# Unicondylar fracture of the femur associated with intra-articular dislocation of the patella in an adolescent: A case report

## Une fracture unicondylienne du fémur liée au déboîtement intra-articulaire de la rotule chez un adolescent: Un rapport de cas

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**Abstract**

Distal femoral fracture associated with knee extensor apparatus injury is a rare event.

The authors report the case of a 19-year-old boy featuring an unicondylar femoral fracture with an intra-articular dislocation of the ipsilateral patella. Both injuries were treated surgically. Emphasis is placed on the mechanism of the lesions and the surgical approach.

***Key words:*** Extensor mechanism, knee, patella dislocation, unicondylar femoral fracture.

**Resume**

Il est rare de voir une blessure liée à une fracture fémorale distale due à l'emploi d'un appareil extenseur du genou. Les auteurs rapportent le cas d'un garçon de 19 ans atteint d'une fracture fémorale unicondylienne marquée par un déboîtement intra-articulaire de la rotule ipsilatérale. Les deux blessures ont été traitées par intervention chirurgicale. L'accent est mis sur le mécanisme des lésions et sur l'approche chirurgicale. Mots-clés: Mécanisme extenseur, genou, déboîtement de la rotule, fracture fémorale unicondylienne.

## Introduction

Dislocations of the patella occur throughout life, being seen most frequently in children and adolescents. By far the most common dislocation of the patella is in a lateral direction[1-8]. Intra-articular dislocation of the patella is an unusual clinical condition[6-8]. Unicondylar femoral fractures are also rare[9,10]. We have had the unusual experience of encountering a case of unicondylar femoral fracture associated with an intra-articular dislocation of the patella in a 19-year-old boy. Both lesions were treated surgically. Since operatively treated unicondylar femoral fractures after open reduction and internal fixation have a better outcome[11-12], this article focuses specially on the mechanism of this peculiar constellation of injury and the surgical approach used.

## Case Report

A 19-year-old boy sustained injury to both of his knees from a traffic road accident, when he was knocked down by a car. He landed on the ground on his flexed knees and was unable to bear weight at presentation in the emergency department. Both knees were painful, but there was no major deformity on the right side. The left knee was held flexed at 20°. Palpation of the soft tissues around the left knee gave the impression of a rupture of the quadriceps tendon.



Fig. 1: Preoprerative AP X-ray showing the fracture of the lateral condyle and the patella locked within the joint



Fig. 2: Preoperative lateral X-ray demonstrating the patella against the trochlear notch

The patella was noted to be abnormally positioned with the skin tenting at its lower pole. Movements of the joint were restricted. Roentgenologic evaluation of the right knee revealed a nonarticular proximal tibia fracture. Anteroposterior and lateral plain radiographs of the left knee demonstrated a fracture of the lateral condyle of the femur. The fracture line was located in

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Fig. 3: Post operative AP radiograph



Fig. 4: Postoperative lateral radiograph

an intermediate plane between the sagittal and the coronal planes10. X-rays confirmed the intra-articular dislocation of the patella which superior pole hooked into the trochlear notch (Fig 1, 2). There was no rotation of the patella in any plane.

The fracture of the tibia was treated with a plaster cast. The patient had open reduction of the dislocation and surgical treatment of the condylar fracture. Closed reduction of the dislocation was attempted under general anesthesia but was unsuccessful. The knee was exposed through a longitudinal midline incision. On inspection, there was no rupture of the extensor apparatus. A lateral parapatellar arthrotomy was performed preserving the fat pad as suggested by Holmes et al[11]. A slight flexion of the knee revealed the patella trapped within the joint and the fracture in its way. Reduction of the patella was achieved by putting pressure on the distal pole while simultaneously unhinging the proximal pole from within the joint[7]. For routine joint inspection, eversion of the patella was performed. The articular surface of the patella was normal. The cruciate ligaments were intact. The fracture was debrided and anatomically reduced and held compressed with bone clamps. Osteosynthesis was performed using two 6.5 mm cancellous partially threaded screws (Fig 3, 4). The lateral retinacular was repaired and the wound closed in layers. The limb was placed in a plaster cast for four weeks, after which time an active flexion and extension program was started.

## Discussion

The close anatomical relationships between the extensor apparatus and the distal end of the femur may result in combined injuries to these structures. However these associated lesions are rare events whether the distal femoral fracture is recent[13] or old[14]. In 2004, Calmet et al[13] reported two cases of open bicondylar Hoffa fracture associated with extensor mechanism injury. To the best of their knowledge, such an association has not been reported previously. In old fractures, deformity of the femur affects patellofemoral congruity. The subsequent weakness of the extensor mechanism can lead to permanent patellar dislocation[14]. In the case described here, both injuries are the result of the direct anteroposterior forces applied to a flexed knee. If isolated intra-articular dislocation of the patella, as often happens is due to direct blow to the superior pole of the patella with knee in flexion[6], the mechanism of both lesions featured by our patient may be difficult to explain. We assume that the first event was the dislocation of the patella owing to the greater mobility of the patella related to the laxity of the ligaments in adolescents. Then, as pointed out by Cameli[15], the direct blow of the patella to the anterolateral aspect of the condyle has resulted in the unicondylar fracture. Fracture was suggested to be the cause of the locked knee. This figure is akin to that in arthritic knee where osteophytes stand in the way of the patella[8]. There is a dearth of specific information on the preferred surgical approach to unicondylar femoral fractures[9-11,16]. At first glance, challenges can be enormous for surgeon unaccustomed to condylar femoral fracture combined with injury to extensor apparatus. The coexistent patellar or quadriceps tendon disruption facilitates the surgical approach to condylar fractures[13]. In the instance of an intact extensor mechanism, the ipsilateral parapatellar arthrotomy recommended by Holmes et al[11] for unicondylar coronal fractures improves the access to fracture as was the experience in this report.

The impression of a rupture of the quadriceps tendon led us to choose a midline incision and performed an ipsilateral parapatellar arthrotomy to visualize the fracture. In conclusion, this report offers us the opportunity to add to literature on the injury pattern consisting of condylar femoral fracture combined with extensor mechanism injury statistics. From experience with this case and review of numerous other reports, we think that the longitudinal midline incision should be undertaken straight away in the setting of a unicondylar fracture associated with an injury to the extensor apparatus. In the absence of a disruption of the extensor mechanism, the condylar

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fracture is amenable to an ipsilateral parapatellar arthrotomy as it allows for complete visualization of the entirety of the distal femur.

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