Tibial eminence fractures reviewed in JAAOS

By Terry Stanton

Tibial eminence fractures are most commonly seen in children and adolescents aged 8 to 14 years. The injury is typically incurred in sports play or in mishaps such as falls from a bicycle or vehicle accidents. Any mechanism, especially a pivoting or twisting force, that can cause an anterior cruciate ligament (ACL) injury may result in a tibial eminence fracture.

Surgical management of these fractures is most effectively accomplished with sutures in an arthroscopic procedure, although this approach is more technically demanding than one with hardware. Outcomes are generally good, but some residual laxity often persists.

A review of these injuries, “Pediatric Tibial Eminent Fractures: Evaluation and Management,” appears in the July issue of the Journal of the AAOS (JAAOS). In an interview, principal author Russell M. LaFrance, MD, discussed the issues and concerns that arise in treating patients with this injury.

AAOS Now: What is the typical diagnostic approach?

Dr. LaFrance: Plain radiographs will usually show the fracture. A magnetic resonance image will show any interstitial damage to the ACL itself and any other intra-articular injury, anything that would change the operative plan or push the case from nonsurgical to surgical management.

These fractures have a high incidence of other pathology, such as meniscal tears or damage to the ACL. Usually the MRI will show other pathology in the knee due to the injury. Meniscal tears should be treated at the time of the injury during fracture fixation. The need for ACL reconstruction, however, is rare.

AAOS Now: How are these fractures classified, and what are the implications for management?

Dr. LaFrance: The Meyers and McKeever classification initially described the injury in three classes; later a fourth was added (Fig. 1). Type I is nondisplaced, typically managed nonsurgically in extension. Type II fractures are hinged, with the posterior cortex intact. Type III fractures are completely displaced (Fig. 2). Type IV fractures are comminuted. If a type II fracture is reducible by extending the knee and the surgeon doesn’t think that surgical reduction will be any better, it can be managed nonsurgically. A type II fracture that still looks fairly displaced on radiographs taken in full extension would indicate surgical management. It also depends on the patient’s age and activity level.

AAOS Now: You write that the preferred surgical approach is arthroscopic, but the reduction can also be accomplished with screws. Are there times when repair with screws is indicated?

Dr. LaFrance: Screws will definitely give you rigid fixation, but the screws can later become prominent and rub on the articular cartilage of the femoral condyle, which can cause significant problems. Also, the fracture piece has to be large enough to accommodate a screw, which is not always the case.

I can’t think of any reason why an injury amenable to screw fixation would not be amenable to arthroscopic suture fixation. Of the cases we reviewed, I didn’t see any that fit that profile.

Passing the suture arthroscopically is definitely more challenging. So, it depends on the surgeon’s comfort level and skill set. A surgeon who is comfortable passing the suture arthroscopically through the ACL and can get a good reduction that way should use that procedure.

AAOS Now: These patients are typically skeletally immature. Does this raise special concerns?

Dr. LaFrance: In the skeletally immature patient, the physis is a concern. If the sutures are going to grow, there is no theoretical tether to growth. Putting a screw across an open physis should be avoided because it might arrest growth. Nonabsorbable sutures can be used in mature patients.

AAOS Now: How do you proceed when the ACL is injured?

Dr. LaFrance: If there is a lot of interstitial damage or an ACL tear, reconstruction is recommended.

If the fracture is repaired and the patient has late symptomatic instability despite good fixation, that would be an indication for reconstruction, but these patients are rarely symptomatically unstable.

AAOS Now: What is the protocol postoperatively, and what complications might you anticipate?

Dr. LaFrance: Immobilization is surgeon-dependent and depends on how much the patient can be trusted to obey protocols and how well the fracture is secured. There is no set protocol. Many surgeons will argue for immediate weight bearing and mobilization with screw fixation. A sutured, comminuted fracture might be a reason to immobilize the patient longer.

Stiffness is a common complication after surgery. Fractures fixed with screws have a high reoperation rate, usually for hardware removal. If the patient’s knee is stiff, it may need manipulation. The knee also may lack full extension. Going back in and doing arthroscopic débridement and notchplasty can help the patient get some motion back.

Most patients have an excellent outcome. They may have some objective laxity of the ACL after the procedure, but this is usually not a functional problem.

Disclosure information: Dr. LaFrance reported no conflicts.

Terry Stanton is senior science writer for AAOS Now. He can be reached at tstanton@aaos.org.