

So You Have a Sore Back?

by Richard Beauchamp, M.D.

Back pain is one of the most frequent causes for time off work. About 80% of people at some time in their lives will experience significant back pain. As back pain is so prevalent in the general population, it is not surprising that it can also be a cause for runners “taking a break.”

Back pain can be located anywhere from the head to the buttocks. Lower back pain is the most frequent source of back pain. Your lower back is a complex structure of vertebrae, discs, spinal cord and nerves manifested by the following:

- Five bone—lumbar vertebrae. This connects the upper spine to the pelvis.
- Six shock absorber—discs. These act as cushioning devices between the vertebrae but can “rupture” under load and compress the nerves.
- Spinal cord and nerves.
- Numerous small joints—these provide the movement between the vertebrae. They may become inflamed as any other joint prone to develop arthritis.
- Many muscles and ligament—they provide strength and power and also support the spine.

As causes of back pain are many, the treatment modalities are also numerous. The basic principles of treatment are very similar regardless of the cause.

Running primarily involves movement of the legs, which, when in contact with the ground, provide propulsion (some faster than others!). The forces exerted by the legs and

the whole body are matched by the response of the ground (Newton’s Third Law), so that the forces absorbed also match the forces expended. When we run, our vertical ground reaction force is about twice our body weight. This is a lot of force that the body has to absorb. The body accepts this force through various means. Beginning at the foot and ankle, the foot initially pronates at heel strike. The knee then slightly bends, as does the hip. Ultimately, the forces are dissipated up to the pelvis and the spine—eventually becoming expended up the skeleton to the shoulders. The forces absorbed by the spine represent the forces from both legs, hence twice what the legs absorb. It may, therefore, be surprising that runners do not have more back complaints than they do.

Back pain can originate from the soft tissues (muscles, fascia, nerves), the semi-solid tissues (intervertebral discs, cartilage, ligaments) or the solid tissues (bones).

The onset of most cases of low back pain is gradual. Acute onset of back pain may be a reflection of a sudden injury and may need immediate medical attention; for example, after lifting and twisting. This is often a result of the spinal muscles being weak over an extended period of time, which results in de-conditioning of the spine and the spine being susceptible to injury from relatively minor actions. Exercise and strengthening the muscles is the best way to prevent this type of pain from occurring.

Most patients with back pain respond to an initial period of “rest.” This means keeping active with cross training (complete rest, cycling, water-running). After one to two

weeks if there are still complaints of back pain, then consult a physiotherapist. Eventually, the pain will usually subside as innocuously as it occurred. If the pain persists after four to six weeks, then you should visit your doctor for further investigations (physical examination, X-rays, bone scan, computerized axial tomography, or CAT scan, or magnetic resonance imaging, or MRI).

You as a runner or a walker can take inventory of your running techniques. Get a biomechanical analysis of your running form done by a therapist and tackle any problems identified. This may include treatment for a postural problem, leg length discrepancy, a weak muscle, over/under pronation, pelvis tightness and sacro-iliac pathology, just to name a few.

Soft Tissue Causes of Back Pain—Muscle, Fascia, Nerves

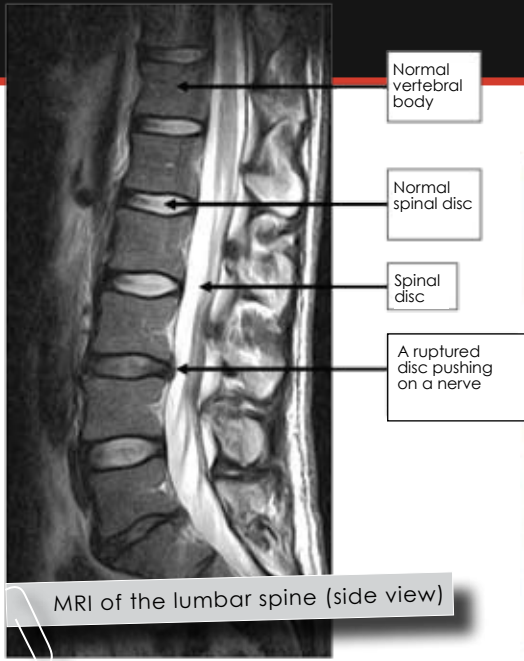
Soft tissues injuries are the most frequent causes of back pain. Many muscle units extending from the pelvis all the way up to the neck support the spine. These are the spinae erectae and the quadratus lumborum muscles. Injuries to these muscles can lead to dysfunction and the development of back pain. Injuries are most frequently a result of weak pelvic and abdominal muscles superimposed on a poor running technique.

Initial treatment for a runner with a recent injury means resting the back for about a week to let the soft tissues heal (NO RUNNING). Application of ice is a good anti-inflammatory agent without the side effects of oral medication. Ice should be

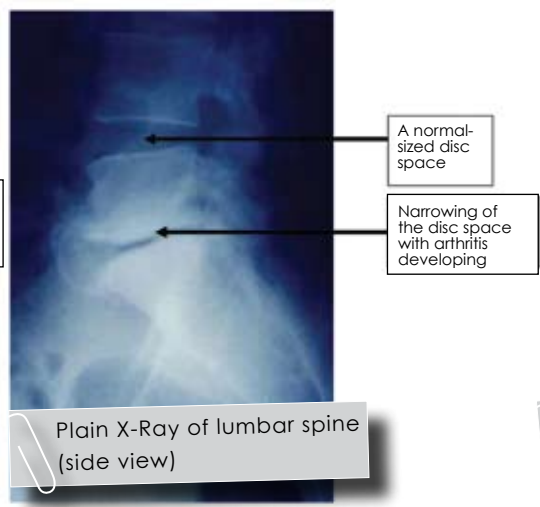
About Richard

Richard Beauchamp is a runner as well as an orthopedic surgeon. His running career has spanned about 10 years and involved seven marathons. His orthopedic surgery career extends over 25 years. He is the medical director of the Shriner’s Gait Lab at the Sunny Hill Health Centre in Vancouver and a clinical professor in the Department of Orthopaedics at the University of British Columbia. He runs out of the Alma Running Room along with his wife and “cookie maker” Dorothy.





MRI of the lumbar spine (side view)



Plain X-Ray of lumbar spine (side view)



Model of the spine showing the pelvis, vertebrae (bones), discs, and nerves

applied with a towel covering for 20 minutes three times a day. Pain that lasts more than two to three weeks could also be treated with oral anti-inflammatories. During all of these treatments, maintaining an activity level is important (active rest). Cycling, walking and general muscle strengthening exercises are to be encouraged.

Semi-Solid Tissue Causes of Back Pain—Discs, Cartilage, Ligaments

Spinal discs (slipped discs) between the vertebrae are prone to degenerate with age. Cartilage and ligament degeneration is known to occur beginning by the third decade. This results in the collapse of the spinal discs with impingement on the nerves in the spine, which can then give referred pain down the leg. If the referred pain goes no further than the thigh, then the cause is often disc degeneration only. If the pain goes further down the leg, to the calf or foot, then compression of the nerve (pinched nerve) is often the cause (sciatica). If this occurs, advice from a doctor is essential. If the neurological involvement is severe, further investigation and treatment are required.

Spinal disc degeneration is seen most frequently in weight lifters and soccer players as reported in the *Journal of Orthopaedics and Sports Physical Therapy*. There were no signs of accelerated degenerative disc disease found in runners.

Without sciatica, most cases of nerve impingement respond to short periods of rest with a concentrated physiotherapy program to strengthen the abdominal and pelvic muscles.

Solid Tissue Causes of Back Pain—Bone

The main integrity of the spine is afforded by the bony architecture. The discs and the ligaments hold the vertebral bodies both together as well as apart. The bony vertebral bodies contribute to the vertical height of the spine. Conditions such as osteoporosis and trauma result in the loss of bony depth through bone collapse; this can be associated with the development of spinal deformity (scoliosis-sideways curvature or kyphosis-hunchback) over time with the development of back pain. Stress fractures of the lower most portion of the sine (sacrum) have been described. The best approach for management of bony deformity and pain is prevention. Runners, especially women,

should be pro-active with calcium nutrition, exercise and strengthening programs.

Beware of the *female athlete triad*: amenorrhea, osteoporosis and anorexia!

With degenerative disc disease, there is loss of support from the discs causing the bony vertebrae to approximate each other. This results in the development of arthritis of both the disc spaces and the many small joints between the vertebrae (facets).

Basic management of arthritis (weight control, muscle strengthening, anti-inflammatories) may be an effective method to treat the arthritis and bone and joint disease of the spine.

Conclusions

Many studies have shown that regular cardiovascular exercises, such as swimming, cycling, running and walking, are the most beneficial exercise for preventing and treating back pain. The foremost approach to preventing back pain is to maintain an active life style with exercise and to develop sufficient muscle strength of the main trunk muscles also through appropriately directed exercises. The individual's ability to run without injuries is probably contingent on his or her's ability to maintain a neutral and stabilized spine. 🟢