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**THE SAN DIEGO KNEE CLINIC**

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**SPINE**

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**We will be offering counseling on diet and exercise. If interested, please contact my office and schedule a medically supervised *Health and Orthopedic Fitness* assessment appointment which will include a spine and joint health assessment evaluation. This assessment will not be covered by health insurance.**

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The second most common running problem I see in my office after knee and lower extremity related problems is back pain.

The runner may have a history of childhood problems, or trauma, but the usual history is of gradual onset of low back pain. The patient usually points to the small of the back and describes an achy, deep-seated pain that is diminished or absent when lying down on his back. Occasionally, numbness is noted in the leg(s) associated with a sharp radiating pain extending into the thigh, calf, and/or foot. Many patients deny low back pain but complain initially and primarily of leg discomfort. Back problems can mimic foot and calf problems, especially when the pain is deep seated, achy, and not too painful to the touch (Voorhies, 2001).

Once again, as I have mentioned in earlier articles, the runner should familiarize him or herself with the anatomy of the body region that is hurting. In the case of the spine, the anatomy is fairly complex. I will explain the basics as it pertains to the low back or lumbar spine. Ninety percent of back-related problems in the runner are in the low back region.

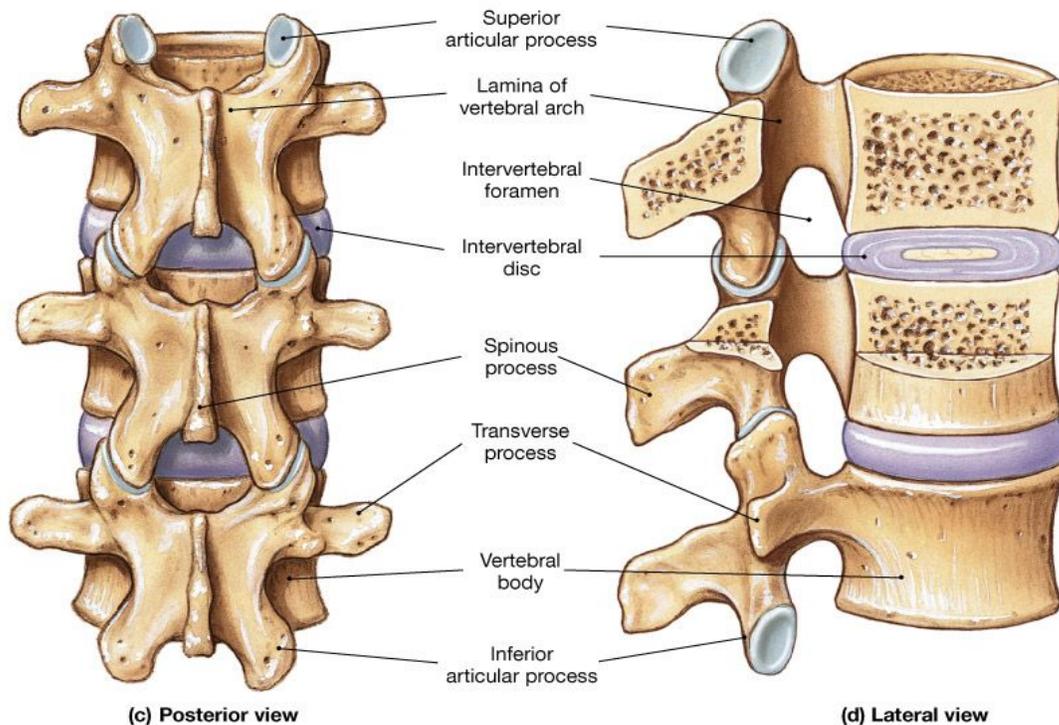


Figure 1.

The spine (Figures 1–4) is comprised of vertebrae—rectangular bones that help provide stability to the axial skeleton. Between the vertebrae are the intervertebral discs, which are somewhat ovoid, softer, and essentially act as cushions between the vertebrae. They provide for shock absorption as well as provide stability. The disc is subdivided into an inner soft area referred to as the nucleus pulposus. The outer circumferential aspect of the ovoid disc is firmer and fibrous, and is called the annulus.

The spinal nerves run in the spinal or neural canal and exit out of the intervertebral foramina, located at the outer end of the neural canal. An important ligament is located just behind the vertebrae and discs, and is called the posterior longitudinal ligament.

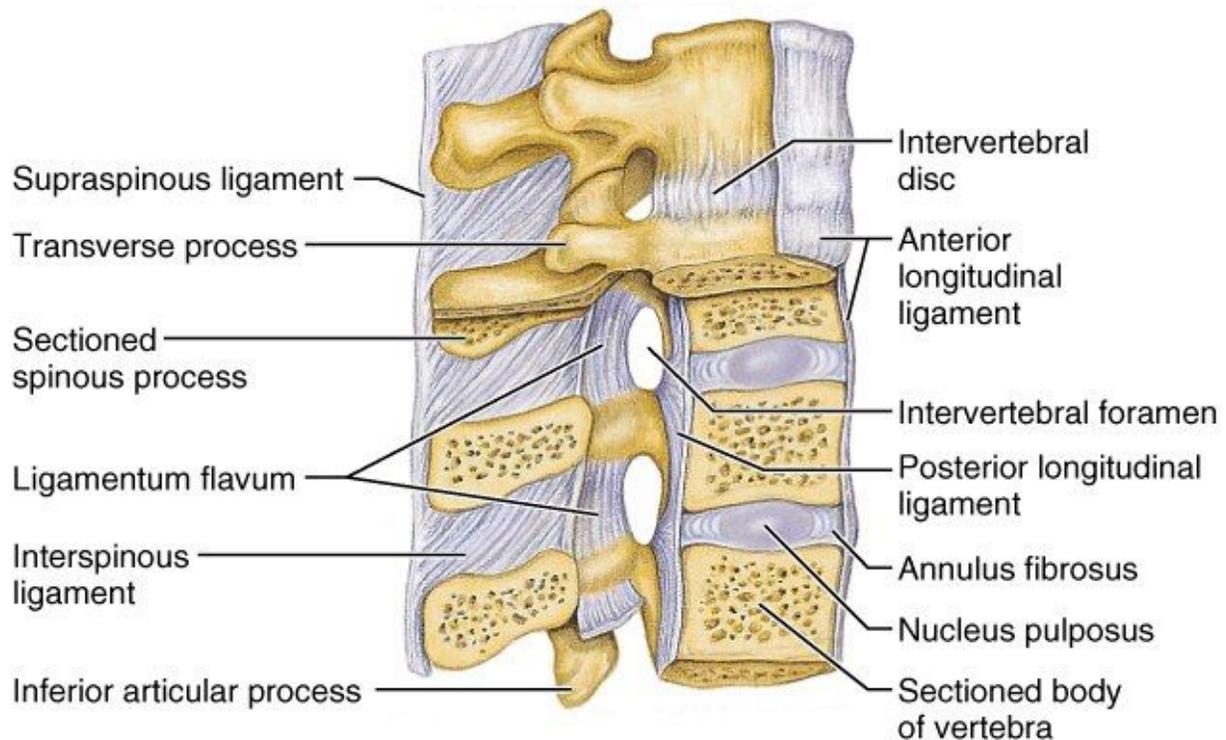


Figure 2.

The two bony struts that form the side stability of the spine are called pedicles. The bony bumps we feel in the middle of our backs are called posterior spinous

processes. There are joints between the vertebrae which are referred to as facet joints, or articulating processes.

With the above information in hand, the patient is prepared to understand his low back pain. The most common problem I see are disc problems (Figure 3). When an intervertebral disc is the source of the problem, in more severe cases, the runner experiences achy low back pain with leg symptoms. What happens to produce these symptoms? With age and/or trauma, the disc loses its vascularity. It becomes less of a sponge and more rigid. With excessive trauma, small microfractures, or breaks, occur within the annulus and posterior ligament.

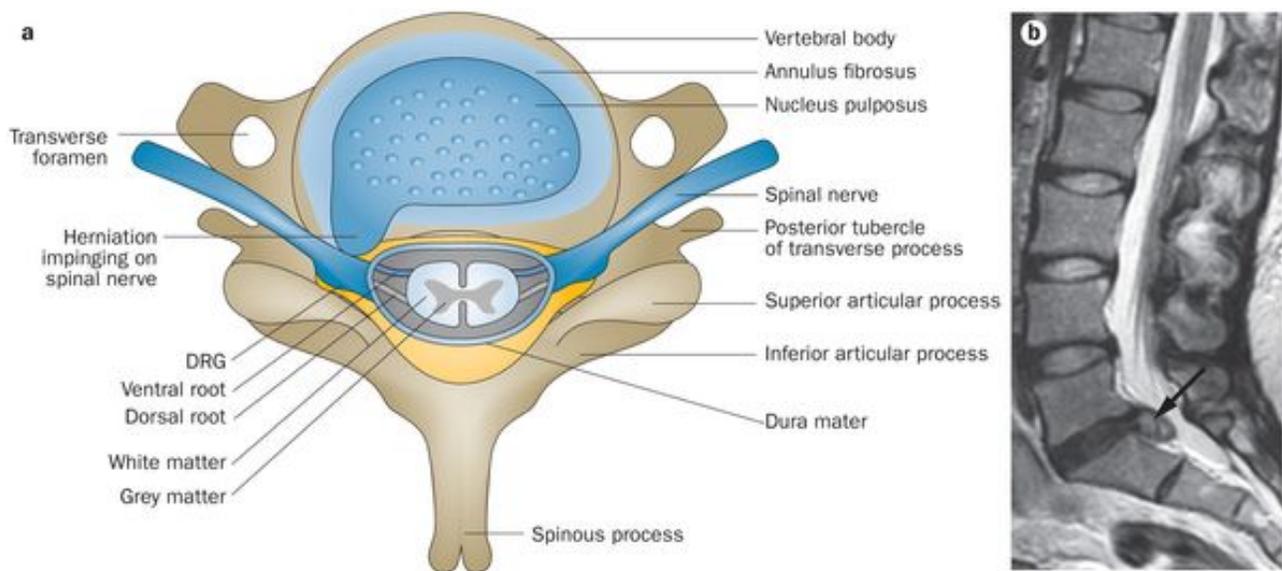


Figure 3. Nucleus Pulposus

With the vertebrae of sacrum pressing against the disc, and with either a bend, twist, or direct axial force, the nucleus pulposus (Figure 3) can push out through the annulus and posterior ligament. This event can produce excruciating pain and secondary muscle spasm. The pain can last several weeks. But, usually with time, will heal.

No running is permitted until the pain disappears, then walking and running can gradually be resumed. Swimming, on the back, is permitted prior to running with a good walking program. At least ninety percent of patients will improve on this regimen.

Now, let's suppose the runner's symptoms included numbness and/or weakness in the leg. What probably occurred was the ruptured disc pushing on one or more nerves in the back region, producing pain and loss of normal function. This is commonly referred to as sciatica, or lumbago (Koes, 2007). This is a more serious problem. If the nerve affected innervates the bowel, bladder, or sexual functions and the patient in addition has leg pain and incontinence of bowel and/or bladder, then surgery is done on an emergency basis to remove the herniated disc and hopefully reverse the damage to the nerves. Surgery is not always successful. It is fortunate that emergency surgery is rarely required.

If the runner has sciatica with his back pain, no running is permitted until the pain disappears. The body will heal itself in most cases, so, once again, time is the great healer. In resistant cases where there is no relief of leg symptoms and especially with muscle weakness or paralysis, surgery is considered. The aim of surgery is to remove the disc herniation that is pinching the nerve, and occasionally bone is also removed to relieve the pressure on the nerve. However, newer, less aggressive techniques, including epidural steroids, are now being used and show promise.

Once the patient starts with symptoms, I usually recommend physical therapy, including inversion or gravity traction. This inversion technique is performed by a physical therapist and the patient is literally hung by his heels. Conceptually, this activity acts as a distraction force on the spine and helps to decompress pressure on the nerve, and thus alleviate the symptoms. It also may affect the nerves in other ways we are unaware of. I have had an amazing number of proven ruptured disc patients improve with this physical therapy technique and have avoided surgery. New band-aid surgery (laparoscopic surgery) has recently been devised to excise the disc. This type of surgery dramatically decreases postoperative recovery time and eliminates large incisions.

There are additional spinal conditions that affect the stability of the spine such as spondylolisthesis or spondylolysis which is a developmental or post-traumatic bony defect in the back of the spine (Figure 4).

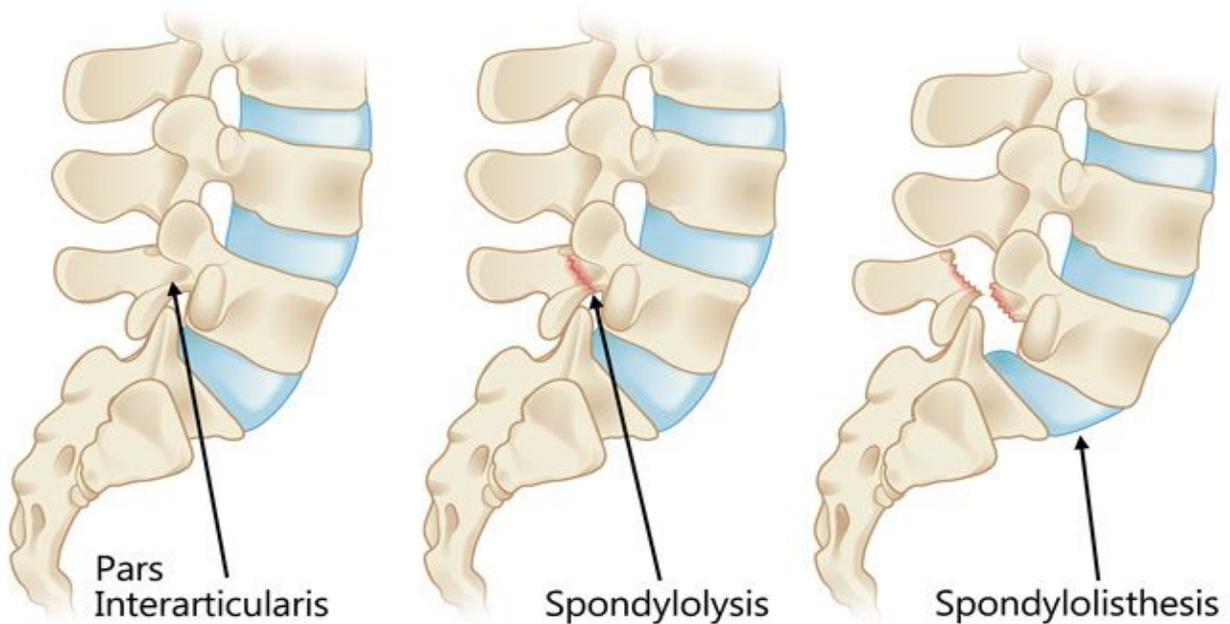


Figure 4.

These conditions are usually handled conservatively with bracing and conservative management. In a chronic case associated with severe pain and neurologic loss, surgical fusion is recommended.

There are other spinal conditions that can affect the runner, but this brief paper is not intended to discuss every diagnosis.

Once again, how does the above affect the runner? If the patient has inversion therapy and improves, he/she may gradually resume running only after a lengthy walking and swimming program. If surgery is performed, the patient is restricted from the stress of running until the runner is pain free and has passed a rigorous physical therapy program, total time conservatively being four to six months. One fact that is troublesome to the runner is that there is a recurrence rate of disc problems of somewhere between five to twenty percent, even after surgery, depending on the study.

With the above information and no back problems, how can the runner avoid this problem or cut down the chance of developing a serious back problem?

First is to recognize the pain of training from the pain of injury. If the pain is in the low back: stop. Do not try to run through it. Do not restart running until you are pain free, then take it easy initially, usually walking for at least a few weeks pain free.

Second, flexibility is important, especially in the hamstrings and thigh muscles, so perform stretching daily in these regions. Also, measure the length of the legs. If one leg is more than 5 to 10 millimeters shorter than the other, then you may require lift in the shoe of the short leg. Remember to take one to two rest days a week to permit the body to heal and strengthen from the repetitive pounding of running. The spine absorbs the shock while running. Proper footwear is important. Your running shoe should have a good support and cushioning to absorb the shock of running. Spinal strengthening is important. Spinal extension exercises are very important and should be combined with abdominal isometrics and spinal flexibility exercises.

I feel the appropriate exercises for back care should be done with the instruction of a therapist so they are done correctly. I think inversion therapy can also be performed as a preventative measure in an attempt to avoid developing spinal problems. In theory, I do not think inversion therapy will change the disc vascularity problem mentioned earlier, but it does counteract the impact forces on the spine so prominent in Western culture. Studies have revealed a very low incidence of disc problems in cultures where sitting in a chair is not common, such as in India where people traditionally "sit" on their haunches with their hips and knees flexed. Thus, especially with symptoms, sitting can be very deleterious by chronically increasing the pressure on the lower spine and spinal discs.

Body weight is a very big factor, and it is best to avoid obesity and thus decrease the axial forces above the hips. Being obese and running is a bad combination. Non-lean body mass is felt geometrically at the spine and lower extremities, and it has been demonstrated that obesity increases the risk of spine and lower extremity injuries and osteoarthritis. Thus, it is paramount to try and stay lean for prevention and treatment.

Running is not recommended for obese patients as a way to lose weight. Diet is paramount with strength training exercise routine, including a supervised weight lifting program to build up muscle mass, or a walking-only program. Diet is the game changer in terms of weight loss and should be instituted prior to a vigorous running regimen. Strength training increases your metabolism and allows decreasing weight faster. As long as you're still eating in a deficit, you'll lose weight

A specific anti-inflammatory diet is also recommended and will be discussed in a separate article.

Thus, if we avoid excessive sitting, stay and/or get lean, fit, and flexible, take rest days, potentially try inversion therapy for spinal pain, and listen to our body, we may avoid a disabling spinal-disc problem and/or treat a non-surgical ongoing spinal problem.

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