The case:

A 38-year-old, elite-level American football defensive lineman presented with right groin pain after an acute hyperabduction injury of the right hip during play.

Figure 1: Coronal short-tau inversion recovery image of the pelvis at the pubic symphysis level (A). Axial proton-density image of the proximal thighs at the pubic symphysis level (B).

Your diagnosis?
**Diagnosis:**

**Avulsion of the Right Adductor Longus From the Symphysis Pubis**

Maxime Freire, MD; Carl S. Winalski, MD; Anthony Miniaci, MD; Murali Sundaram, MD

Magnetic resonance imaging of the pelvis demonstrated a 5-cm gap between the symphysis pubis and an inferiorly retracted adductor longus muscle (Figure 1). A small dark crescent at the proximal margin of the tendon suggested a thin bone fragment remained attached to the displaced tendon (Figure 2). The adductor brevis, adductor magnus, and pectineus and gracilis muscles were intact. Fluid and edema signals were noted at the anterior margin of the right side of the symphysis pubis, with disruption of the aponeurosis producing a secondary cleft sign (Figure 3). These findings are diagnostic of an avulsion of the adductor longus muscle from the pubis with distal retraction of the tendon.

The patient did not exhibit muscle weakness by manual testing, and nonoperative treatment was elected. After 7 months of physical therapy, the patient returned to full play at the same level.

**DISCUSSION**

The adductor longus has tendinous and muscular attachments to the pubis, with the tendinous portion more superficial. The attachment site is immediately lateral to the symphysis and inferior to a bony ridge on the superior aspect of the pubis. The rectus abdominis attaches to the superior aspect of this bony ridge. The fibers of the proximal tendon of the adductor longus blend with fibers from the rectus abdominis tendon, a common aponeurosis that covers the anterior aspect of the symphysis pubis and the capsule and disc of the symphysis pubis. The distal attachment of the adductor longus is on the linea aspera of the femur.

Groin injuries are relatively common athletic injuries, especially in sports that require kicking, twisting, and sudden changes in direction, such as soccer, American and Australian football, ice hockey, skating, skiing, hurdles, high jump, horse riding, swimming, and handball. The incidence varies with the sport. In soccer, injuries to the adductor longus may account for more than half of groin injuries, with muscle strains the most common injury. Injuries of the rectus abdominis may occur concomitantly because the tendon insertions on the pubis are anatomically related.

Despite the relatively high incidence of injury to the adductor longus, complete tendon avulsion is comparatively rare, and only a few case series and case reports are reported in the literature. Most reports of complete ruptures of the adductor longus have occurred at the distal femoral insertion. Many of these cases presented months to years after injury, with suspicion of malignancy because the proximally retracted muscle had produced a groin mass. In such cases, magnetic resonance imaging is used for diagnosis.

Schlegel et al compared surgical and nonsurgical treatments for complete avulsion of the proximal adductor longus tendon insertion in 19 professional football players.

---

**Dr Freire** is from the Department of Radiology, University of Mississippi Medical Center, Jackson, Mississippi. Dr Winalski is from the Imaging Institute, Cleveland Clinic, and the Department of Biomedical Engineering, Lerner Research Institute; Dr Miniaci is from the Department of Biomedical Engineering, Lerner Research Institute, and the Orthopaedic and Rheumatologic Institute, Cleveland Clinic; and Dr Sundaram is from the Imaging Institute, Cleveland Clinic, Cleveland, Ohio.

Drs Freire, Winalski, Miniaci, and Sundaram have no relevant financial information to disclose.

Correspondence should be addressed to: Maxime Freire, MD, Department of Radiology, University of Mississippi Medical Center, 2500 North State St, Jackson, MS 39216 (mfreire@umc.edu).

doi: 10.3928/01477447-20120123-33
Two players sustained a hyperabduction injury. All of the players reported postinjury weakness and tenderness in the groin and proximal thigh region. Fourteen players were treated nonoperatively with physical therapy and light treadmill and bicycle exercise for 3 to 4 weeks and returned to full professional-level play. The 5 patients treated operatively also returned to full professional-level play, but the recovery time was longer (mean, 12.0±2.5 weeks for the operative group vs 6.1±3.1 weeks for the nonoperative group). Our patient was treated conservatively with physical therapy for 7 months and returned to full elite-level play.

Other causes of groin pain in athletes include osteitis pubis and rectus abdominis muscle injuries. Magnetic resonance imaging plays an important role in differentiating these pathologies. The secondary cleft sign (Figure 3), is a line of fluid-like signal interposed between the inferior pubic ramus and the aponeurosis of the adductor and gracilis that communicates with the joint space of the symphysis; it is an important marker of groin injury in athletes with groin pain because it indicates a detachment of the aponeurosis. Milder strains of the adductor may appear as an abnormal signal in an otherwise intact adductor tendon. Edema-like marrow signal in the symphysis pubis may be seen with osteitis pubis.

Kachingwe and Grech proposed an algorithm for athletes with pubalgia. They divided the patients into 5 groups and suggested surgical treatment for 1 group only if the athlete felt or heard an acute lower abdominal rip and was not scheduled to return to play for at least 4 months. They recommended that the participants in the other 4 groups undergo clinical treatment first. For adductor strains, conservative therapy is initially recommended, beginning with rest and followed by careful progressive rehabilitation. If symptoms persist, an injection of a local anesthetic with or without a steroid may be appropriate.

Most athletes do well following conservative therapy for acute adductor injuries, but athletes who develop chronic pain may be difficult to treat. However, if several months of nonoperative therapy fail to relieve symptoms, surgery may be indicated. In refractory cases, adductor tenotomy with or without a fascioplasty can improve chronic groin pain. At surgery, if granulation tissue from an old partial rupture is present, debridement may be performed; otherwise, a tenotomy of the proximal adductor tendon may be performed. Following adductor tenotomy, patients may have decreased isokinetic strength compared with the nonoperative side, but this does not appear to prevent their sports participation.

**REFERENCES**


