

Low Back Pain and Sciatica Explained

How big is the problem?

- 50% of all working age persons or one of every five Americans have back pain each year.
- Back pain is the most common form of disability under the age of 45.
- 2% of Americans are disabled because of back pain.
- 20-50 billion dollars is spent each year treating back pain alone.

Who is more at risk?

- Anyone who does repetitive or heavy lifting.
- Anyone who has job exposure to whole body vibration.
- Anyone who works in an asymmetric posture.
- Anyone who holds the same posture for long periods of time.

How is it prevented?

1. Maintain mental and physical fitness.
2. Lift and carry objects close to the body.
3. Bend your knees when you pick up objects, not your back.
4. Use the right equipment to do jobs, the time and money saved is not worth a possible back injury.
5. Consider wearing a lumbar corset during work (available at most department stores).
6. Consider wearing shoe inserts if you stand for long periods of time.
7. Use a brick sized footrest for one leg when sitting or standing for long periods of time.
8. Rotate job tasks to avoid the prolonged repetitive activity. You may need to change some daily activities to keep from irritating your back.

When it happens, what do you do?

1. After the initial injury, rest in bed no more than 2-4 days.
2. Allow for gradual return to duty- work a half day until you get your conditioning back.
3. Set and keep goals or quotas for duty- do not let pain be your guide for when to stop.

4. Rehabilitate with low stress aerobic exercise: rapid walking, swimming, or biking.
5. Strengthen the abdominal muscles.
6. Start a flexibility program.
7. Seek the help of a specialist.

The doctor said I have a herniated disc at L4/5. What does that mean?

The numbering system used by doctors to describe the location of injuries can be confusing. Essentially, each bone (vertebra) is given a number. The low back is known as the lumbar area. The first lumbar vertebra is called L1 (L is for Lumbar) and it is the first vertebra that does not have a rib attached to it. The next lower vertebra is L2, and next L3, etc. There are a total of 5 lumbar vertebra in most people, thus the lowest one is L5. The last lumbar vertebra sits on top of the first sacral vertebra, known as S1. (S is for Sacral). Because the discs are located in between the vertebra, the doctor must name the vertebra above and below it to describe its location. Thus the disc at “L4/5” for example is the one between the 4th and 5th lumbar vertebra. If you draw a line across the top of your hips, this is approximately the L4/5 area. L5/S1 is the area between the 5th lumbar vertebra and the first sacral vertebra. This is in the small of your back.

Causes of Low Back Pain and Sciatica

It is best to think of the causes of low back pain in two ways. The first is pain due to disc problems. The second is everything else, also known as non-diskogenic pain. **Sciatica** is a general term, which can be thought of as describing pain that goes down the back or side of the leg. The sciatic nerve is a very large, long nerve which is comprised of branches from three levels of the back, L4, L5, and S1. These nerves join in the back and travel in a bundle down the leg all the way to the foot.

Non-diskogenic Pain

Many physicians treat low back pain in a generic way. When the patient doesn't improve, he/she seeks a second opinion, and costs mount. Often the non-diskogenic causes of back pain are

overlooked, which is unfortunate, as some can be treated on the spot. The following are a few of the more common causes of low back pain that you should be aware of. In general, the pain tends to be more aching and in the low back than sharp.

Piriformis Syndrome

Direct trauma to the buttock such as in a fall from a slippery surface, or a slight twisting injury while carrying weight can cause injury to a muscle deep in the center of the buttock known as the piriformis muscle. The problem can also be related to a large difference in length of the legs. Typically the injury occurs where the muscle attaches to the sacroiliac joint or hip. Besides pain directly from the muscle, the muscle can also cause pinching of the sciatic nerve as it passes through a hole near the muscle known as the sciatic foramen. This is what can cause the pain to go down the leg. Last, misalignment of the pelvis or problems in the sacroiliac joint can also cause related piriformis pain.

Treatment is directed at correcting the offending problems such as wearing a heel lift or custom shoe if one leg is longer than the other, or performing a piriformis injection to relax the muscle and decrease sciatic nerve swelling. In rare cases surgery has been performed to widen the area pinching the sciatic nerve.

Iliolumbar Syndrome

This results from sprain of the iliolumbar ligament, and often is lumped under the broad category of lumbar sprain. This ligament is a band of tough tissue that acts as a “tie down” between the last bone of the spine (transverse process of the 5th lumbar vertebra) and the pelvis (iliac crest). People who lift objects while twisting are prone to this syndrome. A telling sign of this problem is tenderness to touch in the back just over the top of the hip, which is just about belt level on most people. It is not unusual to find one leg more than 1.5 cm longer than the other, with pain usually on the side of the *longer leg*.

Treatment can be as simple as a local injection. Of course leg length discrepancy must be corrected if found.

Sacroiliac Pain

Some authors put the incidence of this problem as high as 2-3% of the population. An old term for this problem was ‘lumbago’.

Sacroiliitis is a type of pain that is seen most frequently in young adults and can be the first symptom of a developing 'seronegative spondylopathy'. This term basically means it is arthritis that isn't rheumatoid arthritis. **Ankylosing spondylitis** is one such example. It is a phenomenon primarily in young men where the spine becomes less and less flexible with time. Recent infections such as bladder, or gynecological in women or venereal in men can precede sacroiliitis. Again pain can be in the low back, buttock and thighs.

Sacroiliac joint strain or sprain can be caused by trauma including leaning forward, lifting and object, or sudden deceleration. When walking, the patient will tend to lean toward the good side, and not sit on the painful side. Diagnosis is made by the doctor performing maneuvers that put pressure on the joint, and having this recreate the usual pain. Then numbing medicine is put into the joint, to see if the pain is relieved. There are many treatment modalities available, including manipulation, heat, cortisone injections, electrical therapy, acupuncture and back braces.

Quadratus Lumborum Syndrome

The quadratus lumborum muscle spans the area from the last rib and lower 4 vertebrae to the iliolumbar ligament (see above) and pelvis. The pain and symptoms are similar to that of iliolumbar syndrome, except that there is tenderness over the 12th rib and there usually much more associated muscle spasm. Treatment is directed at stretching and exercising the effected muscles, as well as local injections.

Facet Joint Syndrome

There are two areas where one bone of the spine rides on another bone. The first is on top of the discs, the second is at the facet (zygapophysial) joints. With age or injury, these facet joints wear out (osteoarthritis), are damaged or become inflamed. Sudden twisting while lifting or sudden acceleration/deceleration are common traumatic causes. Pain is felt in the low back, hips and buttocks, but not usually below the knee. The two most common levels where problems occur are at L4/5 and L5/S1. This is probably because these are the lowest levels of the spine, and support the most weight. Thus the older you are, the heavier you are the more likely the problem. Twisting, looking up or bending to the side can aggravate

the pain. Touching the toes usually is OK. Pain that is there with touching the toes, and that goes below the knees is more likely to be caused by a disk problem. Plain x-rays of the back can show degeneration of the facet joints. Facet joint problems can cause instability of the back. With time the joint surface itself can enlarge, and press on spinal nerves causing more pain.

Typically this problem is diagnosed after failure of other techniques, such as epidural corticosteroid blocks to relieve the pain. The pain can be attacked by placing a cortisone like drug either in the joint or around the joint itself. Failing that, the nerves that work the joint may be killed by any of a variety of means. They can be frozen, zapped with microwaves (radiofrequency), or chemically killed. There can be a small patch of numb skin in the back after killing the nerves, however most patients do not notice any changes at all except in pain. It is important to have someone perform the block who is a pain specialist and who is familiar with the various procedures. Surgery can also be done. Typically this involves fusing the joint together so it won't move, and thus won't cause pain. The only problem is that the fusion can cause more wear and tear in the remaining joints above and below the fusion, and this can lead to the need for more surgery 8-10 years later.

Compression Fractures

One study estimated that compression fractures were responsible for 4% of all back pain. These can occur in the upper and lower back vertebrae. They can be associated with trauma, osteoporosis, chronic cortisone or prednisone use such as in people with arthritis, lupus, asthma, or transplanted organs, or in cancer patients. Any movement or weight bearing causes intense pain. Twisting is especially bad. Treatment is directed at reducing the chance of other fractures by starting drugs to keep calcium in the bones. These include calcitonin (Miacalcin), bisphosphonates (Etidronate, Pamidronate), vitamin D, and calcium supplements. The pain is treated with epidural catheters, nerve blocks, pain medications and TENS therapy. Epidural catheters are a small tube the size of a piano wire. It is attached to a pump that continuously drips numbing medicine and/or narcotics are into the area just outside the spine to take away the pain. It can be extremely effective, but carries a risk of infection, meningitis, temporary weakness, and temporary blood pressure problems.

Spondylolysis and Spondylolisthesis

These are terms that describe the slippage of one vertebra forward or backward on another. The most common area for this to occur is the L5 vertebra to slip forward on S1(70%) and next L4 on L5 (25%). This slippage can be congenital, from wear and tear, trauma or disease. The slippage can damage the facet joints, and cause pinching of nerves and/or the spinal cord (spinal stenosis). Pain is usually felt in the low back, buttock and thighs. The slip is easily seen on plain x-rays. The slippage causes a change in angle of the sacroiliac bone, (the hard area at the top of the butt crack) making it stick out more. Treatment is strengthening the stomach muscles, wearing a lumbar brace and surgery.

Spinal Stenosis

This is due to a narrowing of the area around the spinal cord or nerve roots itself. The problem is usually considered congenital such as with scoliosis, or acquired. Acquired stenosis can be due to trauma as from a herniated disc or slippage of one vertebra on another, degeneration as in enlargement of the facet joints, or disease such as **Paget's**. The pain usually comes on gradually, and is brought on by walking or standing, however riding a bike with the back in a forward position is OK. Arching the back as in reaching for a high shelf makes the pain worse. There may be numbness around the groin and coldness in the legs. This can sometimes be confused with narrowing of the arteries in the legs. What makes them different is that with narrowing of the arteries, pain goes away immediately when the activity is stopped. With spinal stenosis, pain goes away when the activity is stopped and the person bends forward, like in the fetal position. It may take 20-30 minutes for the pain to improve once sitting or lying down.

Pain Due to Disc Problems

Studies have shown anywhere from 20-50% of people without pain are walking around with disc disease. Therefore a finding of a herniated disc on a MRI does not necessarily mean it is the cause of the pain. Pain due to a disc problem is typically sharp, shooting in nature. It is made worse by movement of the back, and or/coughing, sneezing or straining with bowel movement. If the disc pinches a

nerve root, then pain will be felt in the general area the nerve supplies. Nerve roots are responsible for moving muscles, feeling hot, cold, sharp and dull objects, as well as your reflexes and position of your body (whether your toe is pointing up or down). There are well-described maps of what portion of the body each nerve works. Thus damage to the nerves can be diagnosed by examining each of these functions, and comparing findings to these maps. This data combined with x-rays, CT scans, MRIs and electrical nerve and muscle tests (EMG and NCS tests) can help distinguish whether pain is from the herniated disc, or whether the disc was there all along and the pain is from something else. (See above, non-diskogenic pain)

The disc is a rubbery pad which acts as a shock absorber between the vertebral bones. Therefore they bear a great deal of weight. They are designed with a hollow inside, filled with a thick gel. The outside of the disc is wrapped in layers of tough fibers. If you cut the disc in half it would look like an onion with a jelly center. Any one of the components of a disc can become injured. The gel inside can dry out or 'desiccate'. There may be too much fluid or pressure inside the disc. There can be uneven pressure on the disc. The outside of the disc may tear, and the inside material can bulge out or gel leak out. It is believed that any of these problems can lead to back pain.

The most common thing we operate for is when the disc bulges or herniates enough to pinch a nerve or squeeze the entire spinal cord. Danger signs of a squeezing of the spinal cord are inability to go to the bathroom, inability to tighten the rectum, and numbness in the area around the anus.

What is the prognosis?

The good news is that 90% of people who have severe back pain will have it go away within two months. The bad news is that 90% of these people will have the pain come back again within the next year. While back pain is one of the oldest known medical problems, first described in the Edwin Smith papyrus from 1700 BC, the prognosis today is tied to our modern industrial society and concepts of work, disability and compensation. People who don't like their jobs, people who don't like their life, people on disability, don't get well as fast or as often as people who aren't. Thus it is clear that psychological factors have a great deal to do with interpretation of pain from physical problems. Solving psychological problems may help the

physical, and solving the physical problems may help the psychological. Therefore there is no single treatment that works for all. No guarantees of success can be made because success of any given treatment depends on multiple factors which are usually not quantifiable.

Nonsurgical Treatment

Volumes of books, journals and scientific data address the issue of how to decide what is the best treatment for back pain. A variety of treatments when all combined usually offer the best chance of success.

Medications- (See pain medications page) When the body is damaged in any way, it swells or becomes inflamed. While part of a normal healing process, chronic inflammation causes pain. This is especially important when dealing with low back pain, as often nerves are pinched or traumatized and inflamed. Therefore the basic treatment is to reduce swelling. This is done with anti-inflammatory medications, such as , aspirin, NSAIDs, and corticosteroids. Because they are not good at controlling severe pain, other medications such as narotics, muscle relaxants, antidepressants and/or anticonvulsants are used.

Epidurals- Epidural blocks in pain management are similar to the epidurals used by anesthesiologists to control labor pain when having a baby. Generally accepted medical reasons to have an epidural block include back pain with pain going down the leg, or pain in the back unresolved with surgery, or pain refractory to other therapies.

How are they done?

The person is placed on blood pressure, pulse and oxygen monitors. Numbing medicine is given for the skin, and a special needle is used to find the space just outside the sack of fluid that surrounds the spinal cord. The epidural area can also be reached by the caudal approach, which is a small opening in the bones at the top of the butt crack. This technique is easy on the patient, especially if they have had surgery back before.. A sample dose of medication is injected to test for proper placement, followed by an injection of a cortisone type medication, known as a corticosteroid, into the epidural space.

How do they work?

There are several theories behind epidural corticosteroid injections. First, it is important to know that the steroid injected is not the same steroid that bodybuilders take, but a powerful anti-swelling drug. This drug may simply reduce swelling of irritated nerves and adjacent tissues, and thus reduce pain. The steroid may stay active in the injection area for 1-3 weeks. There is another theory that simply believes the injection itself washes out irritating molecules from the ruptured inside of the disc. While in most instances one epidural is all that is indicated, at times, a series of three epidurals may provide best results.

What is the success rate?

There have been many studies performed, however they have been done on patients with back pain of differing duration, and dose of injection. At best, a reasonable estimate is that relief for 6 months is probably in the 60% range after a series of two to three blocks. However, some studies conclude that in the long term, there may be little benefit with epidural blocks, and in some patients, such as with spinal stenosis, long term outcome is worse. The longer the pain before the injection, the lower the success rate. Typically, pain relief starts at 2-3 days after the injection.

Physical Therapy (see Home Physical Therapy page). Goals of physical therapy are to decrease the duration of impairment, to strengthen and increase endurance, to reduce mechanical stress (ergonomics), to improve posture, to bring about general restoration, and to reduce pain. The controversy is not whether to do it, but when. Data is now becoming more focused that physical therapy should begin several days to two weeks after the initial onset of pain.

Stretching must be done repeatedly and consistently. A stretching program must address the back, pelvis and legs. Stretching helps correct the fascial, muscular, ligamentous and capsular shortening. If one area of the back has restricted motion, it will cause increased motion at other segments, and thus increased degeneration in those areas. This is where manipulation of the spine may be beneficial.

Stretching exercises like these can be beneficial.

- ◆ Lay on your back and gently pull both knees to the chest with your hands under the knees. After doing both knees, keep one knee bent and bring the other to the chest and alternate.
- ◆ Pelvic tilt. Lay with you back flat on the floor and try to push the floor away with your back. Now keep your back on the floor and slowly raise your pelvis off the floor.
- ◆ Lay on your back with one knee bent, the other crossed over the bent knee. Now try to touch the opposite elbow to the crossed knee. This is for the oblique abdominal muscles.
- ◆ From your back, cross one leg over the other and twist the trunk in the opposite direction.
- ◆ Do 'crunches'. That is keep your back on the floor and bring your head and shoulders up to meet you knees.
- ◆ Straight leg sit-ups are ok if you curl your back. You can also do sit-backs. Start in the sit-up position as if you had just raised up toward the knees. Now hold your bent knees and sit back using your arms to lower you if needed.
- ◆ Lateral trunk flexibility. Stand with your legs slightly apart. Put your right hand over you head and bend to the right. Do not bend forward or back, just to the side. Repeat on the left. Slightly bending the knee you are leaning toward may help keep your back straight.
- ◆ Trunk rotation. Next hug yourself and rotate your upper body to the left then the right. Increase the degrees of rotation as you can tolerate.
- ◆ Flexion rotation. Let you arms hand down and gently bend forward and down. Try to touch the right hand to the back of the left knee and vice-versa. This is important to help with daily activities.
- ◆ Heel cord stretch. Stand with one leg in front of the other and lean against a wall. Keep the heel of the back leg flat on the floor. You will feel calf tightness.

Walking is the best exercise. Daily walking a set distance provides overall strength and conditioning. It also provides nutrition to the disc. The walking should be fast paced with good arm movement, long strides, bounce up on the toes, head up and chin in. Holding a weight in each hand is optional. You can also walk and stretch the

trunk simultaneously by raising the arms and bending from side to side as you walk.

Swimming. Walking can be difficult given conditions like spondylosis and facet pain. Swimming takes the weight off of the degenerated area, and allows muscle strengthening with less pain. The pool should be warm, and have safety rails for easy entry and exit.

Bike Riding. Like swimming, biking takes the weight off of the painful area, and allows muscle strengthening with less pain. Can be especially good for spinal stenosis. It is better to lean forward as you ride. This may be more practical than swimming, as in some areas year round swimming is not readily available.

How often should these be performed?

Stretching is performed at least twice a day. Start with two repetitions of each direction. Build-up by 2 repetitions each week. Add-in daily walking, stretching or biking, and set a time goal for each day. Do no more, no less than the goal. If you over do it, you will hurt the next day, and then will not do the exercise.

Other Modalities

Cold lowers the temperature of the skin and underlying tissues. Theories behind its use are it decreases bleeding, it decreases the amount of chemical pain substances made in tissue, it decreases muscle spasm, and it elevates the pain threshold of nerves. Cold can be used anytime. For chronic pain, cold helps exercises and stretching by minimizing swelling and decreasing nerve sensitivity. Some studies show cold before exercise increases muscle tension, and is why some people do not like to use it.

Heat brings more blood into an area, and can relax muscles. Heat can also elevate the pain threshold of nerves. There are many ways to apply heat, none of which are any better than another. The physiatrist will generally choose the modality based on considerations of cost, availability, habit, or convenience.

Chiropracty can be beneficial if done within the first month which pain occurs. Is not recommended if there is pain radiating pain down the legs. If not helpful during the first month, it should be

stopped. (Clinical Practice Guideline No14, US Dept. Health and Human Services)

Acupuncture is generally not recommended in treating acute low back problems, but may be useful in treating chronic pain.

Other possible modalities for chronic pain include electrical stimulation or TENS (see Electrical Stimulation Page), biofeedback, massage, psychological techniques (see respective pages), braces or corsets, and traction. Leg length discrepancies of 2cm (not quite an inch) or more should be corrected with shoe inserts.

Surgical Treatment

Surgery is performed by Neurosurgeons and/or Orthopedic surgeons with spine expertise or who have completed spine fellowship training. Surgical odds of success vary by the type of problem. If previous operations have been done and failed, chances are not good that the next one will work. An old surgeon professor of mine once said the hallmark of a great surgeon is knowing when *not* to operate. You should call your local medical society for a list of surgeons. The surgeon will need to look at all your x-rays and studies, so bring them to the first appointment. If you haven't had any, he/she will need to order some.

Besides direct surgical correction of the problem, implanted **spinal cord stimulators**, also known, as *dorsal column stimulators* can be beneficial in covering up the pain if all other forms of treatment have failed. These are generally placed by a surgeon and/or trained pain physician, and then managed after the placement by the pain specialist. The concept is that a wire (known as a lead) is placed on top of the spinal cord. A very small electric current is passed down the wire and this electric current blocks the pain. The entire device can be implanted under the skin, including batteries. There is also a type where the batteries are worn outside the skin. Downsides besides the cost include movement of the electrical wires which can throw off the alignment of the wires and change how well the device works. New techniques and wire types have reduced this problem. Of course any implanted batteries will need to be changed periodically and there is always a risk of infection, scarring around the spinal cord from the wires, and equipment malfunction. In my

experience such devices seldom remove the need for medications, but do reduce the amount required.

Sex and Back Pain

Generally speaking, back pain should not prevent normal sexual relations. However, planning is important. For men with back pain, the missionary position may be the worst for back pain. A better option for both men and women with back pain is the side to side position. Other options include male standing female lying, and female on top.

For more information, go to www.newportpain.com The doctors at Newport Pain Management can help. Call 949 759-8400 for an appointment.