



## OSSEOUS FEMORAL AVULSION OF THE ACL ORIGIN, WITH AN OTHERWISE INTACT ACL – A CASE REPORT

### Orthopaedics

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### ABSTRACT

Anterior cruciate ligament (ACL) avulsion fracture is commonly associated with knee injuries and its management is controversial ranging from conservative treatment to arthroscopic fixation. (1) They occur due to sporting or high-velocity trauma. Tears of the anterior cruciate ligament supersede osseous avulsion in the adult demographic. In adults, ACL tears commonly occur in the mid-substance and less commonly avulses from its tibial attachment. Femoral avulsions of the ACL occur less frequently (2). Most of the cases reported in the clinical literature occurred in the skeletally immature patients because of relatively elastic connective tissue and correspondingly weaker bony structures (2). Avulsion fractures of the cruciate ligaments are important, as they can be identified on radiographs, allowing a specific diagnosis. The treatment of cruciate ligament avulsion fractures is different than the treatment of intrasubstance tears of the cruciate ligaments. These injuries can be treated conservatively or surgically with good outcomes. Recently arthroscopic fixation of these injuries with various fixation devices has become more frequent. Treatment largely depends on the type of fracture, particularly, the size, displacement, comminution, and orientation of the avulsed fracture fragment, in addition to the integrity of the attached cruciate ligament. (3)

### KEYWORDS

Anterior Cruciate Ligament, Avulsion Fracture, Femoral Avulsion

### INTRODUCTION

When osseous avulsion of the anterior cruciate ligament occurs in children or adults, the injury typically occurs at the level of the tibial eminence. Conversely, osseous avulsion injuries from the femur are rare. We report a case of a 25 year-old woman who suffered an osseous avulsion of her anterior cruciate ligament from her lateral femoral condyle.

### Case Report

A 25 year old female was admitted to our institute with chief complains of pain in her left knee since 2 days. She sustained a flexion and varus stress injury to her left knee joint due to road traffic accident. Her knee range of motion was painful & restricted ranging from 0-20°.

Primary radiological investigation was done in which X-ray did not show any apparent abnormality, hence 3D CT knee and MRI were done which showed ACL avulsion fracture from its femoral attachment. The avulsed fragment measured 12mm and is displaced by 10mm.

### Radiological Findings

- No obvious abnormality noted on Plain radiograph anteroposterior and lateral view.
- MRI suggestive of ACL avulsion fracture noted from its femoral attachment on medial aspect of lateral femur condyle. (Fig 1.)
- Avulsed fragment measured 12mm and displaced by 10mm.
- CT scan suggestive of comminuted displaced fracture of lateral femoral condyle with few small displaced fragments in intercondylar region. (Fig 2.)

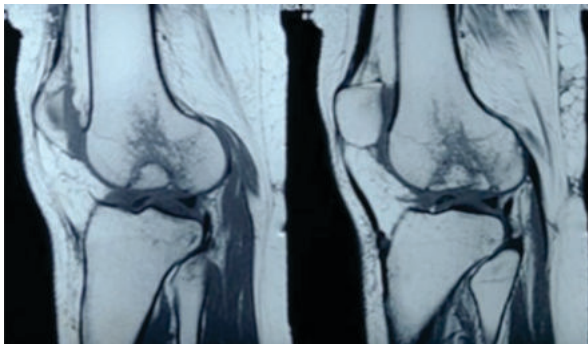


Fig 1 : Mri Knee Joint

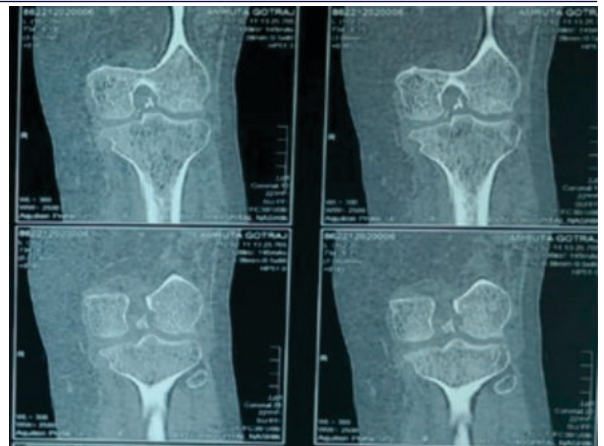


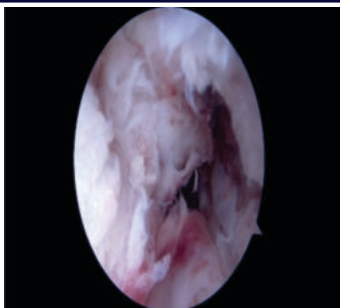
Fig.2 : 3d Ct Knee Joint

### Surgery

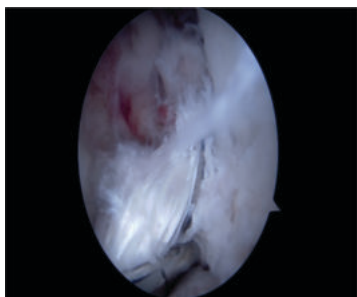
Arthroscopy confirmed osseous femoral avulsion of the ACL origin, with an otherwise intact ACL. Two bites were taken at the crater of femoral side avulsed fragment using fiber tape. Femoral tunnel was prepared and fiber tape was passed through it to pull fractures fragments into place. Final fracture fixation was done using an endobutton placed through a stab incision taken over lateral femoral condyle. (Fig 3a-d) Reduction of fracture and stability was confirmed by a final diagnostic round and negative Lachman's test intra operatively.



Fig 3a. Intact ACL



**Fig 3d.** Post operative X-ray depicting fixation using endobutton



**Fig 3b .** Osseous avulsion of femoral attachment of ACL



**Fig 3c.** Fracture fixed using "pull through" technique

### CONCLUSION

Post-operatively, patient was advised immobilization with long knee brace for three weeks. Three weeks later, physiotherapy was started with gradual knee range of motion. With successful fixation and restoration of ligamentous tension, impingement-free range of motion were achieved without complication. There was stable Lachman, negative pivot shift, 110° of knee flexion, and evidence of early healing at 3 months follow-up.

### DISCUSSION

As mentioned before, the most common tear site of the ACL is mid-substantially. When a tear of the attachment site involving a bony avulsion occurs, the distal tibia attachment is most likely involved. Avulsion fractures of the femoral ACL attachment are more rare. Several studies show (3D) CT imaging that can be useful in determining comminution, orientation, size and extend of the fracture as well as the integrity of the avulsed fragment [4]. These findings are of value in the course of treatment: either conservatively or surgically. However, patient-related factors and activity level are more important than the site of an ACL tear in (surgical) decision-making.

In conclusion, a bony ACL avulsion of the femoral condyle is rare, and diagnosis can be difficult. The key to diagnosis is to have a high index of suspicion in any patient with restricted knee range of motion having a normal radiograph. Early diagnosis and fixation is necessary to restore ligamentous tension and knee biomechanics. In the younger active patient with a large bony avulsion, treatment should be focused on anatomical reposition with preservation of the native ACL when possible, and otherwise ACL reconstruction to regain stability. [5]

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