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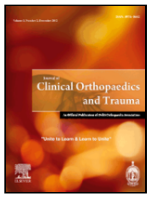

Case report

Schenck's knee dislocation (KD) I injury: An uncommon pattern

Francisco Figueroa [a,b,*], Alfredo Sandoval [b], David Figueroa [a]

[a] Clinica Alemana-Universidad del Desarrollo, Santiago, Chile
[b] Hospital Sotero del Rio, Santiago, Chile

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ABSTRACT

Schenck's knee dislocation (KD) I is a very uncommon pattern of KD, where the knee presents with clinical or radiographic evidence of a KD with one of the ligaments of the central pivot preserved. The correlation between imaging and physical examination is of the highest importance to correctly classify this injury. Recently, there have been reports in the literature with large numbers of Schenk's KD I, however this is due to classifying multiligament knee injuries as if they all were KDs rather to an increase of the pattern. In this report the case of an 18-year old patient that sustained a KD with a preserved posterior cruciate ligament is presented.

1. Introduction

Knee dislocations (KDs) are rare injuries, with an incidence reported to be between 0.02% and 0.2% of all orthopaedic injuries.[1] Historically they were defined as a complete loss of the tibiofemoral congruency that is confirmed radiographically, but there is a general view that this definition might underestimate its incidence because up to 50% of the knees spontaneously reduce before presentation in the emergency department.[2]

Currently, the Schenck's classification of KDs, based on injured ligaments, is the most widely used.[3] Some authors have suggested that any combined anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL) injury should be considered a KD.[1] Therefore, the traditional definition of KD has been expanded to include bicruciate knee injuries, even when the knee is reduced on initial presentation. However, there have been reports of KDs without tears of both cruciate ligaments.[4–6] These injuries are included into the KD I category.[3] They are defined as a dislocated knee either clinically or in plain radiographs with either the ACL or PCL torn, along with a tear of the medial or lateral collateral ligament complex. This KD pattern has been rarely described in the literature. The aim of this article is to report one case of this rare entity, emphasizing on the importance of the combination of the clinical history, physical examination, and imaging to diagnose and correctly classify this injury.

2. Case report

A previously healthy, 18 year-old female patient was admitted in the emergency department of our hospital after closed anteriorly directed blunt trauma to the posterior tibia (physical aggression by a third party). The patient presented with obvious knee deformity, symmetrical distal pulses, and no neurological impairment. A lateral portable x-ray was obtained in the emergency department confirming an anterior KD (Fig. 1).

The dislocation was immediately reduced and the limb placed on a brace. New x-rays were obtained confirming reduction. Angio-CT scans were obtained to rule out any vascular compromise because of the injury. The patient was hospitalized and a Magnetic resonance imaging (MRI) was indicated, showing an ACL avulsion plus middle third tear (Fig. 2), a stenner-like medial collateral ligament (MCL) injury (Fig. 3), and an intact PCL (Fig. 4) and posterolateral corner.

Surgery was performed 10 days after the injury. On physical examination under anesthesia, anterior instability (positive Lachmann test and anterior drawer test) and valgus instability at 0° and 30° of flexion and a positive anteromedial drawer test were obtained, confirming a posteromedial corner (posterior oblique ligament [POL]) involvement apart from the MCL tear. The knee was stable to posterior loads, and to varus forces at 0° and 30° of flexion. Contralateral knee and a full physical examination discarded a generalized ligamentous laxity syndrome. The ACL was reconstructed through the anteromedial portal

* Corresponding author. Vitacura, 5951, Santiago, Chile.
E-mail address: franciscofigueroab@gmail.com (F. Figueroa)

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Fig. 1. Lateral x-ray confirming posterior knee dislocation.

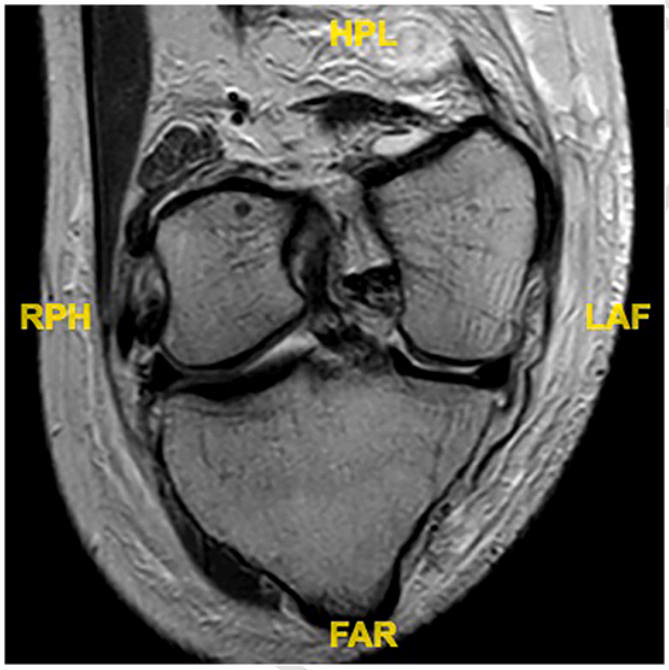

Fig. 2. Coronal oblique T2-weighted MRI confirming ACL middle third injury.

technique using a Tibialis anterior allograft achieving femoral fixation with an adjustable cortical button and tibial fixation with a bioabsorbable interference screw. The MCL and POL were reconstructed using an Achilles-tendon allograft with a single femoral tunnel in the middle point between the MCL and POL insertions and two tibial tunnels, one at the insertion of the POL and another at the insertion of the superficial MCL, while the distal end of the MCL was repaired with a

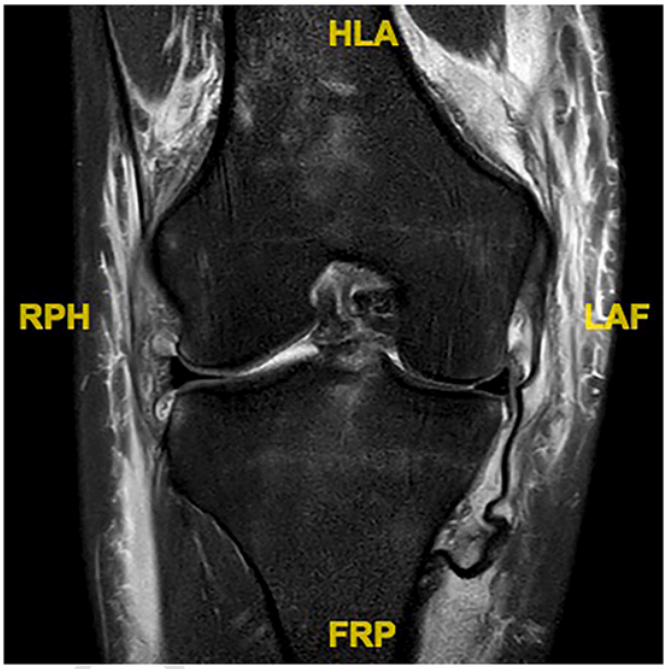

Fig. 3. Coronal T2-MRI confirming MCL stenner-like injury.

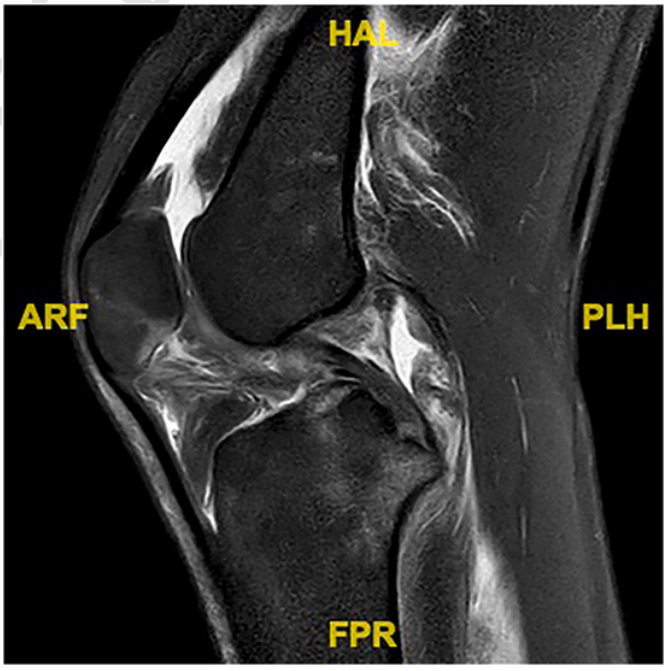

Fig. 4. Sagittal T2-MRI confirming an intact PCL.

suture anchor (Fig. 5). Fixation of the MCL-POL complex was obtained using a titanium interference screw in the femur, a bioabsorbable interference screw for the POL insertion, and a staple on the superficial MCL insertion. A proximal suture anchor was added at the proximal insertion of the superficial MCL in the tibia. Stability was regained, the knee was put in a hinged knee brace for 6 weeks and weight bearing was limited during this period. Passive range of motion (ROM) was initiated immediately after surgery, and after 4 weeks, active ROM was encouraged, obtaining a full ROM at 8 weeks. Later, the rehabilitation focused mainly in strengthening. At 9 months, the patient was discharged and allowed to return to unsupervised activities without any limitations.

Fig. 5. Postoperative anteroposterior x-ray showing ACL reconstruction plus posteromedial corner reconstruction.

3. Discussion

Schenck's KD I injuries were, until recently, rarely described in the literature with only 3 Pubmed indexed articles reporting them, all published during the early 1990s. However, in 2020, Maxwell et al.[7] reported 121 KD I cases accounting for a 42.2% of a sample of knee multiligament injuries. Similarly, in the following months, other series also published more KDI cases than expected,[8,9] with the probable reason being the fact that some authors have expanded the Schenck's classification use to a multiligament knee injury setting.

In a recent article,[3] the group behind the Schenck's classification stated that it is important to understand that not all multiligament knee injuries are KDs, something that is specially applicable to KD I, where the only method to diagnose it is clinical or radiographic evidence of a KD with one of the ligaments of the central pivot (ACL-PCL) preserved after MRI and clinical evaluation. KDs need increased awareness of neurovascular injuries that often accompany them, something that does not apply to every multiligament injury.

For the variant of KDI observed in this case (KD with ACL and MCL tearing) a mechanism of anterior translation and hyperextension (not severe enough to tear the PCL) has been proposed.[6] This can apply to the mechanism of this patient, where an anterior directed force was applied from the posterior tibia. There is biomechanical evidence that disrupting both cruciate ligaments is not completely necessary to dislocate the tibiofemoral joint.[6]

4. Conclusion

Schenck's KD I injuries are very uncommon patterns of KDs, where the knee presents with clinical or radiographic evidence of a KD with one of the ligaments of the central pivot preserved. The correlation between imaging (MRI) and physical examination is of the highest importance to correctly classify this injury. Recently, there have been reports in the literature with large numbers of Schenk's KD I injuries, however this is due to classifying multiligament knee injuries as if they all were KDs rather to an increase of the pattern.

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