



# Hughston Health Alert

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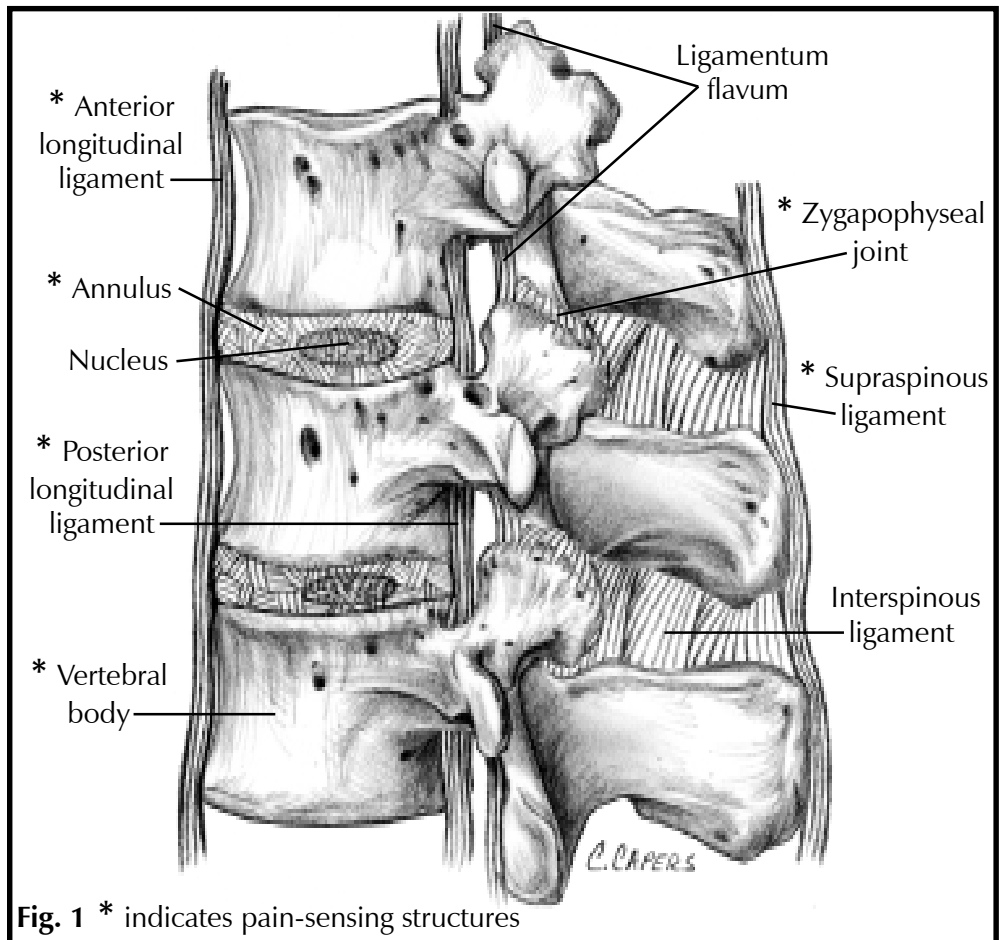
WINTER, 2000

## Managing Low Back Pain

### *A Challenge for the Next Millennium*

All of us have benefited in some way from the advances in medical science that have occurred in the twentieth century. Because of improvements in imaging, medications, and surgical techniques and instruments, doctors can more effectively diagnose and treat illness. Despite these advances, low back pain remains a serious health disorder, and, next to the common cold, it remains the most common reason why people seek medical care. During his or her life, about one in five persons will have a serious episode of back pain that will require medical attention.

Low back pain is the most expensive health care problem for people age 20 to 50 years. It also is the most expensive industrial injury,



**Fig. 1** \* indicates pain-sensing structures

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affecting 2% to 5% of the workforce and leading to 1,000,000 workers' compensation claims annually. Most health care dollars allocated to treating this condition are spent on a small percentage of people — those whose low back pain does not go away after surgery. This problem is often called failed back surgery syndrome.

The key to successful management of low back pain is accurate diagnosis and appropriate treatment. In this issue, we discuss the state of the art in managing low back pain, and we look to the future for what the next millennium might offer to people with low back pain.

(continued on p. 2)

## Current Concepts

Perhaps the most important step in managing low back pain begins with an accurate diagnosis. The doctor makes this diagnosis after obtaining a thorough clinical history and after performing a meticulous physical examination. Recognizing pain-sensitive structures in the spine allows the examiner to search for potential pain generators (Fig. 1, p. 1).

Most people associate low back pain with a ruptured (or herniated) intervertebral disc. This condition means that the shock-absorbing structure (or disc) between two vertebrae (back bones) is bulging into the spinal canal and pushing on one or more spinal nerves. In reality, a herniated disc is responsible for few cases of low back pain. More common in occurrence are other less well-recognized causes of low back pain that can mimic a herniated disc. These causes can involve the joints that unite the low back vertebrae (lumbar posterior facet joint syndrome), the joints that unite the pelvis and spine (sacroiliac joint syndrome), or the low back muscles

and the tissue that covers them (myofascial syndrome).

Advances in spinal imaging have enabled doctors to identify injured structures in the back with greater accuracy. Plain x-rays (which show the vertebrae) are usually not taken when you have acute (recently occurring) low back pain because they rarely show abnormalities or alter treatment. The doctor should take plain x-rays when your symptoms persist for more than four weeks or are the result of trauma (Figs. 2A and 2B).

Magnetic resonance imaging (MRI) is the imaging study of choice to evaluate the low back because it allows the doctor to see the entire lumbar (low back) compartment in a single image and it depicts the bones, discs, soft tissues, and nerves (Fig. 3). Computed tomography, myelography, and discography are other imaging studies that the doctor can use to complement MRI.

The goal in treating low back pain is to select the least invasive treatment that will eliminate your pain and restore you to a normal activity level. There are many treatment options for

**Fig. 3**

**MRI of the lumbar spine**



**Fig. 2A**



**Lateral (side) x-ray view of the lumbar spine**

**Fig. 2B**



**Anteroposterior (front-to-back) x-ray view of the lumbar spine**

managing low back pain.

To help relieve symptoms associated with acute low back pain, your treatment may include physical therapy modalities, such as heat, ultrasound and dynawave (stimulation with sound waves), TENS unit (stimulation with electricity), and massage. The doctor may prescribe muscle relaxants, analgesics, and anti-inflammatory medications (e.g., ibuprofen) for short-term use. Long-term use of narcotics should be avoided. Manual (hands-on) and manipulative treatments by spine therapists can help restore normal back function and motion. Performing therapeutic exercises helps you maintain motion and develop strength, protecting your back against future injury. In addition, you may

need to wear an orthosis (brace) for a short period to help relieve your pain and support your back.

Diagnostic and therapeutic spinal injections are useful additional treatments for syndromes such as herniated lumbar discs, facet or sacroiliac joint syndromes, and spinal stenosis (narrowing of the space in the spinal column through which nerves pass) (see "Spinal Injections," p. 6).

Chemonucleolysis, a once popular, minimally invasive spinal procedure to chemically shrink or dissolve the abnormal disc, is less widely used today because of rarely reported, but serious, complications. Some newer minimally invasive procedures have shown promise in carefully selected patients. These procedures include laser discotomy, intradiscal steroid injection, suction discectomy, cryotherapy, thermal ablation, and percutaneous discectomy. However, open discectomy is still the "gold standard" of treatment for most people who need a disc removed.

With improvements in anesthesia and surgical instruments, spinal surgeons now are able to perform some disc surgeries with minimal blood loss and tissue trauma, allowing patients to spend minimal time in the hospital. In addition, newer surgical devices have improved techniques for fusing the spine (permanently uniting two or more vertebrae).

Finding ways to treat people with failed back surgery syndrome remains a great challenge. Spinal cord stimulation and some devices that deliver medications directly into the spinal canal have a role in these people's treatment. In addition, programs to help restore function and to manage pain provide a wide range of treatments for people with chronic low back pain.

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## Exercise Your Back Back to Health

Low back pain can be debilitating. However, many methods are available to successfully treat this condition. If spinal joint dysfunction is causing your back pain, your treatment may include manual (hands-on) therapy, a short course of nonsteroidal anti-inflammatory medications (e.g., ibuprofen), or spinal injections. Once back function is restored, an appropriate exercise program may

help you maintain and control joint motion to prevent injury, develop muscle strength, and gain pain relief.

### Strength and motion

Exercise for the low back is only beneficial if it is prescribed for your needs. One-size-fits-all exercise programs are not appropriate and can cause injury and pain. The appropriate exercise program for you is based on your injury and the condition of your spine. If you have osteoporosis (porous bones), osteoarthritis, or limited spinal joint motion, the program is designed to

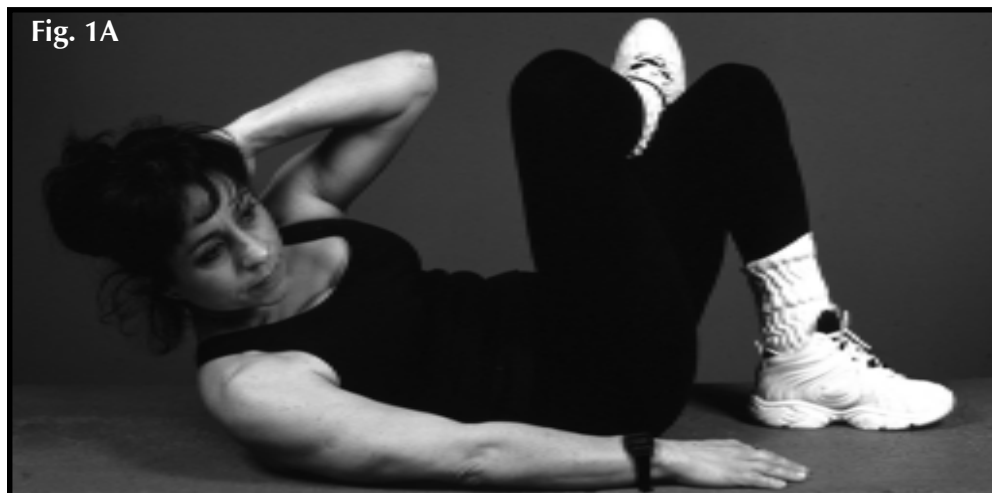


Fig. 1A

**Trunk curl with a twist:** Lie on your back with your knees bent. Place your right ankle across your left knee, your left hand behind your head, and your right hand palm down on the floor next to your hip. Slowly curl up and twist your body, bringing your left elbow and right knee together. Repeat with the other side.

**Push/pull:** Lie on your back with your hands behind your head. Raise your shoulders six inches and bend your right knee. Bring your right knee and left elbow toward each other until you feel a slight twist in your stomach. Keeping your left leg straight, lift your left heel. With a slow, deliberate twist, lower your left elbow and straighten the right knee. Keeping your heel off the floor, bring your left knee and right elbow toward each other. Repeat.

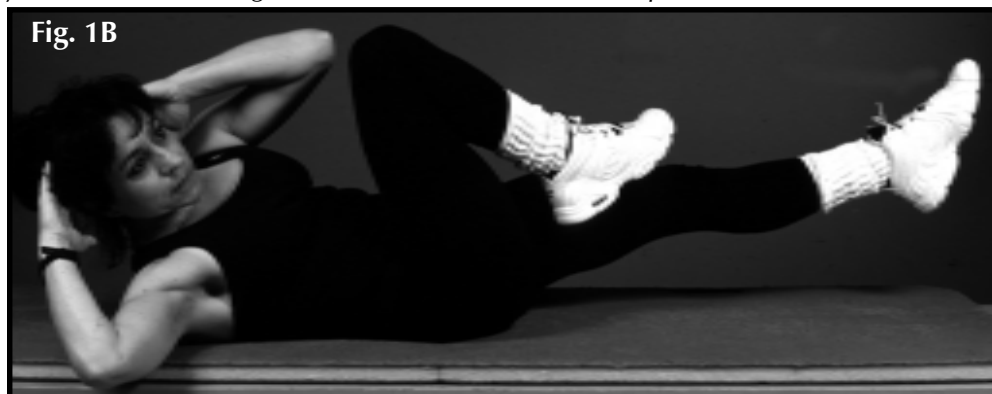


Fig. 1B

prevent more irritation and injury to the joints than the disease is already causing. If you have restricted joint movement, the program includes exercises that help maintain the motion you have regained through manual therapy. These exercises are done a few at a time throughout the day. If your muscles are not strong enough to control movement in the back, you participate in strengthening exercises. Strong back and abdominal (stomach area) muscles help stabilize the back and control its movement.

Two examples of exercises that can help strengthen the back-stabilizing muscles include trunk curl with a twist and the push/pull (Figs. 1A and 1B, p. 3). These exercises focus on the muscles that control trunk rotation. Strengthening the muscles that control back extension (bending backward) is also important. Pointers and prone leg lifts work these extensors (Figs. 2A and 2B).

The objective of exercise is to stress the back muscles without overloading the spinal joints. This exercise method helps improve muscle performance without further injuring the spine.

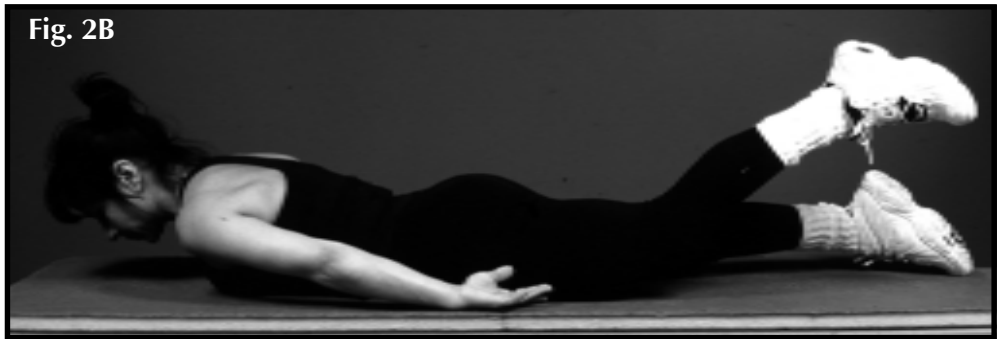
### Endurance and stamina

Building endurance and stamina is another important aspect of this exercise program. In addition to strengthening your muscles, you must develop a high level of cardiovascular fitness. Many cardiovascular activities such as walking, swimming, circuit resistance training, and bicycling can help increase endurance and stamina. Talk with your doctor and physical therapist before beginning a cardiovascular activity. They can help you design a program best suited to your needs and abilities. In addition, pick an activity that you enjoy; you'll be more likely to stay with it. Under the guidance of your physical therapist, gradually work toward participating in your chosen activity three to four times each week for 20



**Fig. 2A**  
**Pointers:** Lift your right arm and left leg, keeping both straight. Hold for five seconds. Lower your arm and leg. Relax. Repeat with your left arm and right leg.

**Prone leg lifts:** Lie on your stomach with your arms by your sides. Lift your right leg, keeping your knee straight. Do not allow your hips to lift off the floor. Hold for five seconds. Lower your leg slowly. Relax. Repeat with your left leg.



to 40 minutes each session. Even being in good physical condition may not prevent back injury and pain if you ask your back to do more than it can. However, if an injury occurs, it usually is less severe, and recovery is faster in a physically fit person.

Exercise can help strengthen the muscles that support your back and control its motion. For certain types of low back pain, an exercise program designed for your needs can be a beneficial part of your treatment.

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#### Further reading

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## Braced for Back Pain

### Developments in Back Supports

Using orthoses (or braces) to manage spinal disorders presents many options and challenges to doctors, orthotists (people skilled in applying orthoses), and other rehabilitation professionals. Orthoses are available in various designs and for various uses. Working together, medical professionals can select the most appropriate device to treat your specific needs.

The use of spinal orthoses dates back to at least the Middle Ages. Originally, metal and leather were used to make the orthoses. Today, orthoses are made of materials ranging from cotton to the new generation of lightweight, durable thermoplastics. These modern

fabrication materials have spawned new designs and have introduced a new level of comfort and an improved willingness among people to wear the orthosis as prescribed.

### Why are orthoses used?

Spinal bracing encompasses three primary objectives. First, bracing can help control back pain. The brace can limit back motion and take the load off intervertebral discs (shock absorbers between back bones), vertebrae (back bones), and other spinal structures (e.g., muscles, soft tissues, and nerves). Second, bracing can temporarily stabilize and protect weak or injured spinal structures. It is often used for this purpose following disc surgery. Third, bracing can provide long-term protection, control, or correction of a spinal deformity. For example, bracing can help limit the natural progression of scoliosis (side-to-side curve of the spine) in adolescents.

Virtually all spinal orthoses achieve these objectives by three effects: 1) compressing the abdomen (stomach area), 2) restricting trunk motion, and 3) modifying skeletal alignment. An orthosis that is custom made to fit your body offers better control of motion than a “quick-fit,” off-the-shelf spinal orthosis.

### What types of orthoses are available?

Spinal orthoses are broadly categorized as either flexible or rigid. The flexible orthoses consist primarily of cloth belts and corsets. Rigid orthoses consist of plastic body jackets. With the recent innovations in resilient plastics, a new category of orthoses – semi-rigid – has been developed. Semi-rigid orthoses combine much of the strength and support of traditional rigid materials with the comfort of fabrics.

### How are orthoses used?

Doctors prescribe flexible belts and corsets to help relieve low back pain associated with trauma, degenerative disc disorder (formation of bone spurs that irritate nerve roots), or postural fatigue (weak muscles that cannot help support the back). At times, doctors prescribe orthoses to provide some stability for the spine. They typically are made of cotton, nylon, or rayon fabric (see photo).

Rigid orthoses are used to immobilize the spine. An example of a rigid brace is the custom-molded body jacket, which is constructed of high-temperature thermoplastic. The orthosis often is used to treat people who have scoliosis or who have had surgery to fuse portions of the spine. It applies firm forces in all directions to prevent spinal motion, and it puts pressure on the abdomen.

By applying pressure, the brace immobilizes the spine and takes stress off it. Because a properly molded jacket achieves total contact with the torso, pressures and forces are distributed over the widest possible area, increasing comfort and the likelihood that you will wear the orthosis as prescribed.

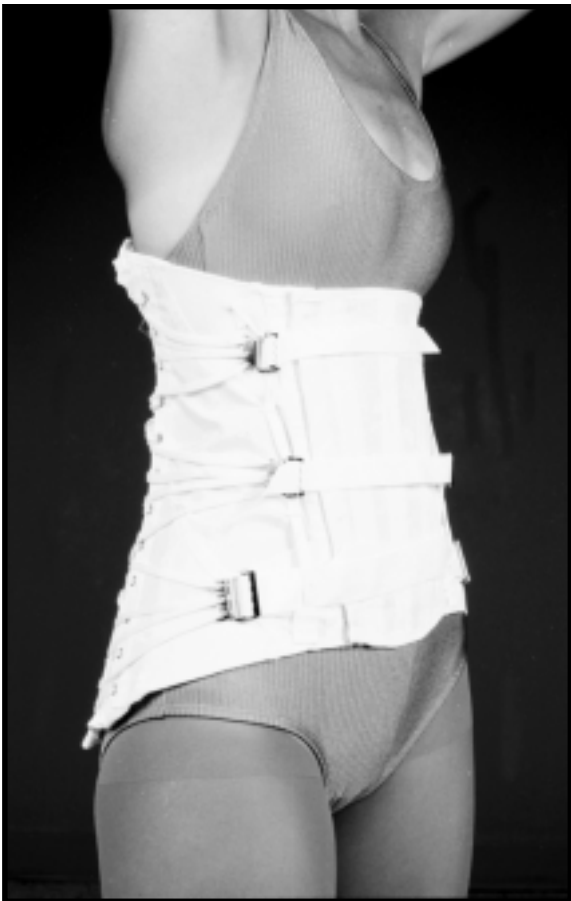
Finding the appropriate orthosis to treat an older person’s spinal deformity presents a particular challenge to doctors and orthotists. Frequently, the spinal deformity is so severe that it needs the maximal correction that a rigid, molded-plastic body jacket can provide. However, older people commonly have problems such as reduced muscle tone, skin conditions, and scar tissue that can make wearing a rigid jacket intolerable. For these people, the soft body jacket is an alternative to the rigid body jacket. Like the hard jacket, it is custom molded to fit the person’s torso, and it provides the total body contact. The soft version is constructed of lightweight plastic and very soft inner foam, making the jacket substantially more comfortable and easier to tolerate for extended periods than the hard jacket. However, the soft jacket is bulkier than the rigid jacket, and it does not give as much support as the rigid jacket gives.

Participation in an exercise program must accompany long-term brace wear. Exercise helps to maintain spinal motion and the strength of surrounding muscles. It also prevents you from becoming dependent on the brace after your back condition is gone.

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#### Further reading

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# Spinal Injections

## Getting to the Source of Your Pain

The discomfort of low back pain can cause you to stop participating in activities you like or need to do each day. Your doctor may prescribe exercises, physical therapy, and a short course of medication to help relieve the pain. In certain cases, the doctor chooses to include spinal injections as part of nonoperative treatment. Spinal injections enable the doctor to diagnose the source of your low back pain or to reduce the pain.

### What are they?

Spinal injection procedures involve injecting medications through a needle placed into a structure or space in the spine. Typical medications used include local anesthetics and corticosteroids. Local anesthetics numb the nerves and temporarily prevent them from sending pain signals to your brain. Corticosteroids help reduce local inflammation that may be irritating nerve fibers, thereby preventing the pain signals from being generated.

Several structures in the spine receive a nerve supply. When the structures are damaged or are not functioning correctly, their nerves send pain signals to the brain. The most common pain-generating structures include intervertebral discs (shock absorbers between back bones), facet joints (joints uniting back bones), nerve roots and dorsal root ganglia (collections of nerve cells near a nerve root), sacroiliac joints (joints uniting the hip and tail bones), spinal ligaments (tissue connecting back bones), and muscles (see Fig. 1, p. 1). The doctor injects local anesthetics through needles placed in or around

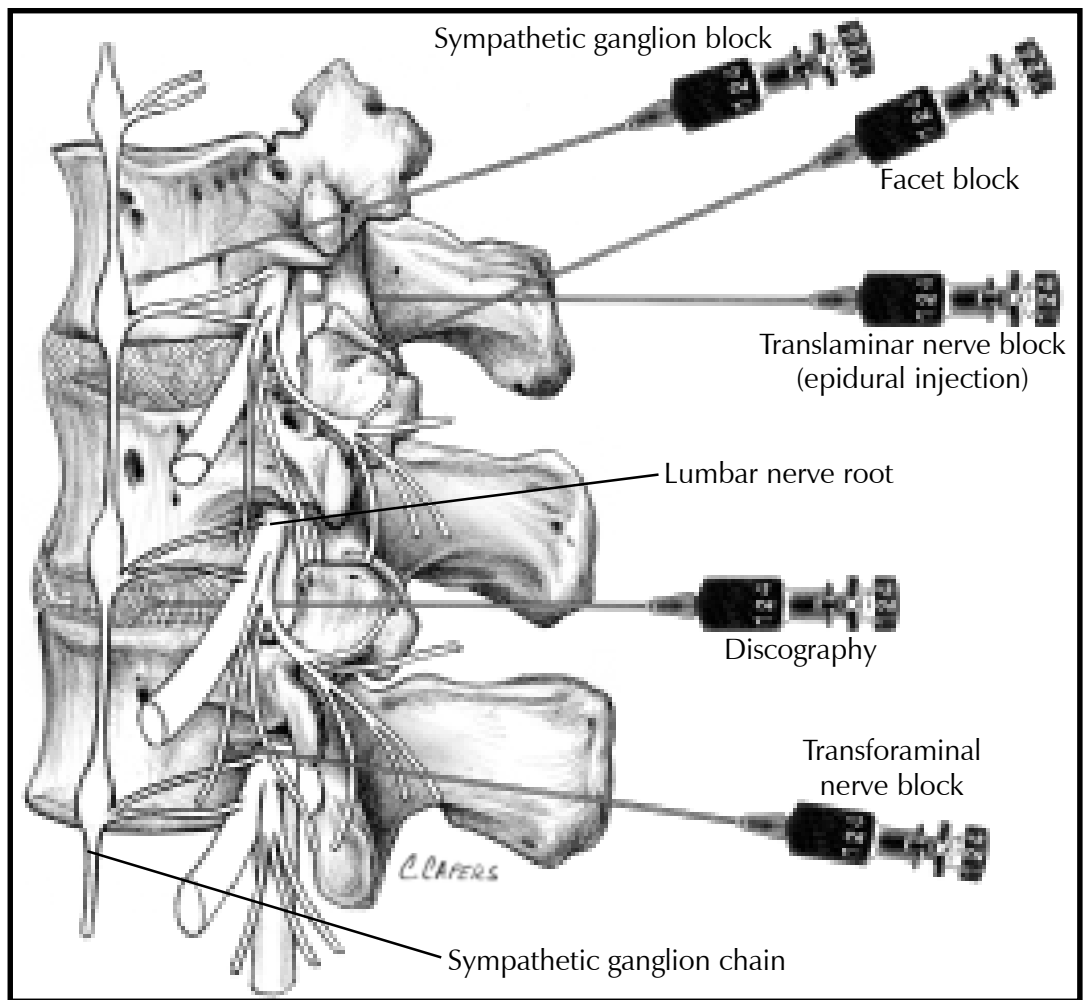


Fig. 1 Lateral (side) view of the lumbar spinal vertebrae with needles in place.

the structure that he or she thinks is causing the pain. If that structure is responsible for your pain, then the medication should give pain relief. Unfortunately, local anesthetics work only temporarily because your body breaks down this medication after a few hours. Therefore, corticosteroids usually are injected along with the local anesthetics to give longer relief.

### What types of procedures are available?

Typical spinal injection procedures for the lumbar spine (lower back) include epidural steroid injections, facet joint or nerve blocks, sacroiliac joint injections, sympathetic ganglion blocks, and discography (Figs. 1 and 2). The doctor often uses an injection of colorless, iodine-based contrast

and a special type of x-ray to help him or her place the needle in the correct location.

Epidural injections involve placing medications in the fatty space that surrounds the spinal sac and its nerve roots in an attempt to relieve back and leg pain. These injections are usually given to people with an intervertebral disc herniation (bulging of disc material into the spinal canal, putting pressure on a nerve) or spinal stenosis (narrowing of the space in the spinal canal through which nerves pass) and associated leg pain.

Injections into the facet joints or sacroiliac joints are used when your doctor suspects that one of these areas is the source of your low back or associated buttock, hip, or leg pain. For diagnostic purposes, small

amounts of local anesthetic also may be applied to the nerves supplying these joints.

Lumbar sympathetic ganglion blocks involve placing a needle along the front of the spine and injecting local anesthetics on a collection of nerve cells (ganglia) in an attempt to determine the origin of your limb pain. The doctor usually chooses to use this block if you have widespread limb pain, swelling, and skin that is hypersensitive to touch.

Discography involves placing needles into the center of a disc and injecting an iodine-based contrast. This test is only used for diagnosis, and it enables the doctor to see if the disc is responsible for your low back and leg pain. Imaging tests (e.g.,

magnetic resonance imaging and computed tomography scans) may show disc abnormalities, but they cannot tell the doctor if that disc is responsible for your pain; discography is the only way to determine this. The doctor also can use discography when he or she is considering treating your condition with spinal fusion (permanently joining two or more back bones).

### When are spinal injections used?

One or more of these procedures usually is considered if you have low back and leg pain that does not get better with other nonoperative treatments, such as oral medications (e.g., ibuprofen, a brief course of narcotics), exercises, mobilization (e.g., osteopathic treatments),

physical therapy modalities (e.g., heat, ice, ultrasound, electric stimulation), or bracing. Usually, these people have moderate to severe pain that interferes with several daily activities and that has lasted longer than a few months. Many times, these injections can help speed up the body's own recovery process, thereby shortening the painful episode.

### Who cannot have them?

In general, you cannot have one of these procedures if

- 1) you have a local or systemic infection,
- 2) you have a severe bleeding disorder or are taking oral anti-coagulants (e.g., Coumadin),
- 3) you have uncontrolled diabetes or congestive heart failure, or
- 4) you are pregnant (if x-ray is to be used).

### How many injections will I have?

The number of injections you will have usually depends on the type of spinal injection and whether it relieves your pain. In general, diagnostic injections (except discography) are performed twice. Therapeutic injections can be repeated if they provide long-term relief (i.e., several months or more). In practice, only one or two injections are usually administered, and, typically, you will not have more than three to five injections each year. If you do not have long-term relief, you may need a more permanent intervention such as surgery.

Spinal injections can be a useful addition to the nonoperative treatment of your low back and leg pain. By getting to the source of your pain, the injections may relieve your pain for weeks, months, or years.

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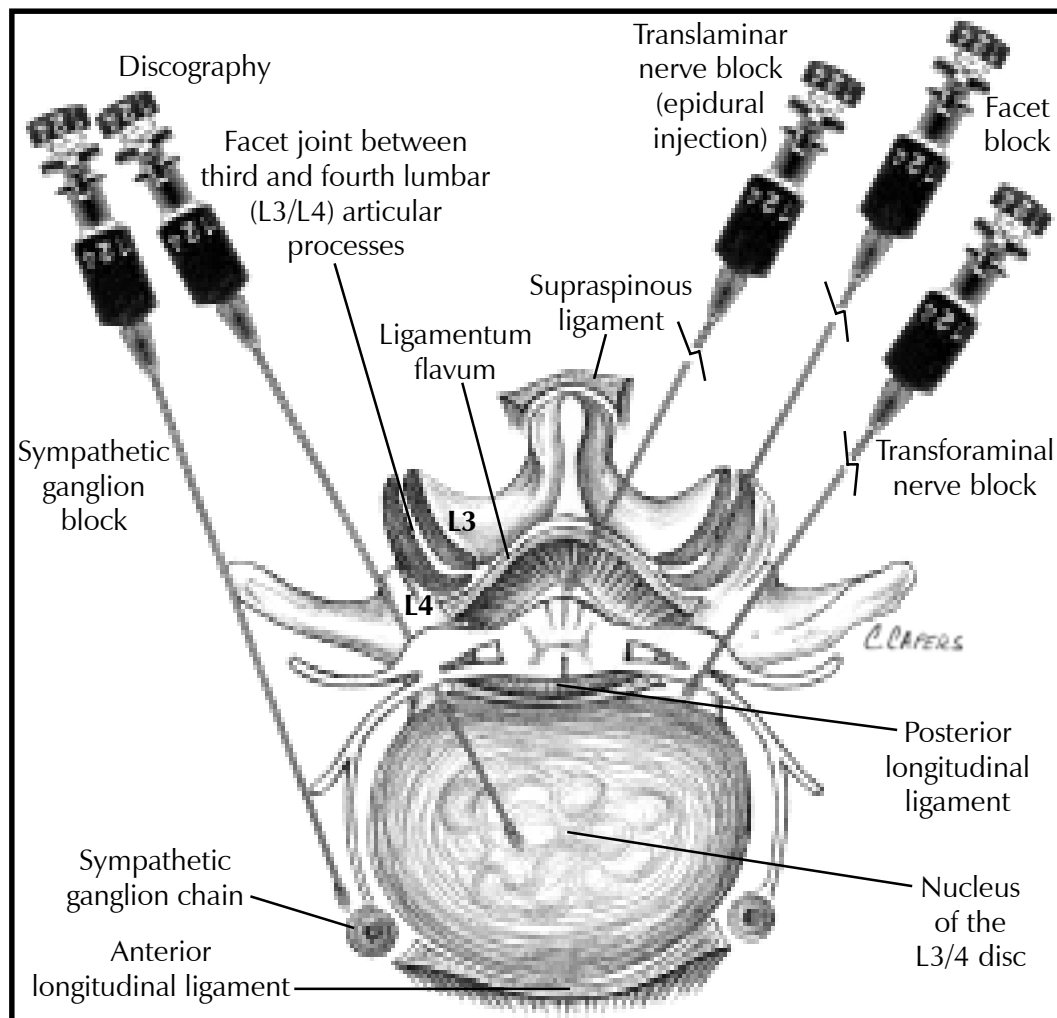


Fig. 2 Aerial (top) view of the lumbar spinal segments with needles in place.

## Future Developments

The future looks bright for the management of low back pain. With the rapid evolution of spinal imaging, practitioners will be able to recognize subtle changes in anatomic structures (e.g., bones, nerves, and soft tissue), improving the ability to make an accurate diagnosis. Surgical treatments will be accomplished through minimally invasive techniques. For example, surgeons will use arthroscopy (tiny camera and instruments inserted in a joint through small holes) instead of open surgery to accomplish spinal decompression (surgical relief of pressure on spinal cord and nerve roots) and spinal fusion (permanent union of two or more back bones). Many surgical techniques will be performed on an outpatient basis (i.e., no overnight stay in the hospital). Newer bone graft substitutes and genetic engineering will allow the surgeon to accomplish bone grafting procedures (adding bone to two or more back bones to cause them to unite) without having to harvest bone from the patient. Recognizing the genetic predisposition for low back pain will allow preventive measures to begin at an earlier age.

Low back pain certainly will be with us in the next century, but our abilities to manage it will be vastly improved.

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The *Hughston Health Alert* is a quarterly publication of the Hughston Sports Medicine Foundation, Inc. The Foundation's mission is to help people of all ages attain the highest possible standards of musculoskeletal health, fitness, and athletic prowess. Information in the *Hughston Health Alert* reflects the experience and training of physicians at The Hughston Clinic, P.C., of physical therapists and athletic trainers at Rehabilitation Services of Columbus, Inc., of physicians who trained as residents and fellows under the auspices of the Hughston Sports Medicine Foundation, Inc., and of research scientists and other professional staff at the Foundation. The information in the *Hughston Health Alert* is intended to supplement the advice of your personal physician and should not be relied on for the treatment of an individual's specific medical problems.

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## Health Hint

Frequently washing your hands can help you avoid catching a cold. The Centers for Disease Control and Prevention recommends that you lather your hands with soap, vigorously rub all surfaces of your hands for at least 10 seconds, then rinse under running water. Make sure you turn off the water faucet with a paper towel to avoid redepositing germs on your hands.



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