

# Non -Union of Lateral Hoffa Fracture - A Case Report

Amit Supe<sup>1</sup>, Shubham Atal<sup>1</sup>, Neetin P. Mahajan<sup>1</sup>, Prasanna Kumar. G S<sup>1</sup>, Amey Sadar<sup>1</sup>,  
Pranay Kondewar<sup>1</sup>

## Learning Point of the Article:

Early diagnosis, stable internal fixation along with early initiation of knee range of motion helps in getting better functional outcome.

## Abstract

**Introduction:** Hoffa is a coronal fracture of the femoral condyle. It is an uncommon injury easily missed on X-rays, which later presents as a non-union. Computed tomography (CT) scan knee helps in diagnosing undisplaced fractures and planning the management.

**Case Report:** A 24-year-old male patient presented to us with complaints of pain, decreased range of knee movements, difficulty in walking and clicking sound at the left knee for 9 years. The patient had a history of trauma 9 years back. X-ray of the left knee showed the non-union of left lateral Hoffa fracture, which was managed with open reduction and internal fixation with CC screws using the lateral para patellar approach. At present 1.5 years follow-up, the patient is comfortable with no pain and having a complete knee range of motion.

**Conclusion:** Although Hoffa fracture is rare, clinical suspicion, along with radiological investigations, is essential to diagnose Hoffa fracture. A missed diagnosis can lead to malunion or non-union, which predisposes to knee arthritis. Timely and proper management of Hoffa non-union with open reduction, stable internal fixation and early knee mobilization help in getting a better outcome.

**Keywords:** Lateral Hoffa fracture, non-union, internal fixation, functional outcome.

## Introduction

Coronal plane fractures of femoral condyle called Hoffa fracture and were first described in 1904 [1]. It accounts for 8–13% of total distal femur fractures [2]. It is a rare fracture, which can be easily missed on X-ray and later presents as a non-union. It is an intra-articular fracture in the coronal plane of the posterior aspect of either of the femoral condyles. Lateral Hoffa fracture is more common because of physiological valgus of the knee joint than medial Hoffa fracture [3]. The most common mechanism of fracture is high energy trauma to the knee when it is flexed at more than 90 degrees such as road traffic accident (80.5%) [4, 5]. These fractures are easily missed on X-rays and computed tomography (CT) scan helps in diagnosing Hoffa fractures. Missed diagnosis is the most common cause of non-union [6]. Conservative management with a cylindrical cast can be done

for undisplaced fractures. Open reduction and internal fixation is must as it is an intraarticular fracture and in getting better functional outcome.

## Case Report

A 24-year-old male presented to the outpatient department with complaints of pain, difficulty in flexing, and extending the left knee for 9 years. The patient had a history of trauma to the left knee in a road traffic accident 9 years back. The patient then was taken to a local hospital where he was given an above knee slab for 6 weeks. No radiographs were taken at that time. The patient is also complaints of clicking sound during the knee movements.

On examination, the patient had mild tenderness over the lateral aspect of the left knee with 10–90 degrees of knee range

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## Author's Photo Gallery



Dr. Amit Supe



Dr. Shubham Atal



Dr. Neetin P. Mahajan



Dr. Prasanna Kumar. G S



Dr. Amey Sadar



Dr. Pranay Kondewar

<sup>1</sup>Department of Orthopaedics, Grant Government Medical College, Mumbai, Maharashtra, India.

### Address of Correspondence:

Dr. Prasanna Kumar. G S,  
Department of Orthopaedics, Grant Government Medical College, Mumbai, Maharashtra, India.  
E-mail: prasannakumarg5@gmail.com



**Figure 1:** Pre-operative X-ray knee AP view.



**Figure 2:** Pre-operative X-ray knee lateral view showing lateral Hoffa non-union.



**Figure 3:** The lateral para patellar approach.

of motion with no swelling, deformity, laxity, and no neurovascular deficit.

Anteroposterior and lateral radiographs of the left knee were taken which revealed the non union of left lateral Hoffa fracture (Letenneur type II) (Fig. 1, 2).

As the patient was having chronic knee pain and difficulty in knee range of motion due to Hoffa fracture non-union, we planned for open reduction and internal fixation surgery. The patient was operated in the supine position, under tourniquet using a lateral para patellar approach (Fig. 3). The knee joint was exposed by retracting the patella medially and the non-union site was reached (Fig. 4). The fibrous tissue at the non-union

site was removed and the edges were debrided till the fresh punctate bleeding comes. There was no loss of bone fragment and cartilage was in good condition. After reducing the fracture, k-wires were used to hold the reduction. Fracture fixation was done using two 4.5 mm cannulated cancellous screws perpendicular to the fracture line from anterior to posterior direction. Hemostasis was achieved and the wound was closed in layers.

The post-operative X-ray showed good alignment and compression at the non-union site (Fig. 5, 6), long knee brace was given for 3 weeks, and the knee range of motion was started. Full weight-bearing was started after 3 months.



**Figure 4:** Intraoperative picture showing debridement of non-union site.



**Figure 5:** Immediate post-operative X-ray knee AP view.



**Figure 6:** Immediate post-operative X-ray knee lateral view.



Figure 7: Functional outcome (knee flexion).



Figure 8: Functional outcome (knee extension).

At present 1.5 years follow-up, the patient is having complete knee range of motion from 0 to 140 degrees (Fig. 7, 8) with no pain and difficulty in walking and the X-ray knee shows healing of non-union site with no displacement of the fracture.(Fig. 9, 10).

**Discussion**

Hoffa fracture is a rare entity caused by high-energy trauma, which can also occur as low-energy injury in children and osteoporotic patients. It often goes undiagnosed on X-ray and may need a CT scan for better evaluation [9]. Lateral Hoffa fracture is more common due to physiological valgus of the knee [10] Missed fracture on X-ray is the most common cause of non-union followed by conservative management as in our patient. Open reduction and internal fixation yield good results for Hoffa fracture. Hoffa Fracture was classified into three types by Letenneur [7], Type I:- Vertical fracture involving the entire

condyle parallel to the posterior cortex of the femur, the popliteus tendon and the lateral head of the gastrocnemius muscle remain attached to the fragment, Type II:- fracture horizontal to the base of the posterior condyle with fracture lines located posterior to the attachment point of the lateral collateral ligament, and Type III:- oblique fracture of the femoral condyle with the fracture line located anterior to the joint capsule, anterior cruciate ligament, lateral collateral ligament, popliteal tendon, and the lateral head of the gastrocnemius muscle. Another classification system is the AO classification, in which Hoffa is classified as B3.2 [8].

Cannulated cancellous screws and headless screws are the implants most commonly used for fixation of Hoffa fracture. Headless compression screw provides better axial compression, high load limit, and better fracture stability, also they decrease soft-tissue irritation and injury [11]. Open reduction, internal fixation with CC screws, and early mobilization gives better outcome in the management of Hoffa fracture according to Singh R et al., which was done in our case and got the better outcome [12]. Even headless compression screws in femoral condyle fracture help in getting better fracture compression according to Lee et al. [13]. It is always advisable to get an x-ray of the knee joint both AP and lateral views in case of high-energy trauma to the knee to diagnose Hoffa fracture otherwise one can miss the diagnosis, which had happened in our case. Anteroposterior X-ray of the knee joint does not give so much information about the Hoffa fracture and most of the time it looks normal so it essential to check in lateral view in all suspected cases. CT scan knee helps in diagnosing the undisplaced Hoffa fractures, other associated fractures, osteochondral fragment and, in turn, helps in planning the management. MRI knee helps in diagnosing fracture and associated ligament injuries.



Figure 9: Follow-up X-ray at 1.5 years (knee AP view).



Figure 10: Follow-up X-ray at 1.5 years (knee lateral view).



According to Soni et al., in situ fixation of symptomatic undisplaced Hoffa fracture fibrous non-union helps in getting better outcome [14]. Conservative management of undisplaced fracture can lead to displacement, non-union, and avascular necrosis [10], which has observed in our case. Open reduction and internal fixation prevent the above-mentioned complications and help in getting better functional outcome and prevents further secondary procedures.

### Conclusion

Although Hoffa fracture is rare, clinical suspicion, along with radiological investigations, is essential to diagnose Hoffa fracture. A missed diagnosis can lead to malunion or non-union, which predisposes to knee arthritis. Timely and proper

management of Hoffa non-union with open reduction, stable internal fixation, and early knee mobilization helps in getting a better outcome.

### Clinical Message

It is always essential to get an X-ray of knee joint both the views in case of high-energy trauma to the knee and in suspected cases to prevent the missed diagnosis and further complications related to it.

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