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Tibial Tuberosity Fracture (Type III-B) in Adolescents: Case Report

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Abstract

Fractures of the proximal epiphysis of the tibia are rare. A case of a 14- year-old male athlete with a posteriorly displaced Ogden type III-B fracture of the proximal epiphysis of the left tibia treated by closed reduction and percutaneous fixation with Kirschner pins and patellar-tibial tension band wiring.

Keywords: Proximal tibial fractures; Classification; Avulsion; Salter and Harris

Introduction

Tibial tuberosity avulsion fractures are rare adolescent injuries with a reported incidence ranging from 0.4% to 2.7% [1]. These avulsion injuries predominantly occur in athletic males as the tibial physis begins to fuse before skeletal maturity, which occurs near 14 - 17 years of age [2]. Classification of tibial tubercle fractures has evolved since they were first described in 1976. Initially, the Watson-Jones classification detailed types I, II and III. Then, Ogden modified the classification to better define the extent of injury and amount of displacement or comminution by adding A and B subsets to those types [3]. Type IV was added by Ryu and Debenham to describe an avulsion fracture of the entire proximal tibial epiphysis [4]. Subsequently, type V was introduced to the classification system by McKoy et al. [1] to describe their experience with a patient exhibiting both a type IIIb and type IV injury. Frankl et al. [5] suggested Subset C for type I fractures with associated patellar tendon tears. The goal of treatment is anatomical reduction and stabilization in order to prevent significant soft tissue injury, malunion, and growth arrest.

Case Presentation

A 14-year-old male experienced sudden left knee pain with 'a pop' when he took-off for a long jump off his left leg. The left knee was held in 110◦ of flexion with inability to extend the knee. On examination, there was swelling over the proximal tibia and tenderness on the anterolateral part of the proximal end of the tibia. No neurovascular impairment was detected. From the plain radiographs a displaced flexion type Ogden classification type III-B fracture of the proximal tibia [6] was identified (Figure 1).

Two hours after admission, under general anesthesia, a closed reduction and percutaneous fixation with Kirschner pins and patellar-tibial tension band wiringand stability of the fracture was confirmed using image intensifier (Figure 2). A circumferential cast in 5◦ of knee flexion was applied. Six weeks after injury, fracture position was satisfactory with radiographic evidence and the cast was removed, encouraging active range of motion of the knee. Fracture healing in a good position and full range of motion were achieved 10 weeks after injury.

Conclusion

In the present report a Type III-B of tibial tuberosity avulsion fractures is described in a 14-year-old male who was injured in jumping sport. Type III tibial tuberosity fractures demonstrate anterior intra-articular fracture extension through the physis and epiphysis into the knee. The tuberosity and the anterior epiphysis remain as a unit. A type IIIB designation (Figure 1) is given if the avulsion results in comminution [2,6]. Open reduction and internal fixation is performed for types IIB, IIIA, IIIB, and IV tibial tuberosity avulsion fractures. Several methods of fixation have been reported, but most authors recommend tension band wiring or cannulated screw fixation of the avulsed fragment (Figure 2) [1,3,7].

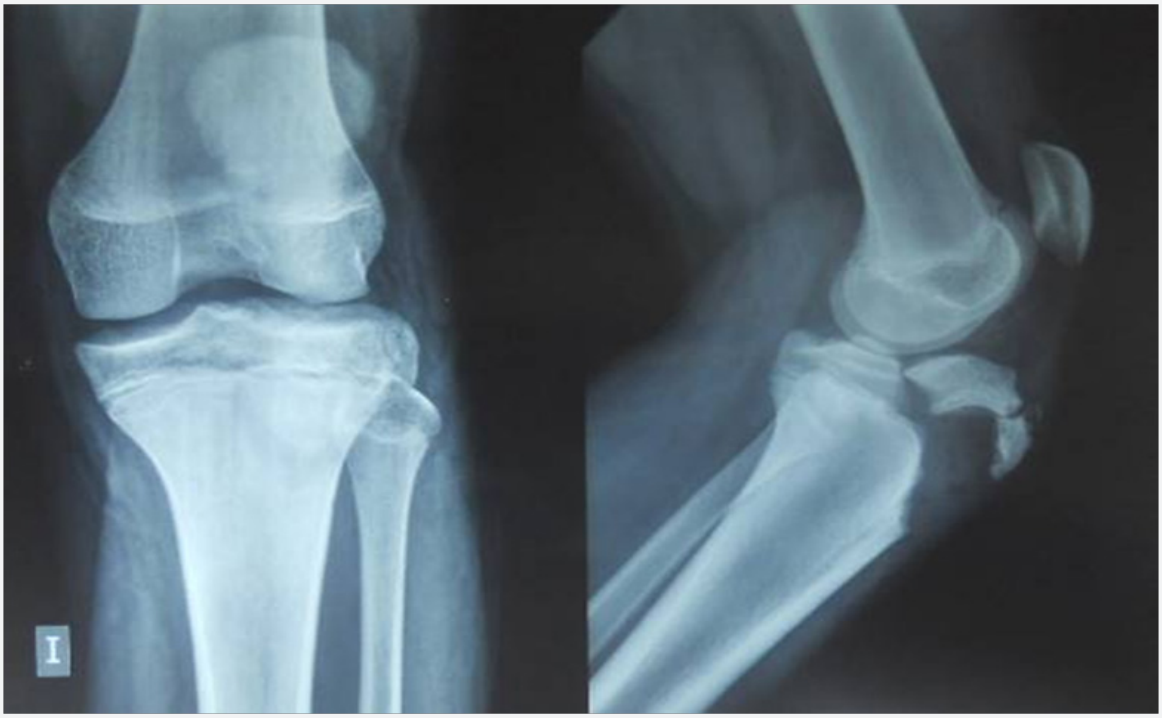

Figure 1: In Type III-B tibial tuberosity fractures there are an anterior intra-articular extension through the physis and epiphysis with comminution.

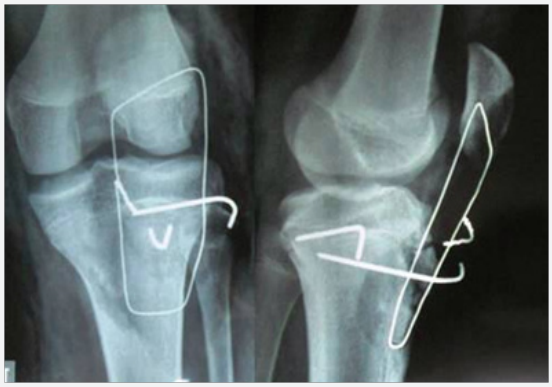

Figure 2: Type III-B fracture after closed reduction and percutaneous fixation with Kirschner pins and patellar-tibial tension band wiring.

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