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Case Study

Acute Infrapatellar Fat Pad Injury in a Professional Football Player: A Case Report and Mechanism Analysis

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Abstract

Acute injuries to the infrapatellar fat pad (IPFP), though rare, can cause significant functional impairment in athletes. This case report presents a 28-year-old professional football player who sustained a non-contact hyperflexion injury to the knee, leading to acute inflammation of the IPFP. We discuss the mechanism of injury, diagnostic imaging findings, conservative management, and recovery process, followed by a comparative review of similar cases in existing literature. The report emphasizes the clinical importance of early diagnosis and structured rehabilitation while also exploring commonalities and contrasts with previously published cases. Key clinical implications and take-home messages are highlighted.

Introduction

The infrapatellar fat pad, also known as Hoffa's fat pad, is a soft, intracapsular but extrasynovial structure located posterior to the patellar tendon and anterior to the intercondylar notch of the femur. It plays a significant biomechanical role in stabilizing and lubricating the knee joint during flexion and extension. Damage to this fat pad, whether acute or chronic, can result in substantial anterior knee pain and compromised mobility.

Chronic IPFP disorders, such as Hoffa's syndrome, have been extensively studied and typically occur due to repetitive microtrauma or impingement. However, acute traumatic IPFP injuries are rarely reported in the literature, particularly among elite athletes. This report contributes to bridging this gap by analyzing a unique case involving a professional football player, with an in-depth look into the mechanism of injury, imaging findings, management, and outcome. A comparison with previously documented cases helps outline patterns in presentation and treatment efficacy.

Case Presentation

A 28-year-old male professional football player (height: 184 cm; weight: 76 kg; BMI: 22.4 kg/m²) presented with acute right knee pain following a non-contact injury during a league match. The injury occurred as the player slipped while dribbling, resulting in a hyperflexion of the right knee (>140°) with simultaneous external rotation of the tibia. Match video confirmed there was no direct impact or collision.

On-field assessment revealed moderate anterior knee pain and inability to continue playing. Emergency room evaluation showed anterior knee tenderness, moderate swelling, and a reduced range of motion (0° extension to 100° flexion). Ligament stability tests were negative, indicating no injury to the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), or collateral ligaments. No visible joint effusion or bruising was present. Despite medical advice, the player declined a plain radiograph. Magnetic resonance imaging (MRI) was then conducted.

Imaging Findings:

- T1-weighted sagittal image: Low signal intensity was observed within the IPFP, suggesting the presence of soft tissue trauma.
- T2-weighted sagittal image: High signal intensity, consistent with edema and acute inflammation, was detected.
- Fluid extended anteriorly from the proximal tibia to the anterior horn of the lateral meniscus.
- No ligamentous injury, meniscal tears, or bony deformities were observed.

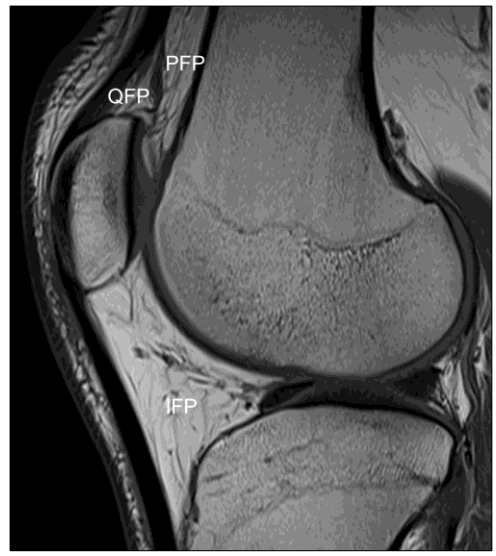

Fig. 1. T1-weighted sagittal magnetic resonance image of the knee shows the intracapsular but extrasynovial fat pads –infrapatellar fat pad (IPF), quadriceps fat pad (QFP), pre- femoral fat pad (PFP).

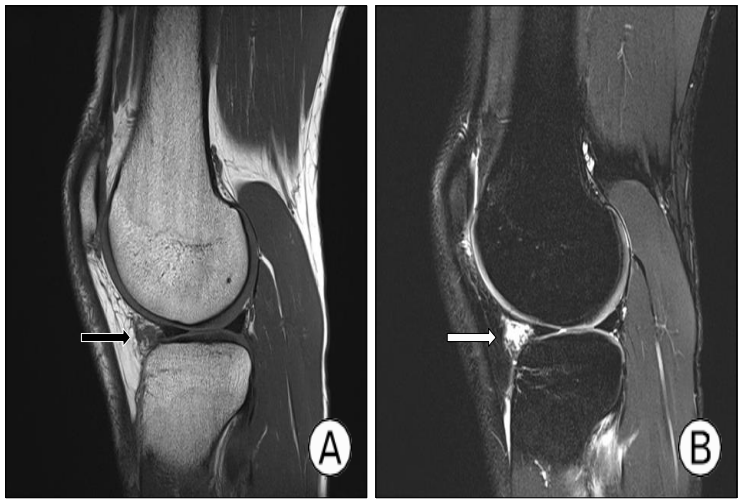

Fig 2: On magnetic resonance image (MRI) scan, low sig- nal intensity in the T1-weighted sagittal image (A) and high signal intensity in the T2-weighted sagittal image (B) were observed at the infrapatellar fat pad located in the anterior part of the anterior horn of the lateral meniscus (arrow). MRIs show fluid collection anteriorly from the proximal tibia extending to the anterior horns of the meniscus.

Mechanism of Injury

The combined action of hyperflexion and external tibial rotation likely caused impingement and compression of the IPFP between the femoral condyles and tibial plateau. This type of stress can lead to tissue irritation, inflammation, and edema within the fat pad. The IPFP's vulnerable anatomical location makes it susceptible to trauma during abrupt, high-range movements often seen in athletic performance. Similar injury mechanisms have been implicated in previous case reports involving acute or subacute trauma to the IPFP.

Comparative Analysis of Similar Cases: To better understand the clinical presentation and treatment response of acute IPFP injuries, it is useful to compare this case to similar ones in the literature.

Yi et al. (2021) described a case involving a middle-aged male who developed an acute IPFP injury after kneeling for an extended period during a religious ceremony. In this scenario, the injury was caused by prolonged anterior pressure rather than a rotational or high-velocity movement. The MRI demonstrated a clear separation within the IPFP and associated edema, yet no ligamentous or meniscal damage. Treatment was conservative, including NSAIDs, cryotherapy, and physical therapy. Recovery was achieved within six weeks without any long-term sequelae. This case underlines that even low-energy, sustained pressure can be sufficient to cause significant trauma to the fat pad.

In contrast, Dragoo et al. (2012) reported a broader study involving athletes with chronic anterior knee pain stemming from repetitive microtrauma to the IPFP, commonly seen in sports such as basketball and running. The resulting injury was not acute but rather developed over time, leading to fibrotic changes and thickening within the fat pad. These patients frequently exhibited symptoms of impingement, especially during terminal extension. Conservative treatments were attempted initially, but a subset of patients required arthroscopic debridement due to persistent symptoms. The outcomes were mixed: some patients responded well to non-surgical management, while others continued to experience discomfort despite surgical intervention. This study highlights the progressive nature of chronic fat pad injuries and the potential for irreversible changes if untreated.

The present case involved a young elite athlete who sustained an acute, non-contact injury during play. The mechanism—a combination of hyperflexion and tibial external rotation—resulted in an isolated inflammation of the IPFP without any structural damage to ligaments or menisci. MRI confirmed the presence of localized edema without deformation of the fat pad. Conservative management, including NSAIDs, brief use of crutches, and a structured physiotherapy regimen, led to a full recovery within six weeks. At six months, the athlete remained symptom-free and had returned to full competitive activity.

These cases illustrate key differences in etiology—ranging from direct pressure, repetitive stress, to acute rotational trauma—and demonstrate the effectiveness of early conservative treatment in preventing long-term impairment. While chronic cases may require surgical intervention, acute isolated injuries such as in the present report respond favorably to non-operative approaches when promptly identified and managed.

Study	Mechanism of Injury	Imaging Findings	Management	Outcome
Yi et al. (2021)	Kneeling trauma (direct)	Separation of IPFP, edema	Conservative	Full recovery (6 weeks)
Dragoo et al. (2012)	Repetitive stress (sports)	Fibrotic changes, thickening	Conservative/Surgical	Variable (some residual)
Present Case	Hyperflexion + rotation	Acute edema, no deformity	Conservative	Full recovery (6 weeks)

Table 1: Summary of Comparative Cases

Management and Outcome:

Conservative management proved effective in this case:

- Pharmacologic: NSAIDs were used for inflammation and pain control.
- Activity modification: Crutches for the first 5 days with partial weight-bearing.
- Physiotherapy: Initiated after the acute phase. Initial focus was on range-of-motion exercises, followed by progressive strengthening, proprioceptive training, and return-to-sport drills.

Recovery Timeline

- Week 1: Pain significantly reduced; walking unaided.
- Week 3: Light training initiated under supervision.
- Week 6: Returned to full-match participation without discomfort.
- Month 6: No recurrence or residual symptoms; patient declined repeat MRI.

Discussion

This case demonstrates that acute IPFP injuries, though uncommon, should not be overlooked in athletes with anterior knee pain after a hyperflexion injury. The importance of early MRI cannot be overstated, as it not only confirms the diagnosis but also helps exclude other serious intra-articular pathologies.

Compared to chronic IPFP disorders, acute injuries display distinct characteristics:

- Absence of fat pad fibrosis
- No impingement signs during passive extension
- Isolated edema without deformity

The recovery outcomes in this case reinforce the success of non-operative management when the diagnosis is timely and accurate. Moreover, this case illustrates the utility of video analysis in sports medicine, allowing clinicians to understand the injury mechanism more precisely and guide management.

Key points:

- Acute IPFP injury can occur without direct trauma, especially under hyperflexion and rotational stress.
- MRI is crucial in distinguishing IPFP inflammation from other intra-articular pathologies.
- Conservative treatment yields positive outcomes in isolated IPFP cases.
- Video analysis enhances diagnostic accuracy in sports-related injuries.

Conclusion

Acute infrapatellar fat pad injuries, while rare, must be considered in athletes with anterior knee pain following hyperflexion trauma. MRI imaging plays a critical role in identifying inflammation and ruling out more severe injuries. Conservative therapy, including NSAIDs and physical rehabilitation, is typically sufficient for recovery. Comparative review suggests that early intervention and structured rehabilitation contribute to excellent prognoses. Further research should examine recurrence risks and long-term joint health in affected athletes.

Reference

1. Gallagher J, Tierney P, Murray P, O'Brien M. The infrapatellar fat pad: anatomy and clinical correlations. Knee Surg Sports Traumatol Arthrosc. 2005;13:268–72.

2. Dragoo JL, Johnson C, McConnell J. Evaluation and treatment of disorders of the infrapatellar fat pad. Sports Med. 2012;2:51–67.

3. Yi SR, Im SH, Cho EH. Acute infrapatellar fat pad separation after contusion in the kneeling position. J Korean Orthop Assoc. 2021;56:341–45.

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