

Lumbar-Disk Herniations: Conservative Clinical Applications

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Low back pain is the most common reason for functional restriction in patients under 45 years of age.¹ Although there are many causes of low back pain, lumbar-disk herniation is one of the most complicated and critical to treat. Because of the complexity of the pathology there is a range of different

approaches to management of lumbar-disk herniation, from rehabilitation exercises to surgical protocols. This article focuses on the more conservative clinical treatment of exercise therapy to achieve functional restoration.

KEY POINTS

▶ A lumbar-disk herniation is a pathology that is both complicated and critical to treat appropriately.

▶ Because of the complexity of this pathology there is a range of different approaches for conservative management, from NSAIDs to joint mobilizations.

▶ Athletic trainers and therapists need to realize that each athlete will respond differently to this pathology and management will be specific to each person.

▶ For some athletes, surgery might be the only option to help eliminate the pain and dysfunction associated with a lumbar-disk herniation

▶ Key Words: radiculopathy, core stability, pelvic stabilization, flexion/extension exercise

the nerve root exiting below the affected disk.² More specifically, injury to a lumbar disk can result in four types of problems. There might be a protrusion of the disk, in

which the disk bulges posteriorly without rupture of the annulus fibrosus. In the case of a disk prolapse, only the outermost fibers of the annulus fibrosus contain the nucleus. A disk extrusion results when the annulus fibrosus is perforated and disk material (part of the nucleus pulposus) moves into the epidural space. The fourth problem is a sequestered disk, or the formation of disk fragments from the annulus fibrosus and the nucleus pulposus outside the disk proper.³ In sports, the main mechanism of a disk injury is that of forward bending and twisting that places an abnormal strain on the lumbar region.⁴ This describes a sudden disk herniation, in which high compressive forces are applied suddenly to the lumbar spine in an unfavorable postural position. One can also develop a gradual disk herniation in which there is a slow, progressive injury resulting from compressive force of a lesser magnitude applied repetitively to the lumbar spine in flexion.⁵

Mechanism of Injury

Disk herniation is the displacement of the nucleus pulposus through a weakened region in the annulus fibrosus with subsequent impingement on one or more lumbar-nerve roots. A complex herniation typically results in pressure on

Signs and Symptoms

The signs and symptoms of a lumbar-disk herniation are primarily nerve-root compression resulting in radicular pain in the lumbar spine that is aggravated by activity. The radiating pain will usually be unilateral and follow a dermatomal pattern into the posterior thigh, calf, heel, and foot, depending on the level of nerve-root irritation. These symptoms usually reflect the final failure of the annulus fibrosus to contain the nucleus

pulposus.^{2,4} A precise neurologic evaluation is needed to determine the spinal levels involved. In addition, the pain patterns from disk herniations are usually inconsistent, with changes in the position of the lumbar spine creating different levels of pressure on the disk space. Pain will be notably present when the athlete sits for a period of time and then attempts to resume play. It should also be noted that the posture of the athlete might be affected, as exhibited by a slight forward bend with side bending away from the side of pain. Side bending toward the side of pain might also be limited and increase pain.⁴

There are several differential diagnoses that can be associated with these signs and symptoms. Other conditions such as facet injuries, muscle spasms, and myofascial restriction can also cause pain down the leg and potential sensation disruption. Finally, it should be noted that if an athlete ever describes symptoms of bilateral leg pain, absent deep-tendon reflexes, or changes in bowel and bladder function he or she should be immediately referred for evaluation for cauda equina syndrome.

Initial Treatment

Once an athlete is diagnosed with a disk lesion it is important that he or she avoid the positions and motions that aggravate or produce any sensory deficits. These motions are most commonly, but not always, forward bending and twisting in the direction that further compresses the affected disk. Educate patients to avoid positions that increase intradisk pressure, such as sitting, bending, lifting, and sometimes extension. The initial treatment of a herniated disk is generally the same regardless of the type of herniation. A short course of bed rest might provide some beneficial effects via pain modulation and reduction of intradisk pressure, but longer courses of bed rest will yield detrimental effects on bone, connective tissue, muscle, and cardiovascular fitness and should be avoided. In conjunction with activity modification, the use of nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, and analgesics can provide the athlete with some further pain relief. Other pain-reducing modalities include ice, heat, and electrical stimulation. If the athlete's paraspinal musculature is not in spasm, a high-frequency sensory TENS application is appropriate. In contrast, if spasm is present a lower frequency motor TENS would be suitable.

Common Rehabilitation Strategies

Once the athlete has been given an adequate amount of rest and therapy to improve mobility, rehabilitation can begin. Although not all authorities agree on its importance, many athletic therapists will have an initial rehabilitative strategy that includes exercises or motions that will localize the pain toward the involved disk. This is called "centralization," and it refers to the movement of pain out of the extremity toward the spine. As is the case with back pain, this movement is toward the midline. This assessment method has been found to have some predictive value in identifying patients who will be able to improve or abolish their symptoms without surgery versus those who will likely require surgical intervention.

Flexibility

In some patients, the pain response and preliminary activity modification might limit lumbar flexibility. Enhancing range of motion is an early goal of rehabilitation, and prescribed stretching exercises can improve flexibility of these trunk muscles (Figures 1 and 2). The main muscle groups of interest are the lumbar extensors and the lumbar rotators.



Figure 1 A Williams's flexion technique to stretch lumbar extensors and widen intervertebral foramina.



Figure 2 Static rotational stretch for the lumbar rotators and hip abductors performed while supine.