Bilateral Tibial Tubercle Avulsion Fractures
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Patient: 15 years, male

Clinical History:
We present a 15-year-old Caucasian male who sustained a hyperflexion injury to his left knee playing football. Six months later he injured the right knee in a similar way. This series of radiographs illustrates bilateral avulsion fracture of the tibial tubercle and the treatment of these injuries.

Imaging Findings:
The patient is a fit and well 15-year-old school boy with no previous history of bone injury or pathology. His first presentation was with a painful, swollen left knee and inability to weight bear following an injury sustained during a game of football. A hyperflexion type injury was described. On examination the knee was swollen and a reduction in movement secondary to pain was noted. Radiographs were taken and revealed a type III avulsion fracture of the left tibial tubercle. The initial management was analgesia, long leg backslab and elevation. The following day he had surgical fixation of the fracture by open reduction and fixation with a 55mm partially threaded cancellous screw. Six months later he represented following another injury during a game of football. On this occasion he was hit by another player in the back of the right leg causing hyperflexion. He described a ‘pop’ sounds and inability to weight bear. The knee was swollen and painful with a reduced range of motion. Radiographs again illustrated a type III fracture of the right tibial tubercle. The treatment instituted was identical to that six months earlier except for a change in surgeon. On each occasion the patient was placed in a long leg cast for six weeks and gradually permitted to increase weight bearing status. After six weeks the cast was removed and he was referred to physiotherapy. He is currently doing well and has no complications from either knee.

Discussion:
Acute bilateral avulsion injury of the tibial tubercle is rare and should not be confused with Osgood Schlatter disease. It occurs either sequentially or simultaneously. The majority of acute traumatic avulsions of the tibial tubercle occur in males. The avulsion occurs when the patella tendon exceeds the combined strength of the physis underlying the tubercle and the surrounding periosteum and perichondrium. The injury can occur through either violent contraction of the quadriceps muscle against a fixed tibia eg when jumping, or acute passive flexion of the knee against a contracted quadriceps.
There are five types of tibial tubercle fracture, types 1-3 were initially described by Watson Jones then revised by Ogden to 5 types. Types 1-3 usually occur in the younger adolescents, types 4 – 5 occurring in the 15 to 17 year age group. Type 1 is distal to the ossification centres, the fragment may be displaced anteriorly and proximally. Type 2 the fracture extends proximally to the tibial ephysis, the fragment may be comminuted. Type 3 the fracture extends into the knee joint displacing the fragment anteriorly, the fragment may be comminuted. Type 4 is extension of the
fracture through the epiphysis of the tibia. Type 5 is avulsion of the patella tendon and periosteum from the tibial tuberosity. Associated injuries such as collateral and cruciate ligament tears, avulsion of tibialis anterior, meniscal damage or lateral plateau fractures should be considered. Treatment is either closed (types 1 and 2) or open (types 3-5) reduction and a cylinder cast for 6 weeks. Complications include screw prominence with associated bursitis, compartment syndrome, loss of motion, refracture, genu recurvatum and leg length discrepancy.

**Differential Diagnosis List:** Bilateral Tibial Tubercle Avulsion Fractures

**Final Diagnosis:** Bilateral Tibial Tubercle Avulsion Fractures

**References:**

Simultaneous bilateral tibial tubercle avulsion fracture in an adolescent: a case report and review of the literature
Avulsion fractures of the tibial tubercle in adolescents. A report of bilateral fractures and a review of the literature.
Henard DC, Bobo RT.
Fractures of the tibial tuberosity in adolescents.
Ogden JA, Tross RB, Murphy MJ
Figure 1

Description: Left knee. AP radiograph. Origin:
Description: Left knee. Lateral view. Origin:
Description: Left knee. AP view. Origin:
Description: Left knee. Lateral view. Origin:
Description: Right knee. AP view. Origin:
Description: Right knee. Lateral view. Origin:
Figure 4

Description: Right knee. AP view. Origin:
Description: Right knee. Lateral view. Origin:
Figure 5

(a) Description: Schematic diagram of an adolescent tibia and patella tendon. Origin:

(b) Description: Classification of tibial tubercle injury. Origin: