

Osteochondral Lesion of the Lateral Femoral Condyle Following Patellar Dislocation – Treatment of a Rare Injury in Adolescents: A Case Study

José Miguel Araújo^{1*}, Natália Barbosa¹, Rosana Pinheiro¹, Afonso Ruano¹ and António Andrade¹

¹ Unidade Local de Saúde do Nordeste, Bragança, Portugal.

*Corresponding Author: José Miguel Araújo, Unidade Local de Saúde do Nordeste, Bragança, Portugal.

DOI: <https://doi.org/10.58624/SVOAOR.2024.04.082>

Received: October 01, 2024 Published: November 11, 2024

Abstract

Introduction: Osteochondral injuries of the knee are increasingly common among active adolescents, often resulting from acute trauma, repetitive microtrauma, or conditions like osteochondritis dissecans. Patellar dislocation is a frequent cause of osteochondral lesions (OCL). Studies indicate that a significant percentage of patients with patellar dislocation exhibit OCLs, particularly in the anterior lateral femoral condyle and medial portion of the patella.

Case presentation: A case study of a 15-year-old female athlete illustrates the clinical presentation and management of such injuries. After sustaining a knee injury during a football match, she experienced significant pain and swelling, with imaging revealing an osteochondral defect in the lateral gutter. Surgical intervention confirmed the presence of a larger defect and involved stabilizing the osteochondral fragment and repairing the surrounding cartilage. Postoperative management included a period of non-weight-bearing followed by gradual rehabilitation. Follow-up MRIs showed complete integration of the cartilage defect, and the patient successfully returned to football practice six months post-surgery.

Conclusion: This case highlights the importance of early recognition and appropriate treatment of osteochondral injuries in adolescents. Surgical techniques, including chondral fixation, can be effective, particularly in skeletally immature patients, facilitating a successful return to athletic activities. Early intervention is crucial for preserving joint function and ensuring optimal recovery outcomes.

Keywords: Osteochondral lesion; Knee; Patellofemoral instability

Introduction

Osteochondral injuries of the knee are increasingly prevalent in active adolescents, often prompted by acute trauma, repetitive microtrauma, or idiopathic causes, particularly osteochondritis dissecans. While chondral (cartilage-only) fractures are infrequent, they have been recorded in the pediatric population (1). These lesions can be associated with soft tissue injuries and their location and size affect the treatment options.

When associated to acute trauma, these osteochondral lesions (OCL) can be encountered in both patella and femur following acute patellar dislocation, or result from a direct blow to the knee. Seeley et al reported that 1/3 of patients with a patellar dislocation had a confirmed OCL in magnetic resonance (MRI) (2).

Sallary et al. (3) reviewed MRI findings in 23 patients with patella dislocation. The authors detected a bone bruise in the anterior lateral femoral condyle in 20 (87%) and a bone bruise in the medial facet of the patella in 7 (30%) of the 23 MRI scans evaluated. The lesions seen in the lateral femoral condyle were located at the periphery of the condyle, in the anterior, non-weight-bearing portion of the condyle at the edge of the lateral articular margin.

Clinical presentation can be challenging in children and adolescents, often due to inability to describe the mechanism of injury. Hemarthrosis is a common finding.

Prompt diagnosis and effective management are critical for optimal recovery, particularly in catering to an athlete's return to sport. Radiographic imaging is crucial for assessing the extent of injuries; however, its capacity to detect OCLs can be limited, and specific radiographic views may be difficult to achieve in acute setting. MRI remains the preferred diagnostic tool for OCL, while tomography aids in assessing larger defects and quantifying injury size.

Treatment modalities are under constant debate and include conservative treatment, most commonly addressed with small and stable lesions, followed by rehabilitation protocol. Surgical treatment is considered when unstable OCL are found, and can include fragment excision alone or combined procedures with soft tissue reconstruction and OCL fixation. Weight bearing surfaces (femur) injuries have higher probability to be fixed (4).

Case Presentation

A 15-year-old female with no significant past medical history, no prior knee injuries and no symptoms of previous patellar instability recurred to the emergency department following a sports injury. The patient presented with acute left knee pain that began during a football match when she collided with another player. She reported that her foot was stuck to the ground and the knee suffered a direct lateral blow in a flexed position. She reported immediate pain, swelling, and an inability to bear weight on the affected limb. She did not describe patellar dislocation.

Physical examination revealed pronounced swelling and tenderness in the left knee, restricted range of motion, particularly in flexion, alongside a negative Lachman test and no signs of varus or valgus instability. An ultrasound confirmed joint effusion. Initial X-rays (Figure 1) displayed no acute fractures; however, a CT scan identified an osteochondral defect in the lateral gutter, measuring 1 x 1.5 cm in size (Figure 2). Although MRI results were delayed until one week post-injury, it ultimately confirmed significant effusion and a cartilage defect on the lateral femoral condyle (Figure 3), raising concerns of an unnoticed patellar dislocation.

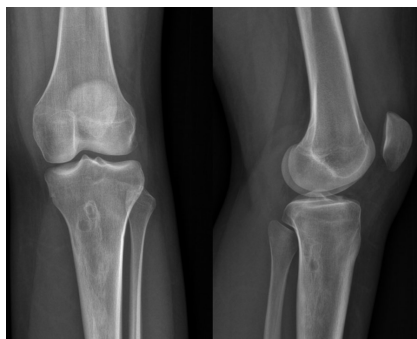


Figure 1. Initial radiography.

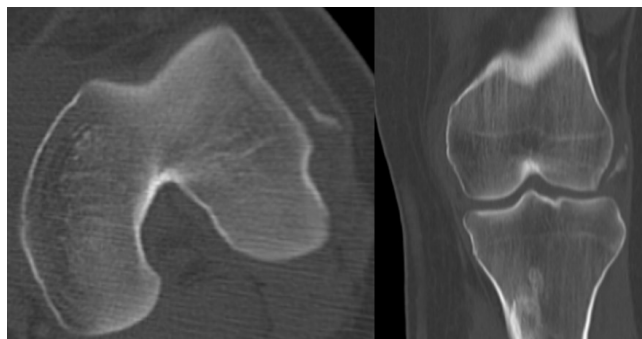


Figure 2. Initial tomography, showing completely displaced osteochondral lesion.

Based on clinical findings, imaging results and review of literature, the patient was admitted to surgical treatment, 2 weeks after injury. The patient was positioned in standard table, with a thigh tourniquet. Surgery began with diagnostic arthroscopy to determine injury size and associated lesions. No meniscal or ligamentous injuries were observed, patellar tracking was normal with slight lateral tilt. The OCL previously observed was larger than expected with a small and central osteochondral fragment with larger chondral-only periphery (Figure 4). Following diagnostic arthroscopy and considering injury size, we did a small lateral parapatellar approach to better visualize the lateral condyle defect. Provisional fixation with a K-wire was done (Figure 5). Osteochondral fragment was fixed using absorbable screws and the peripheral chondral fragment was fixed using absorbable pins.

Post-surgical management involved two weeks of non-weight bearing, with the knee in full extension. Following this period, the patient commenced active flexion, progressing to partial weight bearing at six weeks. Control MRIs performed at two months and one year post-surgery indicated complete integration of the cartilage defect (image 6). She returned to football practice six months post-operation, achieving a Knee Injury and Osteoarthritis Outcome Score (KOOS) of 87.

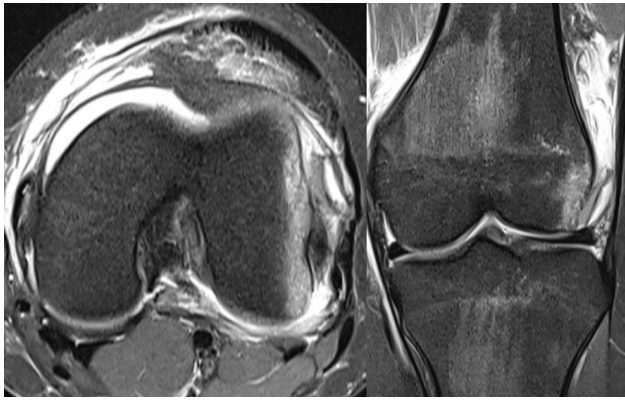


Figure 3. MRI Figures revealing lateral condyle edema and displaced injury.

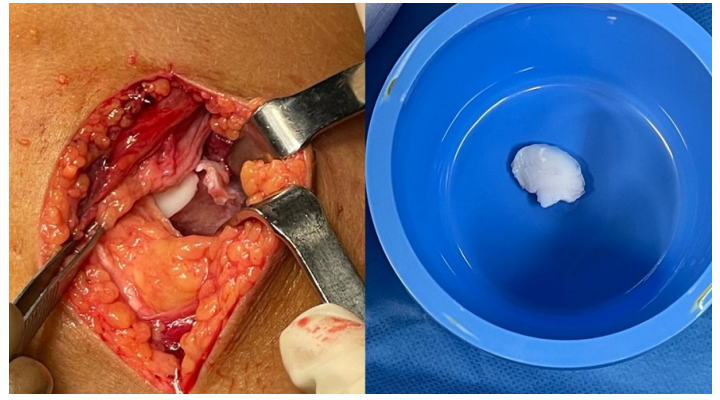


Figure 4. Lateral parapatellar approach with injury location and osteochondral fragment previously removed arthroscopically.

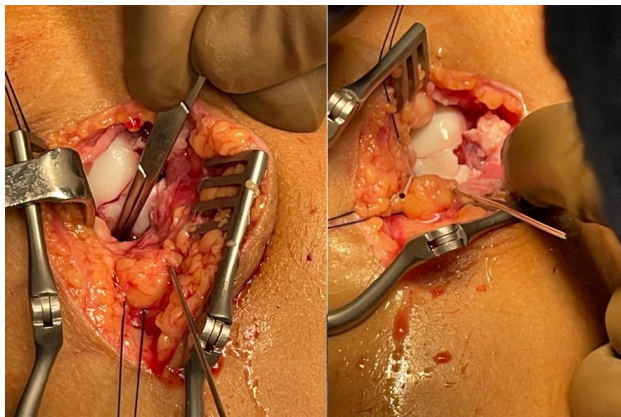


Figure 5. Fragment reduction and provisional fixation with K-wire.



Figure 6. MRI Figures at 1 year post-op with complete healing of OCL.

Discussion

This case illustrates the importance of prompt recognition and appropriate management of osteochondral injuries in the adolescent population. The decision to use chondral fixation in this case was based on the lesion's characteristics and the patient's activity level. Other possibilities would include OCL excision, considering small osseous fragment. Medial patellofemoral ligament reconstruction was also studied (despite retinacular integrity), but after discussion with the patient, and to minimize surgical aggression, was not performed. Soft tissue healing allowed safe return to sports with no symptoms of patellar instability. Other modalities of treatment would include autologous chondrocyte implantation if repair was not viable.

As previously discussed, most common OCL found in children and adolescents affect the medial portion of the patella, and less commonly the anterior femoral aspect of the lateral condyle. This case report describes a less common injury, following a combined flexion/valgus/lateral patellar dislocation moment of the knee after a direct lateral force. Skeletally immature patients have higher probability of osteochondral healing after repair (5), whether the injury is in patella or femur. This patient had complete recovery after 1 year and had clinical and imagiologic correlation throughout follow-up.

Conclusion

Lateral femoral condyle osteochondral injuries can be effectively managed in young athletes through a combination of surgical approaches. Soft tissue procedures and osteochondral repair are effective in skeletally immature patients, and in later adolescence may be combined with osseous manipulation. Early intervention is critical for preserving joint function and facilitating a successful return to sports.

Conflicts of Interest

The authors declare no conflict of interest.

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Citation: Araújo JM, Barbosa N, Pinheiro R, Ruano A, Andrade A. Osteochondral Lesion of the Lateral Femoral Condyle Following Patellar Dislocation – Treatment of a Rare Injury in Adolescents: A Case Study. *SVOA Orthopaedics* 2024, 4:6, 137-140. doi: 10.58624/SVOAOR.2024.04.082

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