Surgical Technique for Treatment of Recalcitrant Adductor Longus Tendinopathy

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Abstract: Chronic groin pain in the athlete can be a difficult problem to manage. Adductor dysfunction is the most common cause of groin pain in athletes, with the adductor longus being the tendon most commonly involved. The most reproducible finding for adductor longus tendinopathy is tenderness along the tendon with passive abduction and resisted hip adduction in extension. Magnetic resonance imaging and injection of a corticosteroid and anesthetic into the proximal muscle-tendon junction are both helpful in confirming the diagnosis. Nonoperative treatment may consist of protected weight bearing, ice application, ultrasonography, electrical stimulation, and gentle stretching with progressive strengthening. However, nonoperative management is not always successful. In these instances, surgical treatment can be quite effective. We present the indications, surgical technique, and rehabilitation protocol of adductor tenotomy for chronic tendinopathy. This can prove a useful tool for the treatment of recalcitrant groin pain attributable to the adductor longus.

Chronic groin pain in the athlete can be a difficult problem to manage. The number of athletes with chronic groin pain represents a small percentage of overall athletic injuries, yet the time lost from competition can be significant. Adductor dysfunction is the single most common cause of groin pain in athletes, with the adductor longus being the tendon most commonly involved. Nonoperative treatment for chronic strains of the adductor muscles can be of limited benefit in patients with recalcitrant pain. Our purpose is to present our indications, surgical technique, and rehabilitation protocol for the isolated release of the adductor longus tendon for chronic adductor strain or tendinopathy.

It is important to adequately assess the source of groin pain to determine the best course of treatment. This begins with a comprehensive history and physical examination. Patients with adductor longus pathology classically present with pain localized to the groin, below the inguinal ligament, usually related to athletic activity. The physical examination should rule out an inguinal or abdominal hernia and will generally show full and painless range of motion of the hip. Femoroacetabular impingement with a concomitant labral tear should also be considered. In addition, the pubic symphysis should be palpated for tenderness.

Constitution of the adductor longus as the source of pain can then be obtained by an injection test consisting of an anesthetic and corticosteroid injection into the proximal muscle-tendon junction. Plain radiographs of the pelvis and hip joint should be obtained to rule out any significant degenerative changes or bony abnormalities. Magnetic resonance imaging is the imaging modality of choice for adductor dysfunction. With adductor strains, increased signal can be found within the adductor longus enthesis.

Nonoperative management includes rest or modification of activities. The start of treatment may consist of protected weight bearing, ice application, ultrasonography, electrical stimulation, and gentle stretching. Later treatment includes progressive strengthening using non-resisted exercise bicycling, pool walking, and light polymeric exercises.

Surgical Technique

The patient is placed supine on the operating table and given prophylactic antibiotics (Video 1). General
anesthesia is then induced. The operative limb is draped free and is positioned with the hip flexed and externally rotated with the knee flexed such that the plantar aspect of the operative foot is vertical (Fig 1). The groin region is then prepared and draped in standard fashion. The adductor longus tendon is generally palpable on the medial inner thigh, and a skin marker is used to make a 2-cm longitudinal mark that is 2 cm distal to the inguinal crease overlying the tendon. Placing the incision distal to the inguinal crease is important to avoid wound maceration and breakdown.

Local anesthesia is infiltrated over the proposed skin incision. A longitudinal incision is then made over the origin of the adductor longus tendon (Fig 2). Sharp dissection with a knife is used to expose the adductor tendon. The deep fascia is incised and elevated to allow a watertight closure of the release site after tenotomy. A right-angle clamp is then passed beneath the tendon of the adductor longus from inferior to superior (Fig 3). The obturator nerve to the adductor longus is not specifically identified; however, extreme care must be taken to make sure that only the tendon of the adductor longus is present anterior to the right-angle clamp. The tendon is then fully released from its pubic attachment by use of electrocautery (Fig 4). Blunt dissection is used to establish that the tendon has been completely released and is freed from the surrounding structures (Fig 5). There are direct muscular attachments of the adductor longus to the pubis that should be released as well, especially on the superior aspect of the tendon. By use of the surgeon’s

Fig 1. Surgical position for release of adductor longus. The hip is flexed and externally rotated, allowing access to the adductor longus tendon.

Fig 2. A 2-cm longitudinal incision is made over the adductor longus tendon near its attachment to the pelvis. The limb is positioned such that the proximal thigh is on the right side of the image.

Fig 3. A right-angle clamp is used to isolate the pubic attachment of the adductor longus tendon. There are direct muscular attachments of the adductor longus to the pubis that should be released, especially on the superior aspect of the tendon.

Fig 4. Electrocautery is used to perform the tenotomy.
finger, the freed tendon is then manually displaced approximately 5 cm distally to prevent reattachment. Hemostasis is achieved with electrocautery. The wound is then thoroughly irrigated and closed in layered fashion. Dermabond (Ethicon Inc., Somerville, NJ) is used to prevent wound maceration. A 4" x 4" gauze and Tegaderm dressing (3M, St Paul, MN) are then placed. This procedure is outlined in Table 1.

**Postoperative Rehabilitation**

Postoperatively, patients are discharged home the same day with full weight bearing using crutches for assistance. Postoperative rehabilitation consists of 3 separate phases (Table 2). Phase 1 occurs during the first week after surgery. During this phase, the goals are to allow the wound to heal and to prevent reattachment of the adductor longus tendon. Patients are advised to keep the legs continuously abducted for the first 3 days after surgery while keeping the dressing dry and applying ice to the surgical area. By postoperative day 3, patients are allowed to be out of bed as tolerated but are instructed to stretch the legs into wide abduction every 2 hours. Pillows should be placed between the legs when sleeping to maintain abduction.

Rehabilitation phase 2 occurs during the second to fifth postoperative week. The goals for this phase are to prevent reattachment, as well as excess scar tissue formation, and to improve flexibility of the adductor muscles. Patients are given stretching exercises to perform 2 to 3 times per day. The stretches include (1) standing and progressively abducting the legs until maximal stretch is reached; (2) standing and shifting one’s weight to 1 side over a flexed knee while keeping the opposite knee straight; (3) standing, placing 1 foot on a table with the knee fully straight, and reaching toward the toes with both hands; and (4) lying face down, grabbing 1 ankle at a time, and trying to pull the heel toward the buttocks (Table 3). All stretches

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**Table 1.** Technical Pearls for Release of Adductor Longus Tendon

- The patient is positioned supine on the operating table.
- The operative hip is flexed and externally rotated such that the lateral border makes contact with the bed (Fig 1).
- An incision is planned directly over the palpable adductor longus tendon approximately 2 cm distal to the inguinal crease to prevent wound maceration and breakdown.
- Local anesthesia is infiltrated over the proposed skin incision.
- Sharp dissection is used to expose the adductor longus tendon.
- A right-angle clamp is passed underneath the tendon of the adductor longus.
- Care is taken to make sure that only the tendon of the adductor longus is present anterior to the right-angle clamp.
- The tendon is fully released 2 cm distal to its origin using electrocautery.
- Blunt dissection is used to establish that the tendon has been completely released and freed from the surrounding structures.
- The freed tendon is then manually displaced approximately 5 cm distally into the thigh to prevent reattachment.
- Hemostasis is achieved with electrocautery; the wound is then thoroughly irrigated and closed in layered fashion.

**Table 2.** Standardized Rehabilitation Protocol Followed by All Patients

| Phase | Timing       | Goals                                      | Activities                                          |
|-------|--------------|--------------------------------------------|----------------------------------------------------|
| Phase 1 | Week 1       | Wound healing                              | Legs kept continually abducted on days 0-3          |
|       |              | Prevention of reattachment of tendon       | On days 3-7, stretching of legs into wide abduction every 2 h, patient can be out of bed as tolerated |
| Phase 2 | Weeks 2-5    | Keep adductors stretched                    | Stretching                                          |
|       |              | Prevent excess scarring                     | Strengthening                                       |
|       |              | Improve flexibility                         |                                                    |
| Phase 3 | Week 6       | Gradual return to running                  | Begin running program                              |
|       |              | Sport-specific training                     |                                                    |
|       | Approximately week 8 | Complete wound healing | Return to athletics                                 |
|       |              | Full hip range of motion                    |                                                    |
|       |              | Painless adductor muscle activity           |                                                    |
|       |              | Resolution of preoperative groin pain       |                                                    |
Table 3. Description of Exercises Performed as Part of Standard Rehabilitation Protocol

| Exercise                        | Explanation                                                                 | Duration                        |
|---------------------------------|-----------------------------------------------------------------------------|---------------------------------|
| Standing bilateral abduction    | The patient stands and progressively abducts the legs until maximal stretch is achieved. | Hold for 20 s, repeat 10 times  |
| Standing unilateral abduction    | The patient stands and shifts his or her weight to 1 side over a flexed knee while keeping the opposite knee straight. | Hold for 20 s, repeat 10 times  |
| Standing hamstring stretch       | The patient stands, places 1 leg on a table, and reaches toward the ankle with both hands. | Hold for 20 s, repeat 10 times  |
| Supine quadriceps stretch       | The patient is prone and grabs 1 ankle at a time, trying to touch the heel to the buttock. | Hold for 20 s, repeat 10 times  |

are held for 20 seconds and repeated 10 times. At 3 weeks postoperatively, gentle strengthening exercises are instituted. The strengthening exercises include (1) standing single-leg abduction, (2) supine single-leg straight-leg lifts, (3) standing single-leg circumduction, and (4) straight-leg sit-ups. All exercises are performed 20 times each, 2 to 3 times per day. During phase 2 of the rehabilitation, care is taken to improve the overall core strength and re-establish proper recruitment patterns of the core musculature.

Rehabilitation phase 3 begins at 6 weeks and includes a gradual return to running. At 7 weeks, sport-specific training is resumed.

Patients are allowed to return to their respective competition level when they show complete wound healing, full hip range of motion, painless adductor muscle activity, and resolution of their preoperative groin complaints. This typically occurs by postoperative week 8. We typically advise a return to full competition at 12 weeks postoperatively.

**Discussion**

Chronic groin pain in the athlete is a difficult problem to accurately diagnose and effectively treat. It can be quite devastating to the athlete and can be responsible for a significant loss of time from participation.\(^1\)\(^2\) Nonoperative treatments for chronic groin pain related to the adductor muscle group are not always successful.\(^4\) In these instances, surgical treatment is indicated. We have found that isolated release of the adductor longus tendon provides satisfactory pain relief and return to sport in athletes.

Our primary indication for isolated unilateral release of the adductor longus tendon is persistent pain emanating from below the inguinal ligament and localized over the adductor tendon in athletes who need to return to competition in a timely fashion. In a recent study, 42 of 43 professional soccer and rugby players returned to their preinjury level of play after partial adductor tenotomy for chronic adductor longus enthesopathy.\(^7\)

It is possible to confirm the diagnosis of chronic adductor tendinopathy with an injection of lidocaine into the pelvic origin of the tendon. The athlete should have improved pain with palpation of the tendon or provocative maneuvers.

There has been some discussion regarding the benefit of performing bilateral adductor longus release in patients who may only have unilateral symptoms.\(^5\) It has been suggested that this prophylactic release of the asymptomatic tendon at the time of release of the symptomatic tendon would prevent the need for future intervention. We have found that our patients who presented with unilateral symptoms generally did not require a contralateral release later and, therefore, do not perform this.

The main risks of the procedure include wound maceration and injury to the neurovascular structures. The risk of maceration is reduced by placement of the incision distal to the inguinal crease. The deep fascia therefore must also be closed in a watertight fashion. Moreover, it is important to fully expose the width of the adductor tendon before release. Use of a right-angle clamp underneath the tendon during release is also helpful to protect the neurovascular structures.

We have presented the indications, surgical technique, and rehabilitation protocol of adductor tenotomy for the treatment of pain emanating from below the inguinal ligament and localized to the adductor longus. We believe that this can prove a useful tool for the treatment of recalcitrant groin pain attributable to the adductor longus.

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