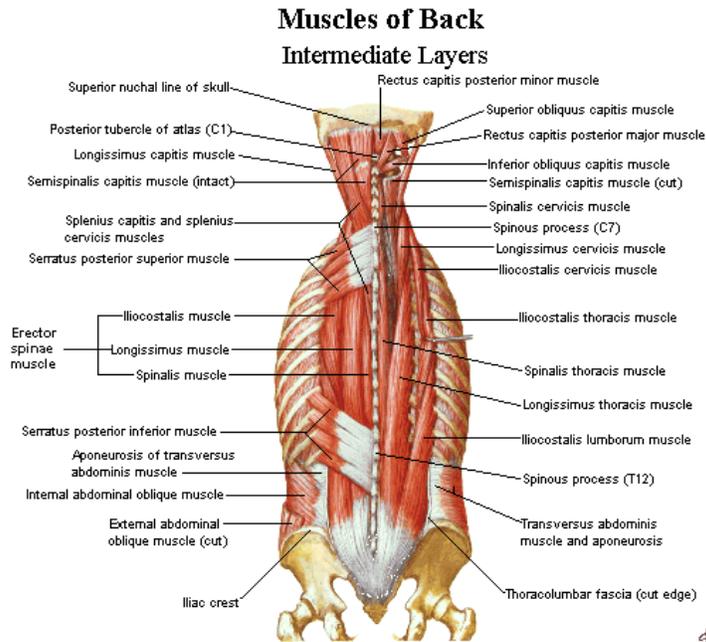


Illustration courtesy of Reference 14

6) **Spinal cord and nerves** that travel through a central hole in each vertebra. The nerves that come off the spinal cord are called nerve roots. They pass through small openings on either side of the connecting vertebrae and combine to form spinal nerves. There are five pairs of lumbar spinal nerves. The bundle of nerve roots that exit the bottom of the spine is called the “cauda equine” because it looks like a horse’s tail. A detailed nerve chart of the whole back is shown in Attachment 1.

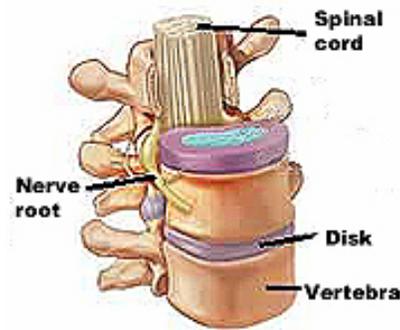


Illustration courtesy of Reference 14.

Lower Back Problems

Men and women are affected equally by lower back pain.¹ Problems occur most often between ages 30 and 50.¹ Because the structure of the back is very complex, pain may come from any of these structures or it may actually be caused by pain radiating from other areas such as the mid or upper back, the hamstrings, a hernia in the groin, or problems in the ovaries or testicles.^{12,18} Sensations vary when you hurt your back, from burning or tingling, dull aching, sharp pain, or weakness in your legs or feet.¹² Low back pain may be acute -- lasting less than a month -- or chronic -- lasting more than three months.^{1,12} Acute back pain occurring more than once is common, but continuous long-term pain is not.^{1,12} In most cases, improper standing, sitting, or lifting causes pain, even though it seems that one simple movement such as reaching for something or bending at the waist was the cause.¹²

As people age, there is a decrease in bone strength and muscle elasticity and tone. The discs begin to dry out and lose flexibility, decreasing their ability to cushion the vertebrae.¹ This is not always a bad thing, since discs that are less full of fluid are less likely to rupture. However, in some cases, the loss of cushioning is a problem.⁴ Most low back pain follows injury or trauma to the back, but pain may also be

caused by degenerative conditions such as arthritis or disc congenital abnormalities in the spine.¹ Obesity, smoking, weight gain, stress, poor physical condition, inappropriate posture, and poor sleeping position may also contribute to lower back pain.¹ In fact, the combination of ergonomics and fitness are cited as two of the most important preventive measures that can be taken to reduce or eliminate most back problems and pain.⁴

1. Strains

The most common causes of lower back pain are muscle strains^{9,17,18} Despite their size and strength, muscles of the lumbar spine can rip or tear, which is called a muscle strain. This is generally caused by a sudden movement, a fall, or lifting a heavy object.^{9,12,17} The muscle and blood vessels within the muscle tissue rips. This may cause bleeding into the injured area. It can take up to 2-3 hours before sufficient bleeding or irritation sets in to produce significant pain. For this reason, many people can tolerate finishing a task at hand, only suffering intense pain later.⁹ Tearing of the muscle tissue is often followed by pain, swelling, and muscle spasms.⁹ Acute low back pain from lumbar strains and sprains can be accompanied by sciatica, an irritation of the sciatic nerve that causes pain into the buttock and leg.^{9,17}

2. Sprains

Sprains refer to an overstretching of one or more of the ligaments of the back. The ligaments can be stretched beyond their natural integrity and in some cases can completely tear.⁹ It is common for muscle and ligament strains to occur together.⁹

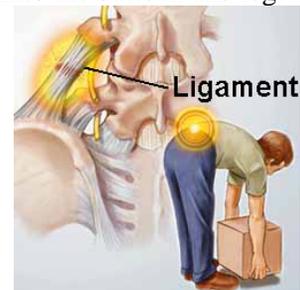


Illustration courtesy of Reference 19.

3. Disc Injury and Sciatica

A herniated disc, sometimes incorrectly referred to as a slipped disc, is a disc that bulges out from its position between two vertebrae. There are four types of disc herniation and a variety of bulging discs, but they all have the potential to cause compression against a nerve, producing sciatica.⁹ As described above in the section on Strains, pain is caused by compression of the nerves as they exit the spinal column resulting in pain radiating into the buttock or down the leg, sometimes accompanied by a sensation of numbness or tingling in the leg.⁹

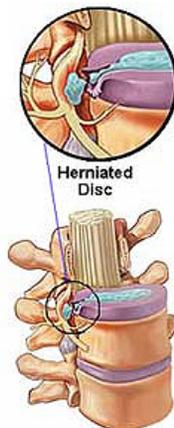
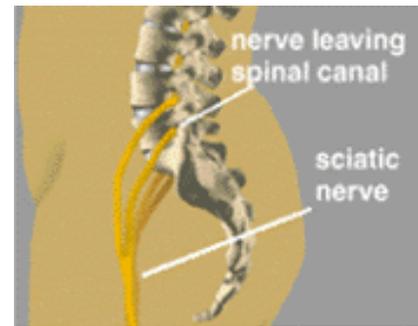


Illustration courtesy of Reference 13



Illustration courtesy of Reference 19

4. Spinal Stenosis

Spinal stenosis is a narrowing of the spinal canal. It can be congenital (a birth deformity), although generally it affects people over 50 and results from degenerative changes or osteoarthritis when bony formations, called osteophytes, form around the joints of the spine.^{1,9} These formations, in conjunction with the thickening of the ligaments inside the spinal canal, reduce the space available for the spinal cord and nerves. The resulting nerve compression may cause back pain and pain in the thigh or leg that is often made worse by long periods of standing or walking, especially downhill.⁹ It can also cause weakness in the legs.⁹

5. Osteoarthritis

Osteoarthritis occurs when the cartilage between the vertebrae is damaged.⁹ It is a natural result of stresses applied to the spine throughout life.⁹ It may affect a single joint or several joints in the spine.⁹ Bony outgrowths, called spurs, develop along the junction of vertebrae and discs.⁹ Narrowing of the space between vertebrae and erosion of the bone beneath the joint may also occur.⁹ Read more about osteoarthritis in our article at http://working-well.org/articles/pdf/Arthritis_fibro.pdf.

Other Back Problems

The following are not related to wear and tear of the lower back structures from overuse, but are important to consider in the discussion of lower back problems.

1. Osteoporosis

There is a decrease in bone density and strength with osteoporosis.^{1,9} This occurs when the body fails to produce new bone or absorbs too much existing bone.⁹ Women are four times more likely than men to develop osteoporosis, especially after menopause.¹ Signs of osteoporosis are subtle and can be easily missed, so many people do not know they have osteoporosis until a bone actually breaks.⁹ Often fractured vertebrae causes back pain or deformity.⁹

2. Spondylolisthesis

This is a condition where one vertebra slips forward on the one beneath it. It may occur as a result of trauma or osteoarthritis, or it may be congenital. There may be no symptoms or there may be pain and stiffness.⁹ If the slip has caused pressure on the nerve root, pain may be felt in the buttocks or thigh.⁹ With a major slip, an increase in the bend of the lower back may be noticed.⁹

3. Pregnancy

For most women, back pain is unavoidable during pregnancy.⁹ In early pregnancy, hormonal changes result in increased joint laxity.⁹ The spine, abdominal and back muscles become more relaxed.⁹ Poor posture and poor muscle tone prior to pregnancy can affect how the back adjusts. As the abdomen protrudes, both gravity and hormonal changes continue to relax the muscles of the low back and abdomen, increasing lumbar curve, and placing stress on the lower back muscles and lumbar spine.⁹ Sciatica can also develop from the increased size of the baby itself, placing pressure directly on the nerves of the lumbar area.⁹ Sciatica almost always disappears following delivery of the baby.⁹

4. Skeletal irregularities

Skeletal irregularities produce strain on the vertebrae and supporting muscles, tendons, ligaments, and tissues.¹ These irregularities include scoliosis (a curvature of the spine to the side), lordosis (an abnormally accentuated arch in the lower back), back extension (a bending backward of the spine) and flexion (a bending forward of the spine).¹

5. Fibromyalgia

Fibromyalgia is believed to be a result of inflammation of the body's connective tissue and it may cause chronic back pain.^{1,9} For more information on Fibromyalgia, please read our article on Osteoarthritis and Fibromyalgia at http://working-well.org/articles/pdf/Arthritis_fibro.pdf.

6. Spondylitis, osteomyelitis, and sacroiliitis

Spondylitis refers to chronic back pain and stiffness caused by a severe infection to, or inflammation of, the spinal joints.¹ Osteomyelitis is an infection in the bones of the spine.¹ Sacroiliitis is inflammation in the sacroiliac joints.¹

The next article will address Lower Back Pain Prevention, and the final article in the series will cover Lower Back Pain Treatment options.

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This article and all of our articles are intended for your information and education. We are not experts in the diagnosis and treatment of specific medical or mental problems. When dealing with a severe problem, please consult your healthcare or mental health professional and research the alternatives available for your particular diagnosis prior to embarking on a treatment plan. You are ultimately responsible for your health and treatment!

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Attachment 1.

VERTEBRAL SUBLUXATION AND NERVE CHART

A Vertebral Subluxation Complex (VSC, Bio-Mechanical Lesion) has numerous components, i.e., osseous (bone), neurological (nerve), connective tissue (muscles, ligaments and discs), lymphatic, circulatory, biomechanical alterations (curvatures, etc.) and somato-visceral (tissue, organs, etc.), which may cause irritation and/or compression of nerve roots and affect these components.¹ The nervous system controls and coordinates all organs and structures of the human body. Many nerves come from the spinal cord, pass through foramina (holes) formed by notches of 24 vertebrae in the movable spinal column, and innervate or supply specific areas and parts of the body.² Whenever specific areas or parts of the body are malfunctioning, generalized and/or specific symptoms are possible.³

SPINAL VERTEBRAE	Spinal Nerves	Areas and Parts of Body	Possible symptoms	
CERVICAL SPINE (NECK)	1C	Back of the head	Headaches (including migraines, aches or pains at the back of the head, behind the eyes or in the temples, tension across the forehead, throbbing or pulsating discomfort at the top or back of head)	
	2C	Various areas of the head	Jaw muscle or joint aches or pains	
	3C	Side and front of the neck	Dizziness, nervousness, vertigo	
	4C	Upper back of neck	Soreness, tension and tightness felt in back of neck and throat area	
	5C	Middle of neck and upper part of arms	Pain, soreness, and restriction in the shoulder area	
	6C	Lower part of neck, arms, and elbows	Bursitis, tendonitis	
	7C	Lower part of arms, shoulders	Pain and soreness in arms, hands, elbows and/or fingers	
THORACIC SPINE (MID-BACK)	1T	Hands, wrists, fingers, thyroid	Chest pains, tightness or constriction	
	2T	Heart, its valves and coronary arteries	Asthma, difficult breathing	
	3T	Lungs, bronchial tubes, pleura, chest	Middle or lower mid-back pain, discomfort and soreness	
	4T	Gall bladder, common duct	Various and numerous symptoms from trouble or malfunctioning of: Thyroid Heart Lungs Gall bladder Liver Stomach Pancreas Spleen Adrenal glands Kidneys Ureters	
	5T	Liver, solar plexus		
	6T	Stomach, mid-back area		
	7T	Pancreas, duodenum		
	8T	Spleen, lower mid-back		
	9T	Adrenal glands		
	10T	Kidneys		
	11T	Ureters		
	12T	Small intestines, upper/lower back		
LUMBAR SPINE (LOW BACK)	1L	Iliocecal valve, large intestines		Small and large intestines
	2L	Appendix, abdomen, upper leg		Sex organs
	3L	Sex organs, uterus, bladder, knees		Uterus
	4L	Prostate gland, lower back	Bladder	
	5L	Sciatic nerve, lower legs, ankles, feet	Prostate glands	
SACRUM & COCCYX (PELVIS)	SACRUM	Hip bones, buttocks	Low back pain, aches and soreness	
	COCCYX	Rectum, anus	Trouble walking Leg, knee, ankle and foot soreness and pain Sciatica, pain or soreness in the hip and buttocks Rectal Trouble	

For further explanation of chart, ask your Doctor of Chiropractic.

¹ Murkowski, K.S.J. Doctor's Works — Vertebral Subluxation Complex, 1989, 1990.

² Gray's Anatomy, 29th Edition, Page 4. Note: Neurological innervation of the human body overlaps in its supply to different areas and parts of the body as well as differ somewhat in different sections. This chart is a simplification of actual innervation. It has been designed for ease of layman's understanding and general education and is not meant and should not be construed as anatomically accurate in its specific sense.

³ Koch, Robert A. The Chiropractic Invertebral—A synopsis of scientific research, 2nd Edition, Baltimore, Williams & Wilkins, 1976/87.

Note: The possible symptoms listed in this chart are not meant and should not be construed to mean that all these possible symptoms are produced whenever there is a vertebral subluxation complex at a specific vertebral level or that chiropractic care will correct all of these conditions.