CASE REPORT

Bicondylar Hoffa fracture—A rarely occurring, commonly missed injury

Devdatta S. Neogi*, Saurabh Singh, Chandra Shekhar Yadav, Shah Alam Khan

Department of Orthopaedics, All India Institute of Medical Sciences, Ansari Nagar, New Delhi 110029, India

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Introduction

Fracture of the distal femoral condyle in the coronal plane, first described by Hoffa2 in 1904, is rare. It can involve either femoral condyle but is more common on the lateral side. A bicondylar pattern of this injury, affecting both the medial and lateral condyles, is even more rare; to our knowledge, only eight cases have been described in the world literature.1,8,9 Hoffa’s fracture associated with trauma to the extensor mechanism is reported occasionally.1 We present here a case of bicondylar Hoffa’s fracture, which was missed initially and was treated 6 months after the original injury. We suggest that, owing to lack of awareness and knowledge regarding this rare lesion, it may often be missed altogether.

Case report

A 35-year-old man presented 6 months after a high-speed collision of the cycle he was riding, resulting in damage to his right knee joint. He had received initial management at a level II trauma centre. At index admission, the diagnosis was made of fracture of the medial femoral condyle with an undisplaced fracture of the patella (Fig. 1). Treatment involved open reduction and internal fixation with cancellous screws of the medial femoral condyle, and tension-band wiring of the patellar fracture. After 5–6 weeks of immobilisation, partial weight bearing was initiated and subsequently full weight bearing. Following mobilisation, the man complained of pain in the right knee with a feeling of instability. He presented to us at this stage.

On clinical examination, there was a minimal knee effusion with global tenderness in and around the knee joint but no apparent instability. The active range of movement was 0–40°. There was no distal neurovascular deficit. Radiography revealed a displaced fragment of the lateral femoral condyle with backing out of one the screws used in fixing the medial femoral condyle (Fig. 2). The patellar fracture was well united. Computerised tomography (CT) of the knee showed a well-united fracture of the medial condyle (with screws in situ) and non-union of the lateral condyle (Fig. 3).

The man was admitted for implant removal and open reduction with internal fixation of the lateral condyle. Using part of the previous anterior incision, all implants were removed. Then, through a lateral approach, the lateral femoral condyle was exposed and mobilised. The margins were freshened and fixed using 4.5-mm cancellous screws, inserted from posterior to anterior. Reduction was checked under an image intensifier. Finally, the fracture site was supplemented with cancellous bone graft taken from the iliac crest.

Postoperatively the knee was immobilised, using a hinged brace, in 20° of flexion for 3 weeks. Following removal of the brace, active physiotherapy was started. Full weight bearing was allowed 8 weeks postoperatively. A radiograph at 5 months demonstrated good union of the lateral condyle (Fig. 4). At regular follow-up, radiography showed arthritic changes; however, the knee was clinically painless and movement at 39 months postoperatively was 0–100°.
Discussion

Bicondylar Hoffa fracture is rare, representing the 33-B 3.2 type according to the AO classification. The injury is usually the result of a direct force applied in the anteroposterior plane to the flexed knee. The fracture line is typically oblique-transverse, following impaction of the proximal part of the tibia on the femoral condyles. In flexion, the lateral condyle receives the impact first. Although Hoffa fracture may be of either condyle, the preponderance of the lateral condylar fractures suggests a biomechanical vulnerability due to a physiological valgus of the knee joint.

Both plain radiographs and CT may be useful in the diagnosis and surgical treatment of these lesions. The interpretation of radiographs can present difficulties, as in our case, because the fracture may be obscured in the anteroposterior projection by the intact anterior part of the condyle. If minimally displaced, the lesion may also be difficult to define in lateral views. Oblique radiography and CT have been recommended as facilitating diagnosis. In four of the eight cases reported in the world literature, the injury was missed on initial imaging. We find that CT with sagittal reformatting is the investigation of choice for visualising Hoffa fracture, particularly for detecting the bicondylar

![Figure 1](image1.png)

**Figure 1** Anteroposterior radiograph of the knee. Black arrow, medial condylar and patellar fractures.

![Figure 2](image2.png)

**Figure 2** (a) Lateral radiograph of the knee (6 months after initial fixation). White arrow, united medial condylar Hoffa fracture. Black arrow, non-union of lateral Hoffa fracture. (b) Anteroposterior radiograph (at 6 months) does not reveal the lateral condylar non-union.

![Figure 3](image3.png)

**Figure 3** CT of the knee at 6 months shows non-union of the lateral Hoffa fragment (white arrow).
type. In our case, a 3D reconstruction at the time of trauma would have enabled early diagnosis.

Non-operative treatment of Hoffa fractures includes closed reduction and cast immobilisation or prolonged traction. Most authors conclude that non-operative treatment of these complex injuries leads to malalignment, rotational deformities, loss of knee movement, joint contractures and subsequent osteoarthritis. The best treatment for most of these lesions is open reduction and internal fixation, although technical skill is essential for a satisfactory result. Operative treatment is known to allow early functional rehabilitation. In the presence of good bone, as our case, two cancellous screws from an intact anterior cortex into each Hoffa fragment provide sufficient stability. Jarit et al. suggest that lag screws directed from posterior to anterior offer a mechanical advantage over screws placed from anterior to posterior.

We propose that bicondylar Hoffa’s fracture being a rare injury, it is easily missed on conventional radiography. We recommend that all apparently single-condyle Hoffa fractures should be examined by 3D CT to enable early diagnosis of a possible bicondylar component. This, followed by immediate open reduction and internal fixation, can be key to a good long-term outcome.

References