Endoscopic Repair of a Gluteus Medius Tear at the Musculotendinous Junction

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Abstract: Abductor tendon tears are an increasingly recognized clinical entity in patients with lateral thigh pain and weakness. These “rotator cuff tears of the hip,” typically result from chronic, nontraumatic rupture of the anterior fibers of the gluteus medius. Although the abductor tendon typically tears from the osseous insertion, the case discussed here ruptured at the musculotendinous junction. This is the first report of this abductor tear subtype and its endoscopic repair.

Abductor tendon tears of the hip are increasingly recognized in patients with lateral thigh pain and abduction weakness. Commonly described as “rotator cuff tears of the hip,” these gluteus medius and minimus avulsions were first described by Bunker et al.1 and have been extensively reported in older women ranging in age from 40 to 60 years, causing debilitating pain and reduced mobility.2

Gluteus medius tears have been reported to occur more often in women than in men at a ratio of up to 4:1, occurring in almost 25% of women in their 60s and over 10% of men in their 60s.3 The incidence of these tears has been shown to increase with age and history of trauma as seen with osteoarthritis and femoral neck fracture, respectively.1,2 The muscle itself can be separated into anterior, middle, and posterior aspects. The anterior and middle aspects of the gluteus medius muscle consist of vertical fibers, are involved in initiating hip abduction, and insert at the lateral facet of the greater trochanter.2,4 The posterior fibers run horizontally and insert onto the superoposterior facet of the trochanter. It is most commonly the anterior fibers that tear at the musculotendinous junction, likely because of prolonged microtrauma and natural degeneration with age.5 Local ischemia and differences in anatomy between men and women have also been implicated as predictors, possibly causing increased stress on and breakdown of collagen fibers in the hip caused by decreased blood flow and wider pelvises in women, respectively.3,5

These factors together can lead to tearing of the gluteus medius tendon, which is seen in 3 common scenarios: (1) chronic, nontraumatic tear of the anterior fibers of the gluteus medius tendon; (2) abductor tendon tears found in patients with femoral neck fractures or osteoarthritis; and (3) avulsion after total hip arthroplasty performed through an anterolateral or translgluteal approach.2 The most common of these scenarios is chronic, nontraumatic tears, as seen in our patient.

Although hip abductor tendon tears are becoming more definitively characterized, there are no known reports of gluteus medius tears at the muscle-tendon junction. The present case is unique because it describes a young woman with greater trochanteric pain syndrome due to an acute traumatic gluteus medius tear.

Case Report

A 37-year-old woman presented to our clinic with right lateral hip pain of 3 years’ duration. The patient reported having no history of thigh or groin pain until a mechanical fall 3 years prior, and since that time, she has had persistent pain and weakness. The patient complained of a sharp, burning pain at the lateral aspect of her hip, exacerbated by prolonged standing, sitting, walking, climbing stairs, and lying in the right lateral decubitus position. She also had mild locking and
catching symptoms without groin pain. In addition, she had a Trendelenburg gait and Trendelenburg sign. Physical examination showed significant tenderness to palpation over the greater trochanter and 4/5 hip abduction strength and associated pain with resisted hip abduction (Table 1).

Plain radiographs showed a well-preserved joint space with no evidence of fracture or tendon calcification. Magnetic resonance imaging (MRI) showed, most notably on T2-weighted imaging, a fluid collection lateral to the abductor insertion at the greater trochanter. There was also a significant tear of the gluteus medius muscle with retraction (Fig 1). There was no evidence of muscle atrophy or fatty infiltration on the axial sections.

Before presentation, the patient had tried oral anti-inflammatory medication and physical therapy, which were unsuccessful in alleviating her pain. She subsequently underwent a diagnostic trochanteric injection, which provided temporary pain relief with continued abduction weakness. The patient was recommended to proceed with a right hip endoscopic trochanteric bursectomy with gluteus medius repair.

**Endoscopic Gluteus Medius Repair**

The patient was positioned supine on a traction table under general anesthesia with the right hip prepared in typical sterile fashion. With traction applied, diagnostic intra-articular arthroscopy was performed through a fluoroscopically guided anterolateral portal and mid-anterior portal. After this was complete, attention was turned to the peritrochanteric space (Video 1). The peritrochanteric space was viewed through an anterolateral portal while working through a midanterior portal and posterolateral portal. After debridement of the trochanteric bursa, a large tear involving the gluteus medius muscle was identified (Fig 2). This was located at the musculotendinous junction, and the muscle belly was mobilized to the anatomic insertion of the tendon. The operative plan was based on recognition of the tear pattern and attempted to directly repair the muscle belly to the tendinous insertion. The anterior portion of the lateral footprint was identified and decorticated with a 5.5-mm burr. Two 4.5-mm biocomposite suture anchors (BioComposite Corkscrew; Arthrex, Naples, FL) containing double-loaded No. 2 ultra-high—molecular weight polyethylene braided sutures were placed in this location. By use of modified Mason-Allen suturing, the muscle was repaired to the insertion. After knot tying with standard arthroscopic knot-tying techniques, the free ends were placed through a self-punching polyetheretherketone knotless anchor (SwiveLock suture anchor; Arthrex) approximately 1 cm distal and lateral to the medial-row anchors (Fig 3). After this was completed, the integrity of the repair was confirmed and the portals were subsequently closed primarily (Table 2).

Postoperatively, the patient was instructed to use a continuous passive motion device set at 30° to 70° of flexion and increased by 5° increments until 0° to 90° was achieved by 2 weeks after surgery. She was restricted to 20-lb flat-foot weight bearing for 8 weeks with no active abduction or passive adduction. She was advanced to weight bearing as tolerated by 9 weeks and full weight bearing without assistive devices by 12 weeks. When the patient returned for her 12-month follow-up, her hip range of motion was full (flexion, 125°; extension, 0°; internal rotation, 30°; external rotation, 50°). Her abduction strength was equal to the contralateral side. There was marked improvement in her symptoms, with the entire examination being painless.

**Discussion**

Greater trochanteric pain syndrome is becoming a more commonly recognized complaint among

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**Table 1. History and Physical Examination**

- Acute or traumatic history
- Trendelenburg gait
- Tenderness proximal to abductor insertion
- Decreased abduction strength (improve accuracy with injection)

**Table 2. Operative Pearls**

- Identify pathology and plan the repair, including preliminary placement of the tendon on the footprint with a grasper.
- Debride the osseous insertion to improve repair integration.
- Ensure that the abductor footprint is covered with suture anchors (typically 1 proximal and 1 distal).
- Pass sutures using a modified Mason-Allen technique.
- Test the integrity of the repair after completion.

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Fig 1. (A) T1-weighted and (B) T2-weighted MRI sequences show the gluteus medius tendon tear with edema and discontinuity extending into the musculotendinous junction (white arrows).
middle-aged women. These patients often present with lateral hip pain and weakness with abduction that worsens in the lateral decubitus position and with exacerbating movements such as walking. Although these pain complaints are most commonly consistent with greater trochanteric bursitis, associated weakness should raise the suspicion for an abductor tear. Diagnosis based on MRI has shown 91% accuracy in surgically confirmed tears. Whereas only 27% of injuries involved a tendon discontinuity, the most common finding was increased signal superior to the greater trochanter (73%). Our patient had increased signal lateral and superior to the trochanter, without obvious disruption of the tendon insertion at the trochanter.

Keys to proper diagnosis of abductor injuries include provocative hip physical examination findings. Patients with gluteus medius tears may present with Trendelenburg gait, depending on the size of the tear, and reduced resisted abduction strength accompanied by pain. To aid in proper diagnosis, both ultrasound and MRI have been shown to be increasingly helpful. In a study of 75 patients complaining of pain and point tenderness local to the greater trochanter, Connell et al. found that sonography was accurate in helping identify gluteus medius tendinopathy ranging from mild tendon enlargements to full tears presenting as diffuse hypoechoic changes with the presence of fluid surrounding the torn tendinous margin. These findings were notably similar to what is seen in shoulder rotator cuff tendinosis and tears, adding to the growing comparison between these defects. Over the past few years, MRI has been shown to be even more useful in the proper diagnosis of abductor tendon tears because more studies have continued to prove its reliability.

In a blinded retrospective study, Cvitanic et al. evaluated 74 hips, 15 with surgically proven gluteus medius tendon tears and 59 asymptomatic hips, using large-field T2-weighted MRI. Proper diagnosis of gluteus medius tendon rupture was shown to be 91% accurate when they used the presence of T2 signal hyperintensity superior to the greater trochanter as a secondary sign of musculotendinous tear on MRI. This MRI finding was the second most specific image indicator of hip abductor tendon tear, at 95% specificity, behind only the presence of tendon discontinuity on the image.

Once tears are properly identified as gluteal medius tears, conservative measures including anti-inflammatory drugs, corticosteroids, and physical therapy are first attempted. If these are unsuccessful and surgery is...
indicated, orthopaedists have the option to operate in an open manner or arthroscopically. Though originally treated through open visualization of the peritrochanteric space during surgery, the advent of new arthroscopic surgery techniques has increased the popularity of endoscopic approaches for gluteus medius repair. Voos et al.\textsuperscript{12,13} first introduced their novel endoscopic approach in 2007 as a viable option when repairing gluteus medius and minimus tears. By use of anterior, lateral, and distal portals, surgery was performed in a manner similar to arthroscopic rotator cuff repair. Of 10 patients who underwent endoscopic repair of partial- or full-thickness gluteus medius tears, all 10 reported complete resolution of pain and return of complete strength with abduction at 2-year follow-up. For tears that cannot be completely visualized through the trochanteric space, a transtendinous approach can be considered for these intrasubstance and undersurface tears.\textsuperscript{14}

With regard to other anatomic sites, intramuscular tears have been described in the pectoralis major during eccentric contracture injuries in young men, with a loose association with anabolic steroid use.\textsuperscript{15,16} Surgical approaches for the repair of tears at the muscle-tendon junction include use of a modified Kessler technique to repair the torn muscle fibers to the remaining sternal head muscle or clavicular head tendon. Merolla et al.\textsuperscript{17} have described repair of the muscle belly directly to the lateral edge of the bicipital groove with suture anchors and a modified Mason-Allen suture configuration. This is most similar to our case in which a tendon-based repair was not possible.

To our knowledge, this is the first report to describe a traumatic gluteus medius musculotendinous junction tear. Although most patients with greater trochanteric pain syndrome present with insidious onset of lateral hip pain, the orthopaedic surgeon should be aware of acute traumatic avulsion of the gluteus medius with a history of trauma. In addition, tear pattern recognition is important because the tear configuration may differ from that seen in shoulder rotator cuff tears. We present a unique case and endoscopic treatment of a tear at the muscle-tendon interface with resolution of pain and improved hip function.

\textbf{References}


