Technical Note

Endoscopic Proximal Adductor Lengthening for Chronic Adductor-Related Groin Pain

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Abstract: Proximal adductor injuries are relatively common groin injuries in athletes. Various tenotomy techniques have been described including open, partial, and percutaneous approaches. Current techniques help most athletes return to sport; however, many develop adductor weakness. Moreover, the procedures lack full visualization of the tendon and do not allow for return to athletes' preinjury level of play. We describe an endoscopic z-lengthening of the proximal adductor tendon with the potential to minimize complications associated with open procedures such as incisional pain and neurovascular injury while affording a more complete tenotomy than current percutaneous techniques. This is a safe and reproducible technique that allows for release of tension as a result of pathologic adductor tendon pathologies.

Groin injuries are relatively common among elite and recreational athletes. Because of the vast discrepancies in descriptions of groin pathologies, Weir et al. classified 3 major categories: groin pain, hip-related groin pain, and other causes of groin pain.[1] Groin pain has been further separated into adductor-related, iliopsoas-related, inguinal-related, and pubic-related. Prevalence studies show that groin problems tend to be 3 times more prevalent among male athletes compared with female athletes.[2]

Nonoperative management of proximal adductor injuries such as physical therapy with active training have shown to be effective in some cases.[3] When conservative management fails, tenotomies have been employed, the specific surgical techniques for which have been previously described.[4,5] The aforementioned systematic review by Serner et al.[4] found that most (70%) proximal adductor injuries were treated with complete adductor tenotomy. This approach to adductor-related groin pain can in some cases lead to wound complications and result in residual weakness of the hip complex. Percutaneous adductor tenotomy is a less invasive approach and has been shown to have some success.[6,7] However, it does not allow for complete visualization of the adductor tendon, which is limiting and has a risk of neurovascular complications. Another surgical technique has been recently described in which a partial tenotomy is performed only on the superficial adductor fibers, resulting in positive outcomes.[8]

In this report, we describe a reproducible endoscopic technique that allows for release of tension in the pathologic adductor tendon with complete visualization while avoiding the morbidity associated with techniques that are more open and invasive.

Assessment and Nonoperative Management

Patients presenting with chronic groin pain should have a detailed hip and groin assessment that includes groin, lower abdomen, and hip examinations to rule out other pathologies. In adductor-related groin injuries, pain is typically localized in the proximal adductor region just below the inguinal ligament. There is also tenderness over the proximal adductor insertion, with passive abduction, and pain is elicited with resisted adduction. Plain radiographs should be obtained to assess for bony degenerative changes over the pubic symphysis and associated femoroacetabular impingement as well as dedicated magnetic resonance imaging (Table 1). Anesthetic proximal tendon sheath and/or pubic cleft injections can also be used for diagnosis.[9]

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The authors report that they have no conflicts of interest in the authorship and publication of this article. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received January 3, 2018; accepted February 22, 2018.

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2212-6287/1833

https://doi.org/10.1016/j.eats.2018.02.017

Table 1. Groin Imaging Protocol

To best depict and accurately diagnose orthopedic injuries around the groin, dedicated hip magnetic resonance imaging must include:
- Thin slice section—oblique and sagittal to assess the integrity of adductor euthesis
- Large field of view to assess:
  - Pubic symphysis
  - Rectus abdominus
  - Pyramidalis
  - Adductor muscles
- Large field of view, fast spin-echo techniques with and without Valsalva to improve sensitivity in detecting
  - Inguinal hernias
  - Femoral hernias
  - Obturator hernias

Initial management involves conservative treatment with avoiding high demand and sport activity. Rehabilitation programs involving progressive strengthening and steroid injections with nonsteroidal anti-inflammatory drugs can be used. Chronic proximal adductor dysfunction that is nonresponsive to conservative management can be considered for endoscopic proximal adductor lengthening (Table 2).

Surgical Technique

Patient Positioning

The patient is brought to the operating room and placed in a supine position, and then administered general anesthesia. The operative extremity is placed in a "figure of 4" (flexed, abducted, external rotated) position, which flexes and allows for access to the proximal adductor tendon (Fig 1). The surgeon stands between the patient's lower extremities with clear view of the endoscopic monitor. All bony prominences are well padded, and the groin is prepped and draped in standard fashion.

Portal Placement

The adductor longus tendon is then palpated and marked with a skin marker. Parallel lines should be drawn to outline the tendon (Fig 2). Portal placement is marked parallel to the adductor tendon, with the proximal placement 2 cm distal from the inguinal crease and the distal portal 4 cm distal from the proximal portal along the vector of the proximal adductor tendon (Fig 3). Then the distal portal is incised using an

Table 2. Advantages and Disadvantages of Endoscopic Proximal Adductor Lengthening

Advantages	Disadvantages
• Fractional tendon lengthening can minimize residual strength deficits. • Endoscopy provides extensive visualization of the proximal adductor tendon. • Portal incisions may minimize wound dehiscence of the groin. • Minimally invasive procedure	• Fluid extravasation risk. • Scar tissue adhesions. • Incomplete tendon lengthening.

Fig 1. Patient's left hip is placed in a supine position with operational extremity flexed, abducted, and externally rotated. Surgical-side groin and proximal thigh is prepped and draped with 4 sticky blue towels, Ioban (3M, Maplewood, MN), and lower extremity drapes.

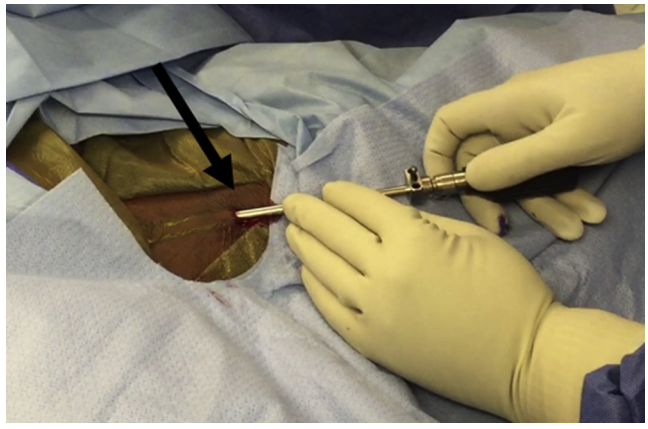

Fig 2. Landmarks of the left pubis and proximal adductor longus tendon are identified. A distal portal 6 cm from the inguinal crease is incised using an No. 11 blade. A 4.5-mm obturator cannula (arrow) and 30° scope is introduced in the distal portal.

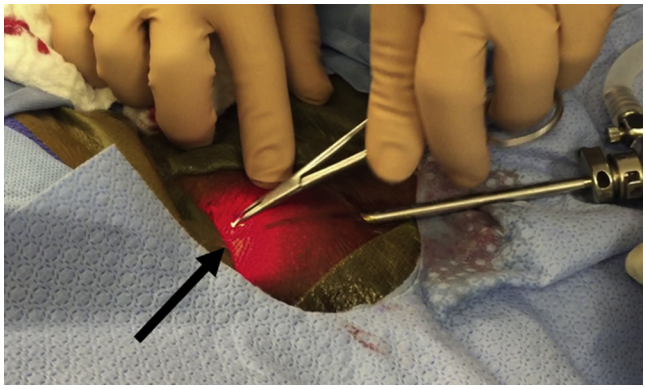

Fig 3. A proximal portal 2 cm from the inguinal crease is incised using a No. 11 blade. A 5-mm plastic cannula is introduced into the proximal portal for instrument use.

arthroscopic No. 11 blade. A 4.5-mm obturator cannula is subsequently inserted into the proximal adductor tendon sheath. A 30° arthroscopic scope is then inserted into the tendon sheath via the distal portal. The proximal adductor tendon is now visualized (Video 1). The proximal portal is created with an arthroscopic No. 11 blade for a working portal in which a 5-mm plastic cannula is introduced.

Adductor Lengthening

A 4.5-mm motorized shaver is inserted into the working portal to enter the tendon sheath (Fig 4). Beginning 2 cm distal to the adductor tendon insertion point, a 3-mm ArthroCare Saber 30 (Austin, TX) electrocautery device is used to perform a 2-cm z-lengthening proceeding distally in a retrograde fashion. Complete endoscopic visualization allows for clear confirmation of the resulting detensioning of the tendon (Fig 5). Small bleeders are coagulated using the electrocautery device to achieve hemostasis. Portals are then closed using 3-0 nylon sutures, and a Tegaderm (3M Medical, St. Paul, MN) dressing is applied.

Postoperative Management

Patient should be instructed to weight-bear as tolerated. A progressive core-strengthening program should be prescribed with gradual return to activity. Sport-specific training should then be performed after 6 weeks for the athletic population.

Discussion

Groin injuries are complex conditions to properly treat because a number of pathologies can potentially be at work. Diagnosis of chronic proximal adductor tendinopathy can be confirmed with an injection of lidocaine into the pelvic origin of the tendon. This should lead to decreased pain on palpation or aggressive maneuvers. Adductor-related groin injuries are particular common, and when conservative management fails, a number of surgical options have been used. Gill et al.[5] described an open surgical treatment for adductor longus tendinopathy. In this report, we describe a reproducible technique that is both minimally invasive and allows the surgeon to fully visualize and treat proximal adductor tendon enthesopathy. The lengthening of the tendon relieves tension without having to fully or partially release it from its insertion.

In a recent systematic review of athletic groin pain studies in which surgical intervention was used, adductor-related pathology accounted for 12% of cases.[10] Evidence shows an even higher rate among athletes with acute groin injuries. In a prospective study, Serner et al.[11] found that adductor injuries accounted for the majority (66%) of cases among 110 athletes with acute groin pain.

The main risks of the procedure include scar tissue adhesions forming and would maceration. Hence, the introduction of the proximal portal distal to the inguinal crease reduces the risk. Another risk of incomplete tendon lengthening can be avoided by fully visualizing the tendon with the endoscope. Fluid extravasation risk can be decreased by monitoring inflow and outflow.

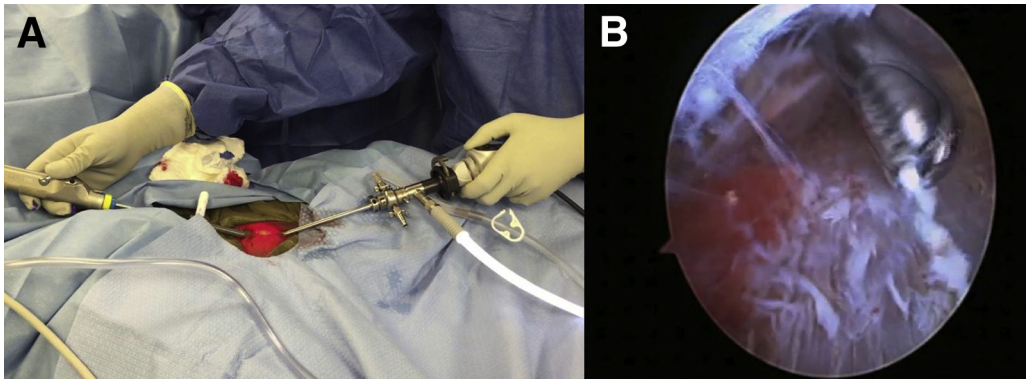

Fig 4. (A) An arthroscopic 4.5-mm shaver is used in the proximal portal (arrow) to enter the (B) tendon sheath (distal viewing portal). Caution is used not to violate the subcutaneous layer with the motorized shaver.

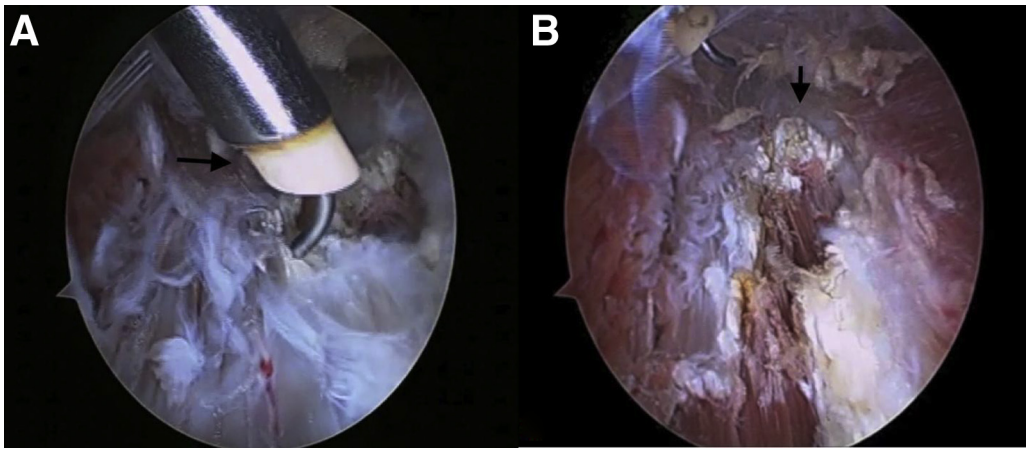

Fig 5. (A) Hemostasis is achieved with a radiofrequency probe (arrow). The length of the proximal adductor tendon is well visualized with the arthroscope. (B) The radiofrequency probe is then used to perform the z-lengthening via the proximal portal from proximal (arrow) to distal.

Endoscopic lengthening of the adductor longus tendon is a safe, minimally invasive, reproducible procedure that has significant advantages in comparison to an open release. Future investigation should be conducted to measure patient-reported outcomes amongst patients who underwent this approach.

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