Separation of the proximal tibial epiphysis in a gymnast

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The patient was a 14-year-old male gymnast with a 6-month history of bilateral knee pain located around the tibial tuberosity. During a mount, he suddenly felt an intense pain in his left knee. The knee was tender and was held in a slightly flexed position. There was no joint effusion. Radiographs showed a Salter-Harris Type II fracture of the proximal tibial epiphysis with an anterior displacement of the metaphysis (Figure 1).

Reduction under general anesthesia resulted in an anatomic position, apart from a slight bow deformity of the tibial tubercle, which could not be reduced by repeated manipulation. The fracture was immobilized in a cylinder cast for 5 weeks. Full weight bearing was allowed after 2 months. The patient resumed gymnastics 5 months after the injury.

At the last follow-up 9 months after the injury, the radiographs showed healing of the fracture and remodeling of the tibial tuberosity with incipient premature closure of the proximal physis. There was slight pain during intense gymnastic activity.

Discussion

Proximal tibial physiolysis can arise from a combination of a forced abduction and hyperextension of the knee. This combination produces a posterior displacement of the metaphysis with a risk of injury of the popliteal vessels (Burkhart and Peterson 1979, Shelton and Canale 1979, Ogden 1982, Kuner 1988).

In our case, at mount, a momentarily excessive strain was transmitted through the patellar tendon, lifting off the tibial tubercle and extending dorsally along the proximal tibial epiphysis, which resulted in an anterior displacement of the metaphysis. In growing persons the physeal plates are two to five times weaker than the surrounding fibrous tissue (Salter and Harris 1963, Schwab 1977).

This mechanism of injury more often results in a single avulsion of the tibial tubercle, with possible extension across the epiphyseal plate to the articular surface, the latter representing the so-called fracture of Tillaux (Rockwood et al. 1984).

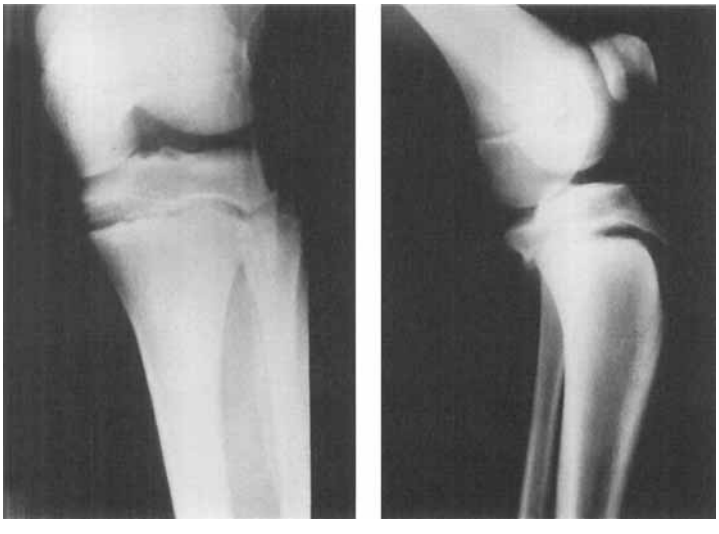

Figure 1. Salter-Harris Type II fracture of the proximal tibial epiphysis with an anterior displacement of the metaphysis.

Ogden et al. (1980) have shown that Osgood-Schlatter's disease (OSD) alters the biomechanical response of tissue in the physis of the tuberosity, thereby making it susceptible to fracture. They and others (Mikkelsen et al. 1985) suggested a possible relationship between OSD and avulsion fracture of the tibial tuberosity. The association of OSD and separation of the entire tibial epiphysis, as described, has not previously been reported.

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