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Int J Case Rep Images 2025;16(1):106–110.
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Cauda equina syndrome after a physical therapy session: A case report

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ABSTRACT

Introduction: With the growing aging population, there is an increasing prevalence of degenerative diseases of the lumbar spine, among which lumbar disc herniation is the most common. This condition occurs when the nucleus pulposus breaks through the annulus fibrosus and compresses the nerve roots. Intradural disc herniation (IDDH), where the nucleus penetrates the dura mater, is rare, accounting for only 0.04–0.33% of cases. The lumbosacral region is crucial for supporting body weight, and imbalances can lead to instability and pain, often manifesting as sciatica. Low back pain affects 70–80% of the population in industrialized countries, increasing after age 25 and peaking between 55 and 64 years. Sciatica, common in these cases, refers to pain radiating to the lower limbs and can be true, pseudoradicular, or cruralgia. This article explores the case of an elderly patient who, after a physical therapy session, presented with disc bulging and irregularities in the cauda equina, likely due to compression.

Case Report: An 88-year-old woman with a history of osteoarticular changes in the lumbar spine experienced worsening symptoms over two months. After a session of global postural reeducation (RPG), she developed severe lower back pain and weakness in her lower limbs, preventing her from standing. Physical examination showed bilateral patellar hyporeflexia and indifferent plantar reflexes. Lumbar spine magnetic resonance imaging (MRI) revealed diffuse disc bulging and a broad-based median protrusion at L2–L3, compressing the dural sac and narrowing the spinal canal. Irregularities in the cauda equina fibers above this area were also noted, likely due to compression.

Conclusion: After the review to compose the discussion of this study, it is concluded that cauda equina disorder is a rare pathology, for which the treatment of choice is decompressive surgery. As it is a rare case, this research contributes to the medical literature, with the aim of supporting other professionals to better manage cases.

Keywords: Cauda equina syndrome, Lumbar disc herniation, Radiculopathy

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Received: 05 March 2025
Accepted: 15 May 2025
Published: 04 June 2025

How to cite this article

Pereira DA, Dantas SAB, de Castro Felicio F, Santos PSM, Canedo GM, da Silva Catharino AM. Cauda equina syndrome after a physical therapy session: A case report. Int J Case Rep Images 2025;16(1):106–110.

Article ID: 101508Z01DP2025

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doi: 10.5348/101508Z01DP2025CR

INTRODUCTION

With the growing aging population, there is an increasing prevalence of degenerative diseases of the lumbar spine, among which lumbar disc herniation is the

most common. Lumbar disc herniation occurs when the nucleus pulposus breaks through a weak region of the annulus fibrosus and compresses the nerve roots, leading to various symptoms. Most herniated nucleus pulposi are typically located epidurally, either outside or beneath the posterior longitudinal ligament. However, intradural disc herniation (IDDH), where the nucleus pulposus penetrates the posterior longitudinal ligament and the anterior wall of the dura to migrate intrathecally, is very rare, accounting for only 0.04–0.33% of all lumbar disc herniations. The pathogenesis and natural course of IDDH remain unclear [1, 2].

The adult lumbar spine is composed of 33 vertebrae, organized into five regions: cervical, thoracic, lumbar, sacral, and coccygeal. Notably, significant movement occurs mainly between the upper 25 vertebrae, with the lower nine fused to form the sacrum and coccyx. Pathological conditions, such as herniation, are most commonly observed between L4 and L5, due to biochemical and anatomical changes over time that reduce the vertebral disc's ability to distribute loads effectively [1, 3, 4].

The lumbosacral region plays a crucial role in load accommodation resulting from body weight, comprising a synergistic complex of intervertebral discs and posterior articular processes that protect the disc and limit forward spinal movement. Disruptions in this synergy among active, passive, and neural stabilization mechanisms can lead to instability and subsequent pain, often manifesting as sciatica or other forms of radicular pain [2, 5, 6].

Low back pain is a prevalent issue, affecting 70–80% of the population in industrialized countries at some point in their lives. Contributing factors include rapid industrialization, urbanization, social class, occupation, poor physical activity, and sedentary lifestyles. The prevalence of low back pain increases after age 25, peaking between 55 and 64 years. Both men and women are equally affected, with a higher incidence in white individuals compared to black individuals. The lumbar spine must balance strength and flexibility to support the body's weight while allowing movement, and any imbalance in this dynamic can lead to lumbar instability and pain [3, 7, 8].

Movement disorders in the axis of the lumbar spine can damage the balance between the sagittal and spinopelvic relationship, which are related to the load of support muscles behind the trunk and the articulated synergisms, which when in deformities, caused by factors such as sex, weight, or degenerative changes. They cause fissures in the fibrous angle, which can develop into a hernia and will later compress nerve roots that emerge from the spine. The clinical manifestations will depend on the location where the herniation occurred [4, 5].

In medical practice, the complaint of sciatica is very common, especially in this case, but the term is often used incorrectly since any painful pattern radiating to the lower limbs is called sciatica. There are three types of pain referred to the lower limbs: typical or true sciatica, which is related to traction, distortion, or compression of the nerve root, plexus, or sciatic nerve; pseudoradicular sciatica, which is characterized by referred pain in the hip and thigh not related to compression of the sciatic nerve. Finally, cruralgia is used for pain radiating from the thigh to the knee caused by femoral neuralgia. In the latter, the roots involved are from L1, L2, and L3, which form the femoral nerve. Injuries to this nerve can contribute to changes in the neurological examination of sensitivity and strength of the hip flexors, since they depend on this compromised root [1, 3, 6].

This article aims to explore the case of an elderly patient who, after an RPG session, presented with diffuse bulging of the disc with a median base protrusion at L2–L3, and irregularities of the cauda equina fibers immediately above this area, probably secondary to compression.

CASE REPORT

An 88-year-old woman, with previous complaints of difficulty walking due to osteoarticular changes in the lumbar spine, has experienced progressive worsening over the past two months. Five days ago, after a session of global postural reeducation (GPR), she began to experience severe lower back pain and weakness in her lower limbs, preventing her from standing.

The patient had already been undergoing physiotherapy activities for relief for a few months, including through the GPR technique.

The physical examination was limited due to pain, revealing bilateral patellar hyporeflexia and indifferent plantar reflexes on both sides, hypoesthesia in the bilateral medial crural region, although pain and strength deficit in the bilateral lower limbs were the main complaints.

The patient underwent a lumbar spine MRI, which showed diffuse disc bulging associated with a broad-based median protrusion at L2–L3, compressing the dural sac and reducing the width of the spinal canal at this level, also occupying the lower recesses of the neural foramina (Figure 1). Additionally, irregularities in the cauda equina fibers immediately above this area were noted, likely secondary to compression.

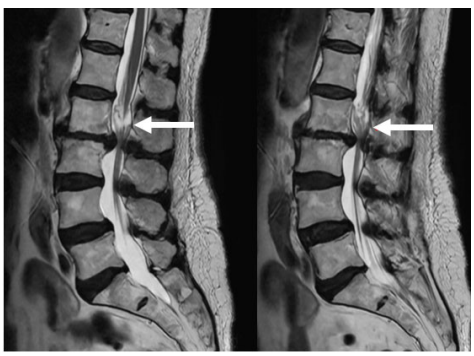

Figure 1: Irregularity of the cauda equina fibers (arrows) immediately above the area of reduced spinal canal amplitude due to disc bulging at L2–L3.

The patient was referred to neurosurgery, where a wide laminectomy was performed for extensive decompression of the nerves. The surgery was performed urgently without complications and the patient recovered completely, without sequelae.

DISCUSSION

Cauda equina syndrome (CES) is characterized by compression of the lumbar, sacral, and coccygeal nerve roots distal to the termination of the conus medullaris at the level of the L1 and L2 vertebrae. This syndrome typically occurs due to compression of the lumbar and sacral nerve roots at the L1 and L2 levels. Various factors can trigger CES, including disc herniation, trauma, vertebral fractures, tumors, infections, and post-manipulation complications, with lumbar disc herniation being the most common etiology. Cauda equina syndrome is considered an orthopedic and neurological emergency, requiring surgical decompression within 48 hours of symptom onset to minimize neurological damage and improve prognosis [3, 6].

According to Fuso et al. (2013), delays in diagnosis and subsequent definitive treatment are contributing factors to the high incidence of sequelae [6].

The clinical manifestations of CES are non-specific; however, early surgical intervention is highly effective in preventing irreversible neurological deficits. Key early symptoms include bilateral radiculopathy and progressive neurological deficits in the lower limbs, which may indicate advanced stages of the condition and a higher likelihood of permanent sequelae. Urinary incontinence or retention, fecal incontinence, and perineal anesthesia are associated with a worse prognosis [7].

The present report did not identify urinary complaints; however, it presented other findings consistent with a diagnosis of cauda equina syndrome, supported by magnetic resonance imaging.

Diagnosis should include a detailed medical history, including the patient's lifestyle and activities. A physical examination focusing on patellar and Achilles reflexes is essential, particularly when lumbar stenosis is suspected. Recommended imaging studies include plain radiography, axial (computed tomography) CT, MRI, and electrophysiological evaluations. Myelography combined with CT and MRI are considered gold-standard imaging techniques for diagnosis, with MRI being preferred. Additional assessments, such as bladder function tests, cystometrography, sphincter electromyography, and uroflowmetry, may be conducted to detect signs of neurogenic bladder.

Although the patient presented a substantial worsening of the condition following GPR (Global Postural Re-education), there is no mention in the current literature of a direct relationship between this technique and the disease described in this report.

Surgical treatment of CES remains challenging, although it generally yields favorable outcomes. The choice of technique depends on the surgeon's experience and the type of injury. Hemilaminectomy often provides better results by minimizing nerve root pressure during the minimally invasive procedure and preserving anatomical integrity to maintain lumbosacral stability. However, it may potentially cause damage to the lumbar spine, the ligamentum flavum (yellow ligament), and may lead to vertebral instability, dural sac coarctation, or even detachment of lumbar vertebrae [5, 9, 10].

Older people present a poor prognosis of the sexual function. Men show reduced sensitivity to the penis and dysfunction of the erection, while women present reduced sensitivity and urinary incontinence during the intercourse. Each patient presents a different level of pain and/ or residual neurological deficits. According to a survey, 20% of patients require a continued support with the catheterization and the colostomy [8, 9].

The prognosis for cauda equina syndrome is assessed based on symptoms at the time of patient admission and varies with the severity of preoperative sphincter disturbances, reduced bladder sensitivity, and the extent of sensory loss in the perianal area. A late diagnosis is associated with a poor prognosis [9, 11, 12].

CONCLUSION

After the review to compose the discussion of this study, it is concluded that cauda equina disorder is a rare pathology, for which the treatment of choice is decompressive surgery. As it is a rare case, this research contributes to the medical literature, with the aim of supporting other professionals to better manage cases.

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Author Contributions

Daniel Antunes Pereira – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Shara Aline Bueno Dantas – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

None.

Consent Statement

Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.