

# Coronal fracture of medial femoral condyle: a case report and review of mechanism of injury

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## Abstract

Intra articular coronal fracture of femoral condyle is rare : isolated medial Hoffas being extremely rare. This case is a 28 year old male who suffered a road traffic accident and sustained isolated, medial Hoffas fracture [Letenneur type I: type 33-B3 as per Orthopaedic Trauma Association (OTA) classification system]. The large medial condyle was reduced, joint surface restored and secured with 4 partially threaded cancellous screws of 4.0 mm size. At 38 months follow up, the fracture united and the patient had 130° range of motion with full extension and no varus-valgus instability. Early diagnosis and prompt treatment can produce good prognosis.

## INTRODUCTION

Coronal fractures of the femoral condyle are rare and are first described by Hoffa in 1904 (1). By definition these Hoffas fractures are intra articular fractures and the principles of management of these fractures are similar to those of intra articular fractures. Lateral Hoffas and bilateral Hoffas are well described, but medial Hoffas are extremely rare, and there is only one case report in English literature to the best of our knowledge (2). Here we are presenting a case report of isolated medial Hoffas fracture and a review of its mechanism of injury.

## CASE REPORT

A 28 year old male sustained a road traffic accident. The mode of injury was impaction to the knee while riding on a bike. He subsequently was unable to bear weight on the right lower limb. On examination the right knee was tense and tender. AP and oblique radiographs of the knee (Fig 1a, 1b) showed an isolated coronal plane fracture of the medial femoral condyle.

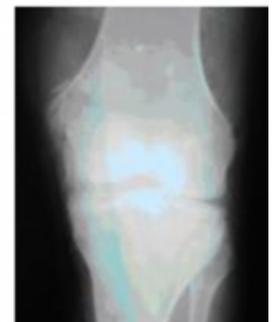
## Figure 1

Fig. 1a, 1b: AP and oblique x-rays of the right knee joint showing Letenneur type 1 Hoffas fracture of the medial femoral condyle extend the junction of the posterior femoral shaft and the proximal aspect of the femoral condyle superiorly to the posterior aspect of the condylar articular surface inferiorly with some amount of comminution superiorly.

Fig. 1a



Fig. 1b



According to Letenneur classification it was type I fracture. Examination under anaesthesia demonstrated significant varus instability in 30° of flexion, but there was no antero-posterior instability of the knee. Knee was approached through medial incision. There was comminution of medial condyle. The tibial articular surface, menisci were normal. The fracture line was found to be passing posterior to the attachment of PCL on the femoral condyle. The large medial condyle was reduced, restoring the joint surface and secured with four partially threaded cancellous screws of 4.0 mm size. The screws were directed posterior and laterally and

were buried in the articular surface. (Fig. IIa,IIb).

## Figure 2

Fig. IIa, IIb: AP and lateral x-rays of the same knee joint as shown in Fig. 1a,1b Post-operative radiographs demonstrating fixation of the medial Hoffa type fracture fragment and restoration of the articular surface using multiple cancellous lag screw

Fig. IIa



Fig. IIb



At final follow up of 38 months, the fracture united and the patient had 130 range of motion with full extension and there was no varus-valgus instability. The patient was pain free and ambulatory with out any walking aids.

## DISCUSSION

The so-called 'Hoffa' fracture refers to an isolated, coronally-oriented fracture of either femoral condyle, with intra-articular extension. This rare injury corresponds to the OTA Type 33-B3 fracture (frontal, partial articular fracture of the distal femur). These injuries have previously been classified by Letenneur (3). This classification was originally described for lateral Hoffas fractures. Type I fractures extend from an extraarticular location at the junction of the posterior femoral shaft and the proximal aspect of the femoral condyle superiorly to the posterior aspect of the condylar articular surface inferiorly, such that the popliteus tendon insertion and the lateral head of gastrocnemius origin remain attached to the condylar fragment. The anterior cruciate and lateral ligament insertions may be attached to either the condylar or shaft fragment. Type II originate posterior to the posterior femoral shaft-condylar junction, and are therefore potentially entirely intraarticular. Compared to Type I fractures, the aforementioned ligamentous insertions are less likely to be attached to the condylar fragment. In Type III fractures all of the ligamentous insertions remain attached to the condylar fragment. According to this classification ours was type I fracture.

The mechanism of injury of this fracture pattern is controversial. Some authors have postulated direct impact with the knee in a flexed position as the mechanism of

injury, while others have attributed the fracture to simultaneous vertical shear and twisting forces (3,4). Lewis proposed that direct impaction leading to axial loading force to the femoral condyle with the knee in 90 or more of flexion possibly with an element of abduction results in typical Hoffas fracture (3). Most of these injuries are a result of motor vehicle accidents. The normal riding posture of the motor cyclist involves sitting with the knee flexed at or beyond 90. In this position with slight abduction lateral femoral condyle is the leading part of the knee to receive a direct impact.

In our patient the exact mode of injury was that the patient was riding a motorbike when he got an axial collision with another vehicle. Due to sudden deceleration, his inner side of the knee hit the handle of the motor bike. Medial impact directly to the medial femoral condyle with the knee in more than 90 flexion, with an element of adduction and internal rotation has led to medial Hoffas fracture.

The treatment of Hoffas fracture is similar to that of any intra articular fracture. Open reduction is mandatory for good long-term function. The articular surface is exposed through a medial or a lateral approach, depending on which condyle is involved. Anatomic reduction of joint is essential and temporary fixation with k-wire is followed by permanent fixation with interfragmentary lag screws of size either 6.5 mm partially threaded cancellous screws or 4.0 mm partially threaded cancellous screws, depending on the size of the fragment. A minimum of two screws is mandatory to provide rotational stability. Insertion of screws through articular cartilage is necessary to achieve the lag effect and should be placed as for laterally as possible, while it should be medial for medial Hoffas fracture. Following surgery, full knee range of motion is encouraged, but weight bearing must of course be delayed until fracture union occurs (up to 12 weeks in most cases). Since these fractures do not heal by formation of much external callus and vascularity of these fractures is impaired because of large bone surface covered with articular cartilage, delayed union, nonunion or avascular necrosis are not unexpected complications of these fractures especially in type II fractures.

## References

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