

Tibial Tuberosity Avulsion Fractures in an Obese Adolescent: A Rare Injury

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Abstract

Avulsion of tibial tuberosity is very rare injuries seen in adolescent boys. We hereby report a case of a 16-year-old obese boy with acute tibial tuberosity avulsion. The patient was obese weighing 110 kg. Fixation and rehabilitation was a challenge and hence we want publish this rare combination. To best of our knowledge, no such cases are reported. A 16-year-old boy presented to emergency department with a history of tripping from stairs. Clinicoradiological examination revealed closed acute tibial tuberosity avulsion. The patient was obese weighing 110 kg. The patient underwent fixation with cancellous screws and 5.5 mm suture anchor. Following a comprehensive rehabilitation, the patient regained complete range of motion and back to routine activities. Acute tibial tuberosity injuries are very rare injuries commonly seen in adolescent age. Associated injuries and comorbidities make the optimal treatment of such injuries challenging.

Keywords: Adolescent obese, avulsion fracture, tibial tuberosity

INTRODUCTION

Tibial tuberosity avulsion injuries are uncommon injuries encountered in clinical practice. These injuries most commonly occur in adolescent boys aged 12–16 years and account for only 1% of pediatric fractures.^[1,2] These injuries are usually high energy injuries that extensive soft-tissue damage, periosteal stripping, vascular compromise, intra-articular damage, and compartment syndrome can occur with these injuries.^[3,4] Tibial tubercle fractures often occur in athletic adolescents approaching physeal closure who have strong quadriceps muscles that lead to avulsion following eccentric contraction. We hereby present rare case of a 16-year-old adolescent obese boy treated for tibial tuberosity avulsion fracture. Avulsion associated with obesity is a challenge in fixation and rehabilitation.

CASE REPORT

A 16-year-old boy presented with injury to left knee following tripping while walking down the stairs. The patient presented with severe pain and swelling in around knee immediately following injury. The patient was unable to walk posttrauma.

On examination, swelling and tenderness around anterior aspect of knee. was present. Active straight leg raising test not possible.

Radiological examination revealed tibial tuberosity avulsion injury [Figures 1 and 2]. Informed consent taken for surgical intervention. Under spinal anesthesia, the patient with a straight midline incision, underwent open reduction and internal fixation of avulsion fracture. Knee joint was inspected intraoperatively as it was open injury and ruled out any associated injuries [Figure 3]. Postoperatively, the patient was immobilized in a log leg knee brace for 3 weeks. The patient was put on nonweight bearing with crutches, isometric quadriceps, and hamstring exercises. After 3 weeks, the patient

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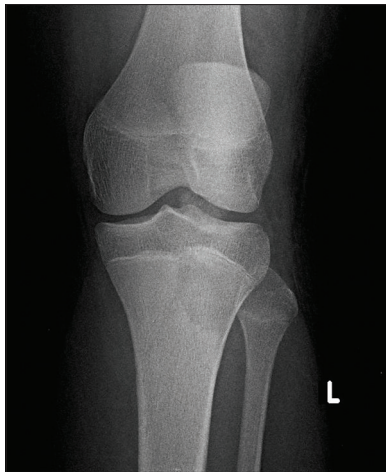


Figure 1: Preoperative radiograph anteroposterior view

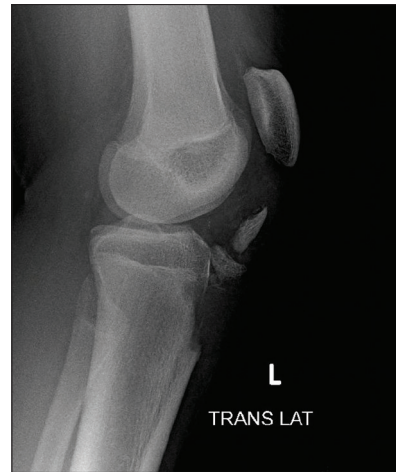


Figure 2: Preoperative radiograph lateral view

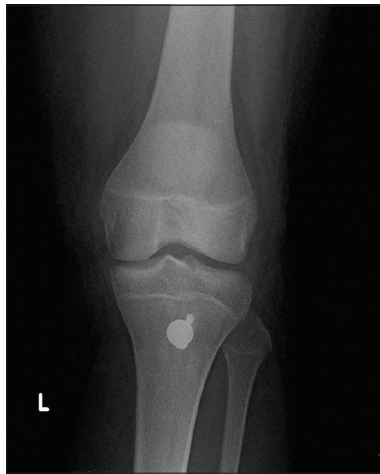


Figure 3: Six-month postoperative radiograph anteroposterior view



Figure 4: Six-month postoperative radiograph lateral view

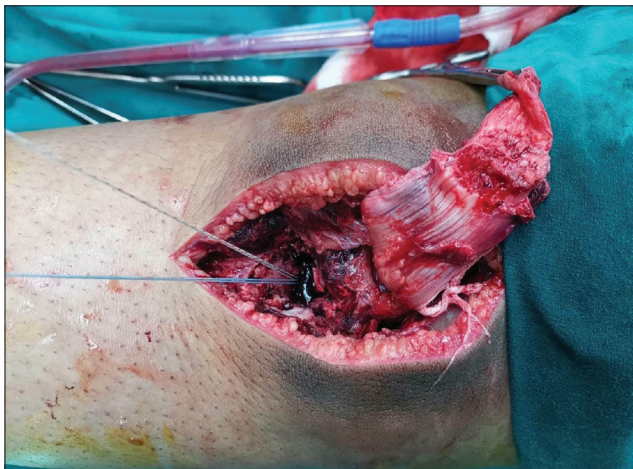


Figure 5: Intraoperative image showing tibial tuberosity avulsion

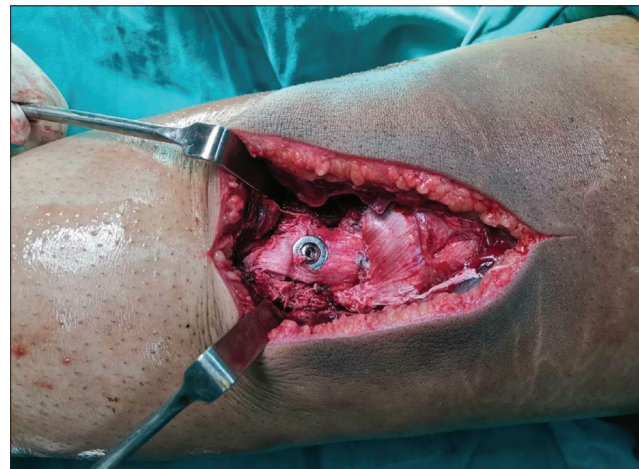


Figure 6: Intraoperative image showing tibial tuberosity avulsion fixation

was started on range of motion and partial weight bearing. At 6 weeks, the patient regained complete range of motion and started full weight bearing. At 3 months, avulsion fracture completely healed [Figures 4-8].

DISCUSSION

The tibial tubercle is the secondary ossification center of the proximal tibia which develops in traction and hence called apophysis, whereas primary ossification center is the tibial



Figure 7: Clinical photograph showing full knee extension at 6 months



Figure 8: Clinical photograph showing full knee flexion at 6 months

epiphysis which develops in compression. Tibial tubercle extends distally from the anterior aspect of the proximal epiphysis and serves as the point of attachment of the patellar tendon. Tibial tubercle fractures commonly occur in adolescent boys near the end of their growth.

The proximal tibial physis closes distally toward the tubercle apophysis during normal development, creating a mechanically vulnerable period in adolescence that predisposes the tubercle to a potential avulsion injury.^[2]

Tibial tubercle fractures are commonly produced by eccentric loading of the knee extensor mechanism while landing or resisted jumping. These injuries are most often associated with jumping and landing sports such as basketball.^[5,6]

The objectives of treatment are to restore the extensor mechanism and the joint surface, when disrupted. Open reduction with internal fixation which involves fixation with screws, washers, tension band wiring, or suture repair of periosteum, as necessary, followed by casting for 3–4 weeks.

Associated injuries such as meniscal tears, cruciate ligament laxity, patellar or quadriceps tendon avulsions, and compartment syndrome have been reported with tibial tubercle fractures.

In our case, the patient was obese and well built as a result rehabilitation was a challenge. According to literature, associated injuries are common, whereas our patient, there were no associated injuries. At 6 months, the patient was back to his routine activities.

CONCLUSION

Tibial tuberosity avulsion fractures are very rare injuries seen in adolescent children following high-velocity injuries. The

objective of treatment is open reduction, stable fixation, and early rehabilitation. Associated injuries and obese patients as in our cases make treatment of these injuries a challenging.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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