Tibial Eminence Fracture in a Youth Football Player

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The tibial eminence lies between the condylar surfaces of the medial and lateral tibial plateau. First described by Poncet in 1875, fracture of the tibial eminence can result from either a contact or a noncontact mechanism, but it is relatively rare in comparison to the frequency of other knee injuries, such as anterior cruciate ligament (ACL) tear. A tibial eminence fracture can occur to an individual of any age, but children between 8 to 14 years of age have the greatest risk, with such an injury typically resulting from a bicycle fall or sport-related activity.1

Most tibial eminence fractures are reported to result from extreme tension on the ACL, which produces an avulsion fracture from an incompletely ossified tibial eminence.2-4

Although the mechanism of injury for a tibial eminence fracture is similar to that for an ACL tear, the pathology that results can vary according to age. Children experience a substantially greater degree of plastic deformation of the ligament before failure occurs, and disruption of the tibial eminence occurs before a ligament tear.2,3

In a skeletally immature individual, the epiphyseal growth plate offers less resistance to a traction force than generated within the collagenous structure of the ACL.2,3,5 Thus, “bony weakness” results in a tibial eminence fracture when a load is imposed that would produce a ligament injury in a skeletally mature individual.2,3,5,6

We describe the case of a 12-year-old male football player who sustained a tibial eminence fracture, and we discuss special considerations in the diagnosis and management of knee injuries in the pediatric population.

Initial Patient Presentation

A 12-year-old Asian male football player presented a chief complaint of right knee pain when he sought care from an orthopedic physician. The patient reported having sustained a noncontact pivoting injury that coincided with the sensation of a “pop” during a football game on the previous day. He was unable to continue playing after the incident. He did not receive any medical care at the game and reported having self-administered cryotherapy overnight at home. The patient presented knee effusion, antalgic gait, and constant pain of 7/10 on a visual analog scale. He was unable to fully flex or extend the knee due to pain. Anterior
drawer, Lachman’s, and lateral pivot-shift tests were all interpreted as positive. No previous knee injury or relevant medical history was reported.

**Differential Diagnosis**

The differential diagnosis included ACL tear, patellar subluxation, and avulsion fracture of the tibial eminence.

**Diagnostic Imaging**

Anterior-posterior and lateral radiographs revealed a fracture of the tibial eminence within the intercondylar notch (Figure 1). Magnetic resonance imaging (MRI) confirmed the existence of an avulsion fracture of the tibial eminence with displacement and ACL disruption (Figure 2). A computerized axial tomography (CT) scan and a 3D reconstruction were obtained for surgical planning (Figure 3).

**Treatment**

The patient was diagnosed with a type II tibial eminence fracture according to the Meyers and McKeever's classification scale (Figure 4 and Table 1). On the basis of the combination of the type of fracture, the patient’s age, and limited growth plate involvement, the surgeon chose to perform an arthroscopic reduction and internal fixation. The surgical procedure was performed eight days after the injury had occurred.