

LUMBAR PEDICLE STRESS FRACTURE IN A YOUNG SOCCER PLAYER: A CASE REPORT

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ABSTRACT

This case report details the presentation, diagnosis, and management of a lumbar pedicle stress fracture in a 19-year-old male soccer player. Lumbar pedicle stress fractures are uncommon in young athletes, and their diagnosis can be challenging due to subtle clinical manifestations. This report aims to contribute to the understanding of this specific injury pattern, emphasizing the importance of early recognition and appropriate management in young individuals engaged in high-impact sports.

KEYWORDS: *lumbar pedicle, fracture, sports, spine, vertebra, spondylolysis, surgery*

INTRODUCTION

Lumbar pedicle stress fractures represent a unique subset of spinal injuries characterized by microstructural damage resulting from repetitive mechanical loading. They consist of the breakage of one or both vertebral pedicles, the bony structures connecting the posterior arch of the vertebra to the vertebral body (1-12). Most spinal injuries typically involve the posterior elements, while lumbar pedicle fractures stand out due to their unique location and potential impact on spinal stability. The most common causes are spondylolysis (13-18), congenital anomalies (19, 20), and previous spinal surgery (21-24).

Lumbar pedicle stress fractures are often subtle and may elude initial detection, posing a diagnostic challenge for clinicians. Stress fractures in weight-bearing bones are well-documented; conversely, the literature on lumbar pedicle stress fractures remains limited.

The underlying etiology, biomechanics, and optimal management strategies for such fractures remain areas of active investigation. Through the detailed examination of this case, including the patient's clinical history, imaging findings, and therapeutic interventions, we aim to elucidate the complexities of lumbar pedicle stress fractures.

Our report underscores the importance of a heightened clinical suspicion for such injuries and the implications of early detection ensuring favorable patient outcomes. Lumbar pedicle stress fractures are rare occurrences, particularly in the younger population. This case involves a 19-year-old male soccer player who presented with persistent lower back pain following an intense training session. The atypical nature of these fractures in young athletes presents an interesting challenge that merits exploration.

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CASE REPORT

A 17-year-old soccer player was referred to our radiology department for an activity related low back and right leg pain suddenly appeared during an intense football match. Despite initial attempts at conservative management, the pain persisted, prompting further investigation. His height was 176 cm and BMI was 23. The patient had no history of previous traumatic injury, orthopedic surgery, underlying metabolic disorders. His soccer training routine involved high-intensity drills, frequent accelerations, and sudden stops, likely contributing to the repetitive stress on the lumbar spine. Clinical examination revealed localized tenderness over the left lumbar region without neurological deficits. Lasague and Wasserman's test allow us to exclude slipped discs.

The young man was not responsive to non-steroidal anti-inflammatories to manage his pain. Initial assessments, including conventional radiographs, were inconclusive. Spinal radiography showed no signs of vertebral pathologies as spondylolisthesis. Initial radiographs did not show any overt abnormalities. However, recognizing the possibility of a stress fracture, advanced imaging studies, including magnetic resonance imaging (MRI) and computed tomography (CT) scans, were ordered (Fig. 1A-C).

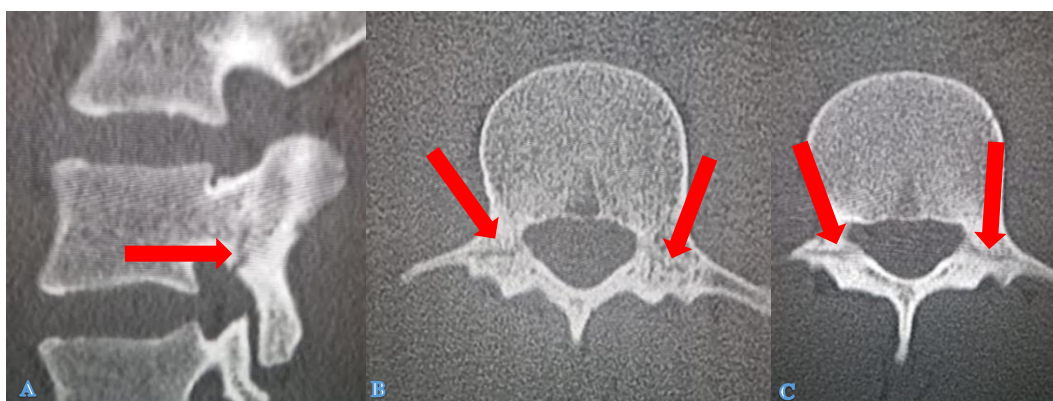


Fig. 1. A): CT scan pedicle fracture line longitudinal course (arrow); B-C): axial CT scans with reconstruction algorithm for bone, bipedicular fracture of L3 (arrows).

The MRI revealed a subtle linear hyperintensity in the left lumbar pedicle, consistent with bone marrow edema, a characteristic found in stress fractures. Confirmatory evidence was obtained through CT imaging, which displayed a well-defined fracture line through the left pedicle of the L3 vertebra. No focal bony lesion or osteopenia were observed (Fig. 2).

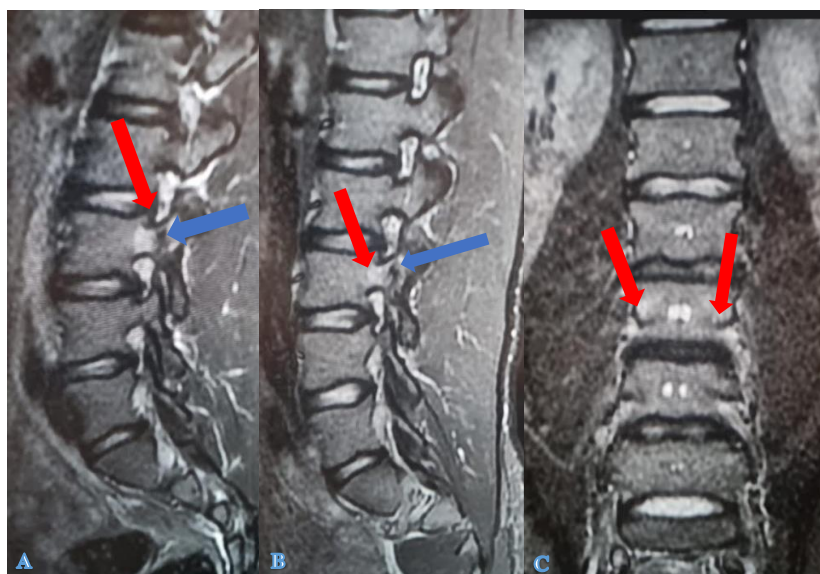


Fig 2. A-B): Flair sagittal MRI scans (A right, B left) documenting the post-traumatic edema at the pedicle level (red arrows), and the longitudinal stress fracture line (blue arrows); C): coronal MRI scan: confirmation of pedicle stress fractures (red arrows).

Considering the clinical presentation and imaging findings, a diagnosis of lumbar pedicle stress fracture was established. The rarity of this condition in a young athlete and the potential impact on his sports participation raised questions about the most appropriate management strategy, necessitating a comprehensive and individualized approach.

This case highlights the importance of a thorough clinical evaluation, including advanced imaging, in diagnosing subtle spinal injuries such as lumbar pedicle stress fractures, particularly in the context of high-impact sports. The subsequent management decisions were tailored to address both the unique characteristics of the fracture and the patient's athletic aspirations, leading to a multidisciplinary treatment plan.

DISCUSSION

Lumbar pedicle stress fractures, though infrequent in young athletes, necessitate careful consideration due to their potential impact on performance and long-term spinal health. In this case, the patient's involvement in soccer, a sport demanding rapid changes in direction, frequent accelerations, and abrupt decelerations, likely contributed to the development of stress fracture.

The diagnostic challenges associated with lumbar pedicle stress fractures are noteworthy. Initial radiographic assessments may not reveal the subtle nature of these fractures, emphasizing the importance of advanced imaging modalities, such as MRI and CT scans, for accurate diagnosis. Understanding the biomechanics of stress fractures and their varied presentations is crucial for clinicians to promptly identify and appropriately manage these injuries.

This case prompts a discussion on the optimal management of lumbar pedicle stress fractures in young athletes. Conservative management, as employed in this instance, involves activity modification, physical therapy, and a gradual return to sports. It is essential to balance the need for recovery with the athlete's eagerness to return to play, ensuring that the healing process is not compromised. Monitoring the patient's progress through regular follow-ups and imaging assessments is vital to gauge the effectiveness of the rehabilitation program and to identify any potential complications.

Additionally, the psychological impact of a stress fracture on a young athlete should not be overlooked. The extended period of restricted activity and potential fears of re-injury may contribute to emotional stress and anxiety. Incorporating psychological support into the overall management plan can be beneficial in addressing these aspects and promoting a holistic recovery.

This case report contributes to the growing body of literature on lumbar pedicle stress fractures in young athletes, emphasizing the need for a comprehensive approach to diagnosis, management, and rehabilitation. Further research is warranted to establish standardized protocols for the prevention, early detection, and effective management of lumbar pedicle stress fractures, with a focus on optimizing the return-to-play process while prioritizing the long-term musculoskeletal health of the athlete.

Management

The patient was managed conservatively with a tailored rehabilitation program, including activity modification, physical therapy, and gradual return to sports. Regular follow-ups and imaging assessments monitored the healing process, ensuring a safe and successful return to soccer activities.

CONCLUSIONS

In conclusion, this case report highlights the importance of recognizing and managing lumbar pedicle stress fractures in young athletes, particularly those involved in high-impact sports. The diagnosis of this condition can be challenging due to its subtle nature, and advanced imaging modalities such as MRI and CT scans are often necessary for accurate diagnosis. A multidisciplinary approach, involving sports medicine specialists, orthopedic surgeons, and physiotherapists, is essential for developing a comprehensive treatment plan that addresses both the unique characteristics of the fracture and the athlete's athletic aspirations. Conservative management, including activity modification, physical therapy, and gradual return to sports, can be effective in promoting healing and facilitating a successful return to athletic pursuits. Further research is needed to establish standardized protocols for the prevention, early detection, and effective management of lumbar pedicle stress fractures in young athletes.

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