Technical Note

Repair of Full-Thickness Gluteus Maximus Tear With Suture Anchors

Ryan H. Barnes, M.D., John Ryan, M.D., and W. Kelton Vasileff, M.D.

Abstract: Gluteal tendon tears are a common cause of hip pain. Most commonly, tears occur in the gluteus medius and minimus, and there are well-established nonoperative or operative treatment pathways. In this Technical Note, we describe our technique for repair of a full-thickness gluteus maximus tendon tear using anchor fixation.

Gluteal tendon tears are a common cause of lateral-sided hip pain. The prevalence in the general population ranges from 10% to 25%.[1] Most patients with gluteal pathology tend to be female and in the age range of 40 to 60 years old.[2] Typically, the tears most commonly occur in the gluteus medius and minimus tendons, which are important stabilizers of the hip. Similarly, the gluteus maximus aids in stabilization and plays a major role in hip extension and hip external rotation.[3] Previously, gluteal tendon tears were underrecognized, with patients being misdiagnosed with greater trochanteric bursitis; however, with heightened awareness and improvement in imaging, treatment of gluteal cuff tears has been increasing recently.[4,5] Now, tendinopathy of the gluteus medius or minimus tendons is recognized as the primary cause of greater trochanteric pain syndrome.[2]

Initially, an extensive course of conservative treatment is attempted. Treatment options include physical therapy or a home-exercise program, oral anti-inflammatory drugs, injections (corticosteroids or platelet-rich plasma), and shockwave therapy.[2]

When patients are not responsive to nonoperative management, both open and endoscopic surgical repairs have been shown to have good outcomes with similar functional improvement.[5] During open repair of gluteus medius tendon tears, a double-row technique using sutures anchors is commonly used and has good short-term outcomes.[6] In chronic cases with increased retraction or poorer tissue quality, a bioinductive collagen patch can be used to augment the repair.[4] The majority of patients who undergo repair are able to return to their preoperative activity at the 2-year follow-up.[1]

Only case reports are published in the literature for isolated gluteus maximus tears. However, there are no significant outcomes studies in the literature, given the rarity of an isolated gluteus maximus tendon tears. Kara et al.[7] reported the case of a gluteus maximus muscle belly tear; however, symptoms improved after a few days of conservative management. Alradwan et al.[3] published a case report on a partial tear. The objective of this Technical Note is to describe our surgical technique for repair of a full-thickness gluteus maximus tendon tear using anchor fixation.

Patient Evaluation

When evaluating patients in the clinic for gluteal pathology, it is crucial to obtain a detailed history, perform a thorough physical examination, and carefully check all available imaging. Common historical factors for gluteal pathology include hip pain, specifically lateral hip pain, weakness of the hip, or difficulties with ambulation. On physical examination, it is important to determine whether the etiology of the patient's symptoms is gluteal or intra-articular in nature or from other common causes. If the patient's symptoms are stemming from gluteal pathology, patients will often have pain with lateral hip pain, hip weakness, and gait dysfunction.

Standard radiographs should be obtained. Our standard hip radiographs include anteroposterior pelvis,

From the Department of Orthopaedics, The Ohio State University Wexner Medical Center, Columbus, Ohio, U.S.A.

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Address correspondence to Ryan H. Barnes, Department of Orthopaedics, The Ohio State University Wexner Medical Center, 2835 Fred Taylor Dr., #2000, Columbus, Ohio 43202, U.S.A. E-mail: rhbarnes44@gmail.com

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anteroposterior of the symptomatic hip, 45° Dunn, and false-profile views. Using this imaging, we evaluate for the degree of osteoarthritis as evidenced by the joint space and Tönnis grade. If we believe gluteal tears to be the cause of the patient's symptoms, we recommend conservative, nonoperative treatment initially. We typically try a course of formal physical therapy for at least 6 weeks with a supervised home-exercise program, activity modification, and oral anti-inflammatory drugs, and can consider either a corticosteroid or platelet-rich plasma injection. However, if a patient remains symptomatic despite these treatments, we will obtain a magnetic resonance imaging of the hip. If the magnetic resonance imaging scan shows a tear, surgical repair may be indicated.

Indications for Surgery

Surgical indications and contraindications for gluteus maximus tendon repair are detailed in Table 1. We recommend attempting gluteus maximus tendon repair in patients who limited function or pain and have full-thickness tears and if the patient has exhausted nonoperative treatments with persistent symptoms. Contraindications include patients who are poor surgical candidates or those with advanced hip osteoarthritis. If a patient has had a previous injection with relief of symptoms, it can provide the patient with a reference point for pain relief postoperatively. We feel it is important to discuss risks associated with surgery including but not limited to infection, bleeding, nerve injury, stiffness, continued pain, and repair failure (Table 2). We also thoroughly discuss postoperative restrictions, including partial weight-bearing (50%) for 6 weeks and crutch or walker use for approximately 6 weeks.

Table 1. Indications and Contraindications for Gluteus Maximus Tear Repair

Indications	Contraindications
Recalcitrant symptoms despite extensive nonoperative management	Patient is a poor surgical candidate
Full-thickness tear	Advanced hip osteoarthritis
	Physical examination is not consistent with gluteal pathology
	Improvement with nonoperative management

Table 2. Risks and Limitations of Gluteus Maximus Tear Repair

Risks	Limitations
Repair failure	Restricted postoperative weight-bearing
Continued postoperative pain	Open approach rather than endoscopic
Stiffness	Limited about of published data

Table 3. Equipment Required for Gluteus Maximus Tear Repair

General	Gluteus Maximus Tear Repair
Beanbag, foam, and axillary roll for positioning in the lateral decubitus position	Suture anchor drill and drill guide
	Suture anchor punch
	Suture anchor
	Curette
	Rongeur
	Free needle

Table 4. Key Steps of Gluteus Maximus Tear Repair

1. Position the patient in the lateral decubitus position, with all bony prominences well-padded and an axillary roll
2. Standard posterolateral approach
3. Identify scar tissue and debride bursa and unhealthy-appearing tissue
4. Mobilize tendon adequately
5. Prepare gluteal insertion with curette and vent bone marrow using anchor punch
6. Place double-loaded suture anchors in a triangle formation
7. Pass suture through tendon
8. Tie suture with hip in neutral position
9. Closure

Table 5. Pearls and Pitfalls for Gluteus Maximus Tear Repair

Pearls	Pitfalls
Debride adherent tissue or scar to allow for full mobilization of the tendon	Have a careful and thorough discussion with patients preoperatively to discuss postoperative limitations
Adequately obtain exposure of the gluteal footprint	Avoid overcrowding or increased distance between anchors
Gently roughen the footprint to stimulate bleeding	
Use a suture anchor punch to create additional channels for marrow stimulation in the cortical bone for biologic enhancement of the repair	

Surgical Technique (With Video Illustration)

Patient Positioning and Approach

A list of equipment required to perform our surgical technique for gluteus maximus tear repair with suture anchors is listed in Table 3. The key steps of the technique are summarized in Table 4. Pearls and pitfalls of our technique are summarized in Table 5. The patient is identified in the preoperative holding area, the site is marked, and the patient is taken to the operating room, where general anesthetic is administered. The patient is placed in a lateral decubitus position with a beanbag (Video 1). Preoperative antibiotics are provided, and the

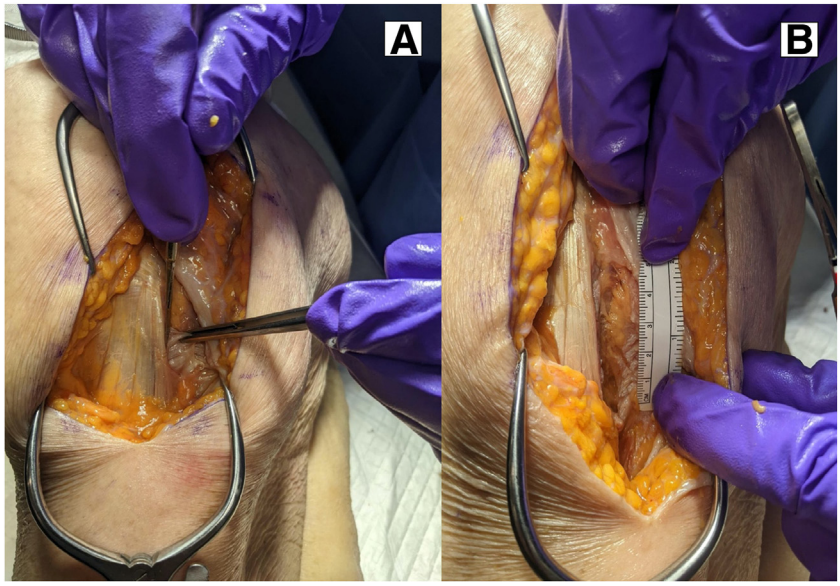

Fig 1. Cadaveric specimen of the approach to the gluteus maximus tendon and anatomy of gluteus maximus tendon insertion to the gluteal tuberosity of the femur. The specimen in this figure is positioned laterally. (A) The insertion of the gluteus maximus insertion just posterior to the posterior border of the vastus lateralis. (B) The gluteus maximus tendon length following elevation of the tendon from the femoral insertion. The length of the tendon is approximately 3 cm.

operative extremity is prepped and draped in a sterile fashion. A standard posterolateral approach to the hip and femur is used (Fig 1). The incision is made over the posterior one-third of the greater tuberosity and extended distally located over the central portion of the iliotibial band. The iliotibial band is then split at the center longitudinally. The posterior border of the vastus lateralis is then identified along with the torn gluteus maximus tendon. A padded mayo stand can be used to aid in improved exposure with increased hip abduction and internal rotation.

Gluteus Maximus Tendon and Insertion Preparation

Next, the torn tendon is identified (Fig 2). Once the gluteus maximus tendon is identified, bursa and unhealthy-appearing tendon are debrided with a rongeur. The tendon is mobilized after freeing the tendon from the scar tissue and from where it had become adherent to the undersurface of the iliotibial band (Fig 3). The gluteal tuberosity is then identified at the posterior aspect of the vastus lateralis. The insertion point is then prepared using a rongeur and curette to debride and roughen the surface to bleeding bone. To

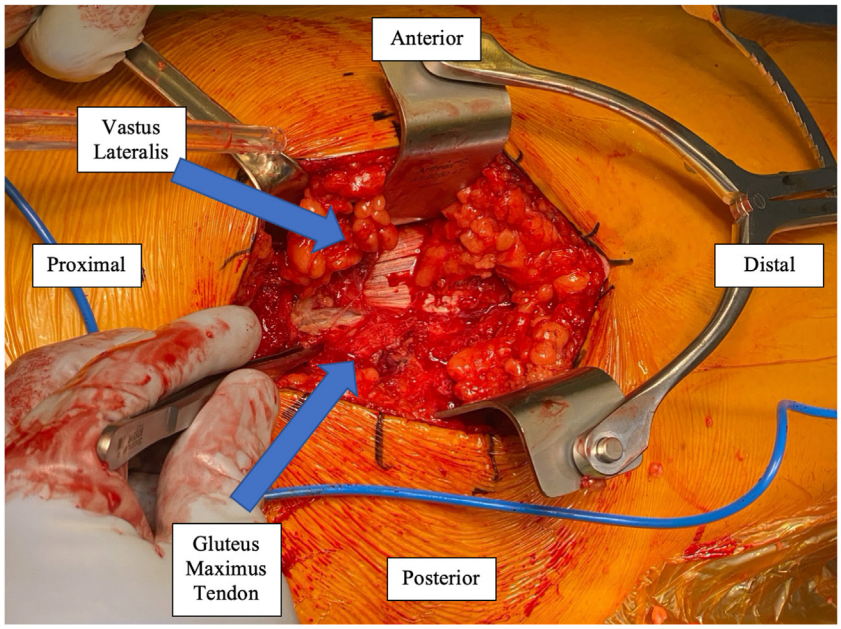

Fig 2. Intraoperative photographs of a right hip positioned laterally following a standard lateral hip approach. This figure demonstrates the torn gluteus maximus tendon and the scar tissue encountered being held with forceps.

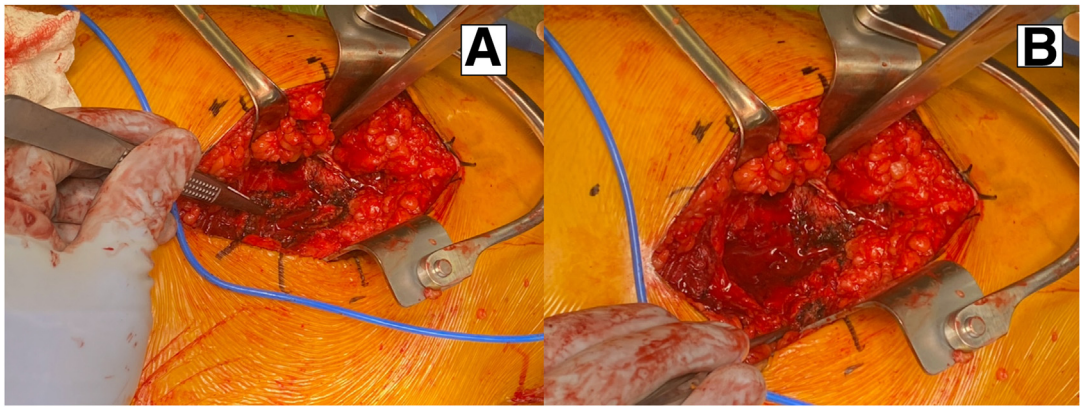

Fig 3. Intraoperative photographs of a right hip positioned laterally following a standard lateral hip approach. The gluteus maximus tendon (A) before medialization and (B) following debridement and mobilization of the scar tissue and adherent tissue to the iliotibial band.

aid in repair-site biologics, a small anchor punch is malleted into the footprint for marrow stimulation.

Gluteus Maximus Repair Technique

Using a similar configuration to open gluteus medius repair with suture anchors, a total of 3 double-loaded suture anchors are placed in a triangular configuration (Fig 4). This configuration aids in spreading out the footprint of the repair. The suture is then passed through the tendon with a free needle, including whipstitching a number of the sutures for tenotization. Once all of the sutures are passed, the sutures are then tied distally to proximally with the leg in a neutral position (Fig 5). A layered closure is then performed with 0 VICRYL of the iliotibial band and deep subcutaneous layer, 2-0 VICRYL suture for the subcutaneous tissue, and a running subcuticular stitch with 3-0 MONOCRYL. A sterile, dry dressing of 4 × 4's, ABD pad, Tegaderm (3M, St. Paul, MN), and ACE wrap is placed. A hip specific icepack is applied to the hip. A hip abduction brace is applied with motion ranging from 0 to 40° of flexion, limiting to 0° of abduction, and 0° of extension.

Postoperative Management and Rehabilitation

Patients follow a standardized postoperative and rehabilitation protocol. Restrictions include partial weight-bearing (50%) with crutches for 6 weeks and start to wean off crutches at that time. The hip abduction brace remains in place for 6 weeks, at which point hip extension, flexion beyond 40°, and abduction are initiated.

Discussion

Outcomes of gluteus medius repair have been documented to be successful in the literature. Longstaffe et al.[5] have demonstrated that both open and endoscopic repair of gluteus medius tears have increased hip strength with low rates of retear rate. However, there are no significant outcomes studies in the literature, given the rarity of an isolated gluteus maximus tendon tears. There are a couple case reports that describe

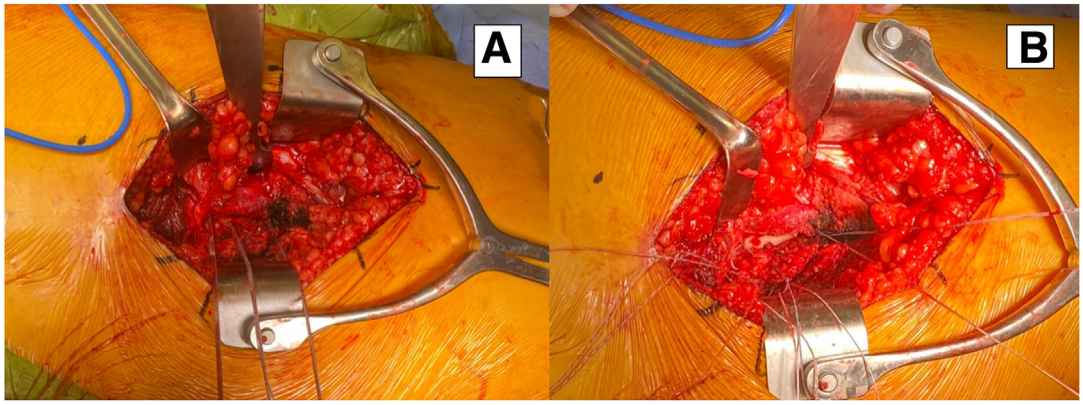

Fig 4. Intraoperative photographs of a right hip positioned laterally following a standard lateral hip approach and following the placement of 3 suture anchors placed in a slight triangle configuration (A) and following passing the sutures through the gluteus maximus tendon (B).

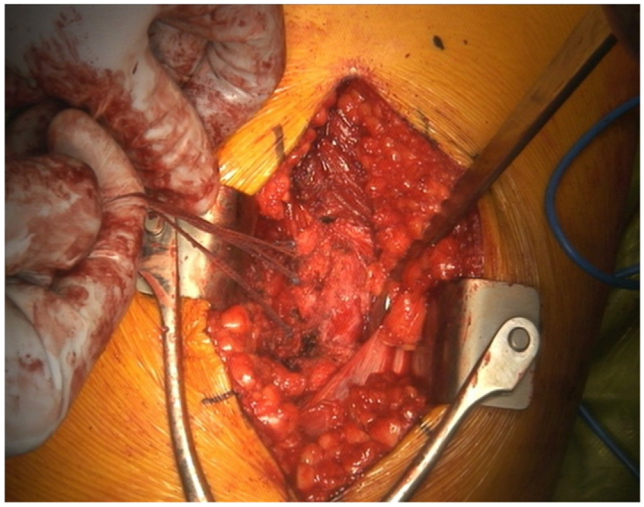

Fig 5. Intraoperative photographs of a right hip positioned laterally following a standard lateral hip approach demonstrating the final repair of the gluteus maximus tendon to the femoral insertion on the gluteal tuberosity after tying of all suture anchors.

gluteus maximus tears. Kara et al.[7] reported the case of a gluteus maximus muscle belly tear; however, symptoms improved after a few days of conservative management. Another case report by Alradwan and Youssef[3] described the case of a male patient of similar age to ours but with a traumatic partial-thickness tear of the gluteus maximus tendon. Their patient ultimately had surgical repair after not responding to 6 months of conservative treatment. Their surgical repair consisted of a suture repair with single-anchor fixation of the partial tear. Shekhbihi et al.[8] also described a surgical case following an isolated, partial-thickness tear of the gluteus maximus iliotibial band insertion that was repaired by attaching the tendon to the iliotibial band using absorbable suture.

This described surgical technique for gluteus maximus repair using suture anchors does provide advantages. Advantages of this technique include that it provides complete fixation in an anatomic position. We also try to maximize biologic healing by venting the bone by using the anchor punch.

Limitations of this technique include an open repair rather than endoscopic. There are no published patient-reported outcomes using this repair technique for a gluteus maximus tear, but it would be beneficial to try to collect data. Finally, it is important to have a thorough discussion with the patient preoperatively about the complications and postoperative restrictions.

In this current Technical Note, we describe our technique for gluteus maximus repair with suture anchors. We believe that our repair technique provides an anatomic repair and provides stable fixation in this unique tear pattern. We feel that technique has good patient- and anatomic-specific advantages, and, anecdotally, we have seen good outcomes with our patient treated using this technique.

Disclosures

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