

# L5/S1 Disc Herniation in a College Football Athlete

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## Abstract

**Background:** Disc herniations located in the lumbar spine are common injuries with athletes who often load their spine or lift heavy objects with improper form. Along with athletes, this can be a common injury for the regular population as well; often seen during lifting and rotating motions. An 18 year-old male, collegiate football defensive lineman, has gone through basic training camp for the military and began football season directly after. Following examination, it was discovered that athlete had complaints of pain and numbness in both sides of his lower back along with pain extending down his left leg. Athlete had little mobility or flexibility in his thoracic spine as well. During his initial exam, he presented with point-tenderness over his lumbar spine (L4-S1), occasional numbness down his left leg, and lower extremity weakness. Athlete reports that prior to basic training camp, he was performing a light-weight squat, when he first felt this pain. He decelerated into the squat, then once at the bottom position, felt the pain and could not finish the squat. Athlete was able to abandon squat without further injury; however, following this, the pain increased during movement. Athlete was able to "ignore" pain during basic training and the beginning of football season. The athlete was then removed from football practices and lift and was required to report for daily treatment. Images were also requested. **Differential Diagnosis:** Lumbar Disc Herniation, Vertebrae Fracture, Sciatica. **Treatment:** Athlete began treatment with the athletic training staff on the following day. The athlete reported to treatments once daily until images could be evaluated and a diagnosis could be determined. The MRI revealed a partial disc herniation at L5/S1. A rehabilitation plan with short- and long-term goals were established for the athlete. Athlete was treated conservatively with therapeutic exercises, modalities, and light stretching. This treatment was designed by the medical staff to increase stability in his lumbar spine by strengthening the abdominal muscles, create space within the thoracic column, and encourage proper posture to create the best environment for healing. **Diagnosed Injury:** L5/S1 Disc Herniation **Uniqueness:** The rehab of this athlete was done non-operatively with the help of three epidural steroid injections (ESI's). These were used on three separate occasions with 3-4 weeks between injections. The goal was to manage the pain that the athlete felt during treatment. The first two injections failed. The athlete experienced relief following the third injection and was able to return to more intense activity such as sprinting and semi-restricted lifting. **Conclusion:** The results of this case report suggested that the use of epidural steroid injections can be beneficial if athlete receives multiple treatments while also participating in daily therapeutic exercises and treatment with modalities. This study is a broad explanation of a complex injury and the recovery process from a collegiate athlete and common complications that will provide insight for multiple clinicians

## Introduction

Back injuries are very common injuries among all athletes and can have many different origins and presentations depending on the athlete and sport. Disc herniations are often found in active athletes who load their spine during their sport and can also be found in the average population; most commonly from lifting heavy objects with a rotating motion. The most common level for a disc herniation in the spine is at either L4/L5 or L5/S1. These two locations account for 90% of symptomatic herniations in the spine. The following information will explain the mechanism of injury, clinical assessments, radiographic findings, diagnosis, treatments and return to play to provide additional information to this athlete's injury.

## Purpose

The purpose of this case report was to introduce an 18-year-old collegiate football athlete who received an L5/S1 Disc Herniation while decelerating into a squat before going through basic military training and the beginning of football practice. This athlete chose to use an epidural steroid injection for his treatment. An overview of this injury is presented to obtain additional information and a better understanding regarding the use of epidural steroid injections and their benefit on a collegiate football player.

## Anatomy

Understanding the anatomy of the spinal column and spinal discs is essential in understanding the injury and radiographic findings of this case. Herniations happen when two adjacent vertebrae compress on their respective intervertebral disc. These discs are jelly-like "cushions" composed of an annulus fibrosus and nucleus pulposus. The annulus fibrosus acts as the strong boundary- it is made of lamellae, which is strong sheets of collagen fibers, and holds in the nucleus pulposus. The nucleus pulposus is a gel-like elastic substance that acts as a shock absorber for the spine. Each disc is held in the center of two vertebrae and is kept in place due to the formation of fibrocartilaginous joint at both touching surfaces. A herniation is diagnosed when the inner portion of the disc ruptures or gets pushed through the small space, often pushing into the spinal canal and putting pressure on nearby nerve roots or pathways. These injuries can be located anywhere throughout the spinal column. According to a study done by Karademir, he found that the most common level for this injury is L4/L5 at 54%, followed by L5/S1 with 34% (Karademir 2017).

## Case Report

**Patient:** This Collegiate football player is an 18-year-old defensive lineman athlete that endured an L5/S1 disc herniation before completing basic military training and the beginning days of football practice before reporting his injury. The following information will explain the mechanism of injury, clinical assessments, radiographic findings, diagnosis, and treatments to provide additional information to this athlete's unique injury.

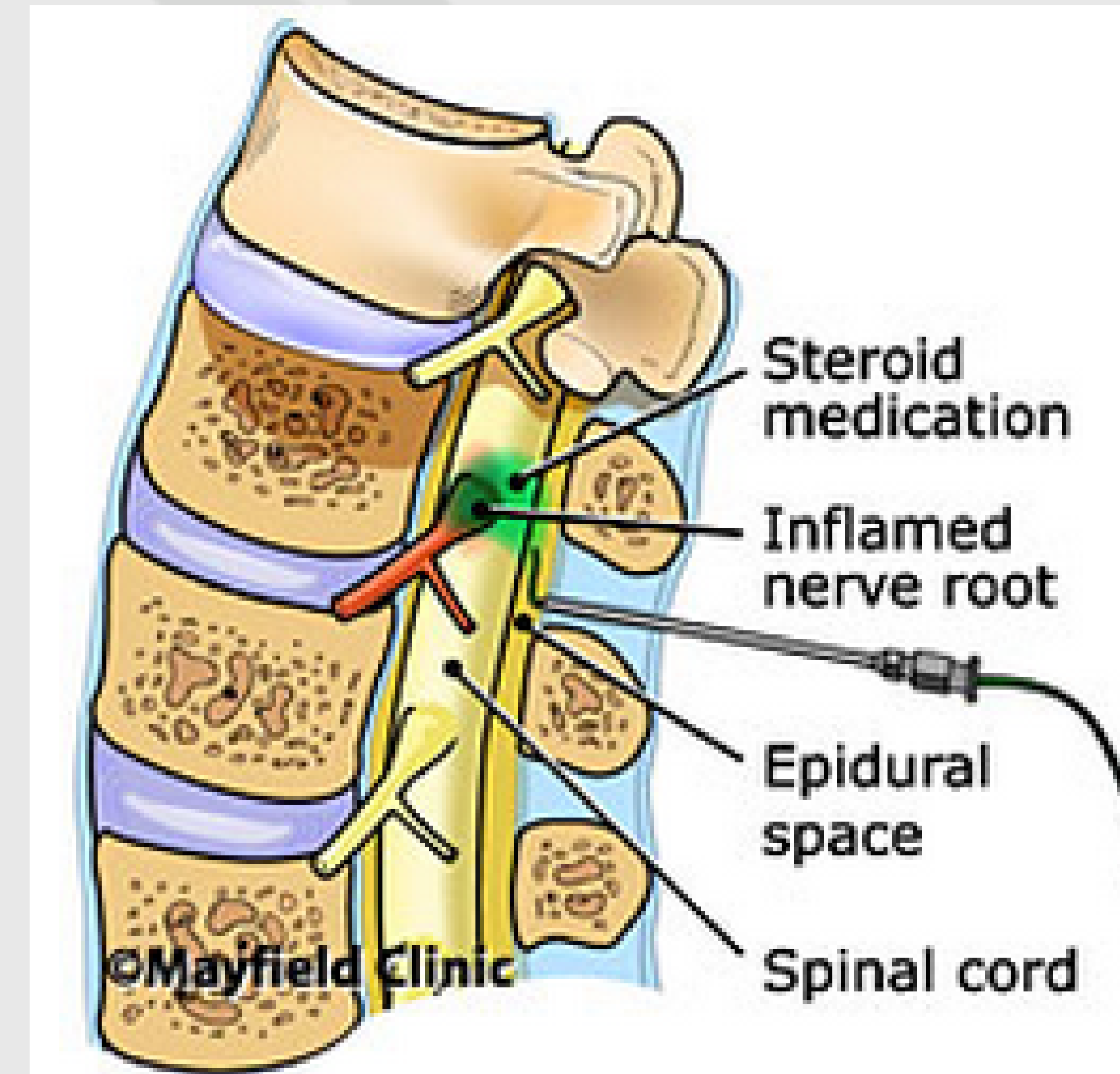
**Mechanism of Injury:** Disc herniations can be a common injury to athletes who are often put in positions that cause stress and extra pressure of the spinal column. Athletes such as football linemen, gymnast, golfers, and weightlifters are more susceptible to a disc herniation due to the nature of their sport. Axial loading is a common mechanism of injury and is often seen during improper hitting techniques in football.

**Clinical Examination:** This particular athlete joined the football team with a pre-existing injury from a failed squat that occurred approximately 1 ½ months before coming to the Academy. During deceleration into a squat, the athlete reports feeling a sharp pain in his lower back, along with numbness down his left leg. He was able to remove the weight from his back, which allowed him to get up safely from the squat. Following this, he felt a sharp, radiating pain in his lower back; but, said he took ibuprofen to relieve some pain. He claims that he was not able to work out the following week due to pain. The pain began to minimize about a week after injury, which left the athlete feeling most of his pain in the mornings and with daily tasks such as: putting on socks and boots, running, push-ups, squats, making his bed, etc. The athlete failed to mention his pain during basic training military camp, due to the possibility of it affecting his chance into The Academy.

During his initial evaluation, the athlete was discovered to have point-tenderness over his lumbar spine along with decreased mobility of his thoracic spine. An array of endurance and core strength testing determined that this athlete also does not have the core control that he should for his fitness level. Other special testing for this injury was done to determine the extent of the injury. The athlete tested positive when performing the Kemp Test, SLR, and lumbar instability test. This athlete was also tested for their range of flexion in their thoracic spine. Since he was very limited in this motion, the medical staff focused their attention once a week to perform a specific exercise that would better show his progress. The athlete was instructed to lay supine with his knees relaxed at 90/90, taking all stress of the lumbar spine. The athletic trainer then grabbed the athlete's arms and caused forced spinal flexion by pulling his arms towards his lefts as if he was touching his toes. The athlete was instructed to be completely relaxed and another medical staff member would examine the curvature of the thoracic spine and let the other trainer know when the spine stopped moving in singular units like it is supposed to. This allowed for the athletic trainer in charge to create movement in the spine by using the weight of the athlete himself.

**Radiographic Findings:** The results of the MRI found the athlete received a partial disc herniation along the L5/S1 junction.

**Clinical Examination:** During physical examination, tenderness was present over the lumbar spine and weakness was present in the left leg. Pain was diffuse and would sometimes radiate down his left leg, causing numbness and tingling for a few seconds. Clinical tests used to evaluate the disc herniation included SLR, Kemps test, and the lumbar instability test. The results of the MRI however, confirmed that the athlete suffered a disc herniation at L5/S1. This is the most common location for disc herniations. With the option of conservative treatment or surgical treatment, this athlete chose to use conservative treatment and the use of epidural steroid injections.



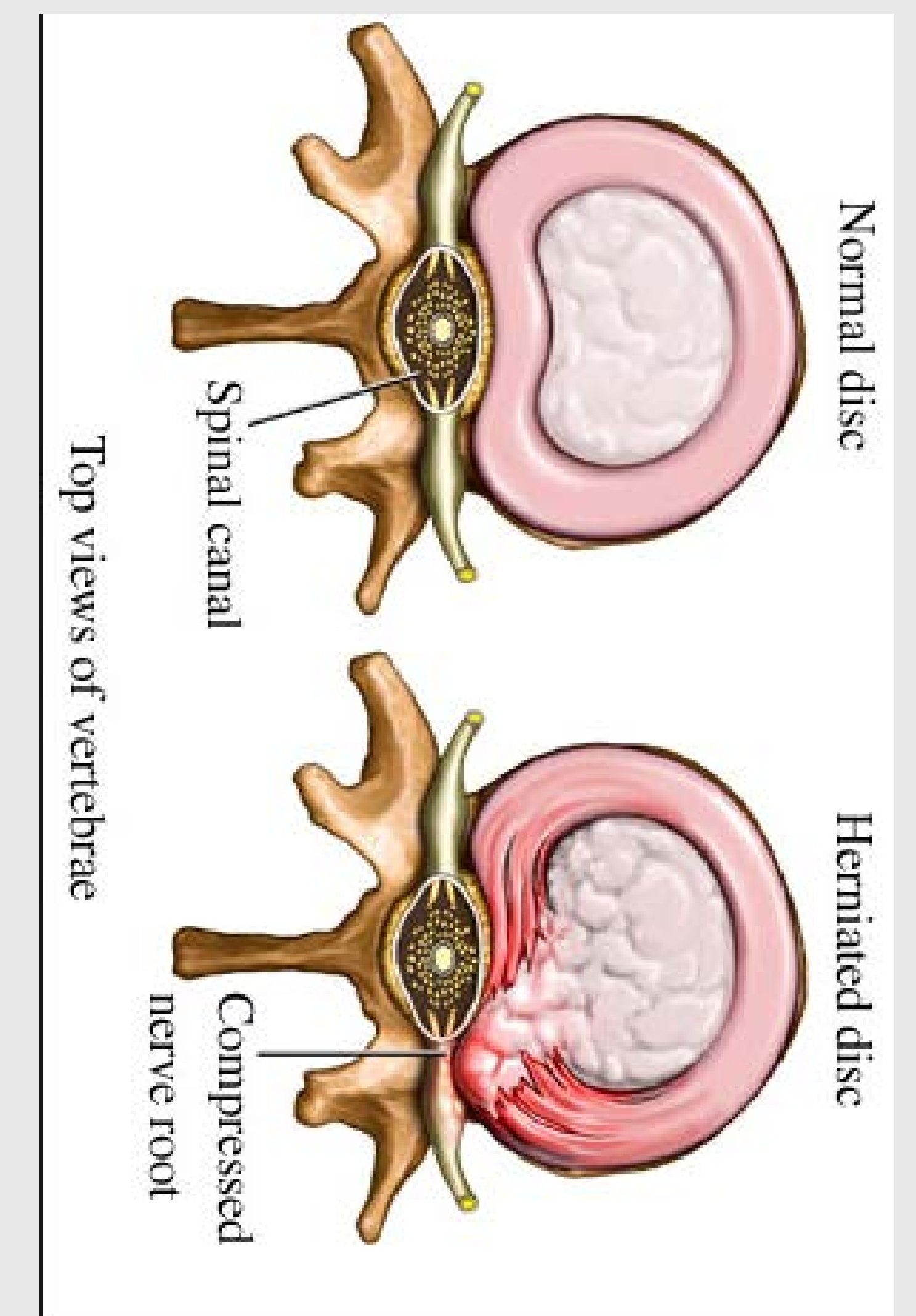
## Rehabilitation and Results

Following the decision of vetoing surgical repair of the lumbar vertebral disc, conservative treatment is usually recommended for athletes and often has successful results if the herniation is still intact. With this patient, the sports medicine staff devised a rehabilitation protocol in which the athlete was to follow for 5 weeks. The protocol was designed with the goal of utilizing ESI along with therapeutic exercises to encourage progressive rehabilitation. The athlete was to begin a 4week period of daily conservative treatment. This phase consisted of diminishing pain and inflammation, restoring range of motion, maintaining muscular strength and flexibility of the spinal column. In order to reduce inflammation the use of modalities such as E-STIM with a heat pack, soft tissue massage, ultrasounds, cryotherapy, and HIVamat were utilized prior to exercises. In order for the athlete to progress he must have pain free range of motion. This athlete was not showing signs of improvement, he was referred to a spinal specialist and given his first ESI. Following a brief recovery period, he continued with the therapeutic exercises and treatment like before. This was done for three weeks and then the athlete was reevaluated by the team physician. The recommendation of a second ESI was put into motion within the next few days. Similar treatment followed the second injection and slowly the athlete was beginning to express minor "relief" from his daily pain. With the progression of the athlete, he began more challenging exercises such as running/jogging, body weight exercises and begin to incorporate light lifts with the team. The athlete was the reevaluated by the team physician and the decision for one final injection was agreed upon. The third injection limited his pain to almost non-existent. The athlete was able to increase his workload and stopped having complaints of pain in his daily life. Return to play was then implemented with the condition that he remains pain-free and that he must report any numbness/tingling following treatment.

## Discussion and Summary

Disc herniations are common injuries for those experiencing chronic low back pain. These injuries can occur in all sports along with the regular population. It often occur in the L4/L5 and L5/S1 region of the lumbar spine due to limited mobility of the spine with the combination of lifting a heavy object in a rotational pattern. The mechanism of injury may be created in a different manner, but similarly consists of forced extension to the spine such as in spearing or exhilarating strong forces during the lift of a heavy object. Physical examinations that include proper palpitations, special tests, and clinical findings are imperative in a correct diagnosis. Once a diagnosis is hypothesized, radiographic findings maybe necessary for some patients depending on severity and confidence of the diagnosed injury. Conservative treatment is followed and created with a rehabilitation protocol from the sports medicine staff.

This injury was accurately diagnosed and handled with best protocol standard. Injuries to the spinal column are somewhat common in the athletic populations but it is important to understand the common factors, presentation signs, and predisposing factors that can lead someone to endure this type of injury.



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