Iliotibial Band Lengthening: An Arthroscopic Surgical Technique

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Abstract: Iliotibial (IT) band syndrome is a common cause of lateral knee pain in runners and cyclists. Many can be treated nonoperatively; however, some may require surgical lengthening of their IT band to achieve optimal pain relief and a return to preinjury level of activity. Several studies have been published detailing surgical lengthening procedures and satisfactory outcomes after these procedures. However, it is important to continue to improve on and optimize outcomes. We present our arthroscopic IT band—lengthening procedure.

Iliotibial (IT) band syndrome in a common condition that causes lateral knee pain in runners, with a reported incidence rate of 1% to 12%.[1-4] It was first described in 1975 by Renne[5] as a condition affecting active-duty marines. The proposed cause involves friction of the IT band on the lateral femoral condyle during repetitive extension and flexion at the knee.[1,6] Hence, patients will often complain of pain during activity and will often have crepitus palpated at the lateral femoral condyle during flexion and extension (positive Noble compression test).[6-8] Nonoperative management is the standard of care for this condition, often consisting of rest from pain-inciting activities with a gradual return to activities as tolerated, oral anti-inflammatories, physical therapy focused on stretching the IT band, and corticosteroid injections.[1,3,9,10]

However, if symptoms persist for greater than 6 months despite these conservative modalities, some patients may require surgical intervention to achieve pain relief and return to preinjury activity levels.[6] It has been seen that by surgically lengthening the IT band, one can achieve satisfactory pain relief and a quick return to activity.[11-13] Although there have been surgical techniques for this particular condition published, it is critical that techniques continue to be improved to achieve optimal results.[14-17] Therefore, our purpose was to describe an arthroscopic surgical technique for IT band lengthening in patients with IT band syndrome refractory to conservative treatment modalities.

Surgical Technique

Step 1: Preparation

The patient is placed in the supine position and the affected knee (right side) flexed to 30°. This is critical because inadequate flexion may lead to the inability to appropriately visualize the IT band. The lateral femoral

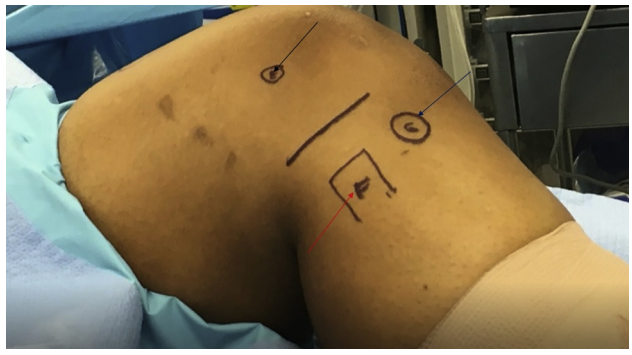

Fig 1. The patient is placed in the supine position and the right knee is flexed to 30°. We have marked the lateral femoral epicondyle (black arrow), the head of the fibula (red arrow), and the Gerdy tubercle (blue arrow).

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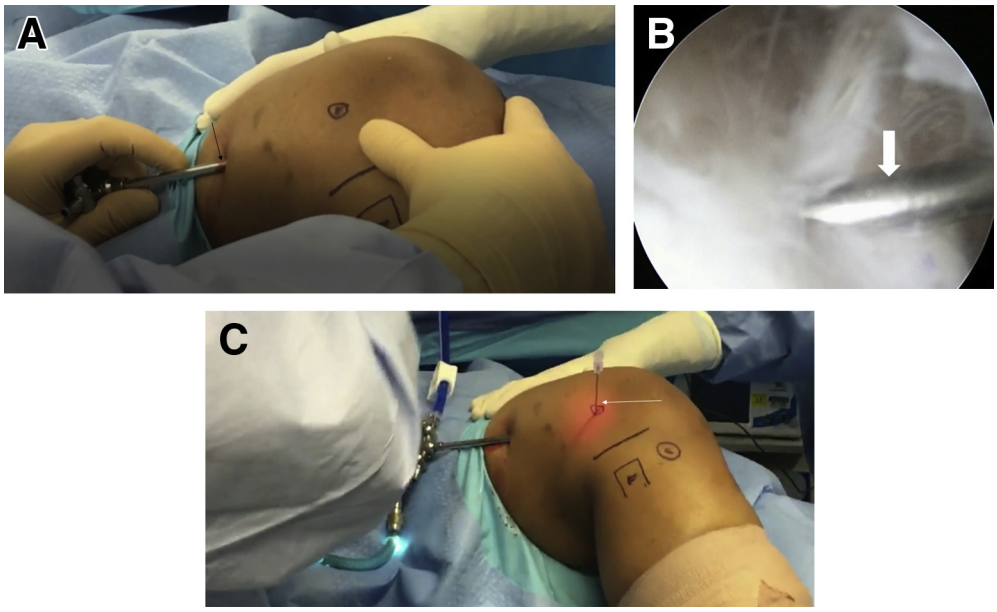

Fig 2. (A) While the patient remains supine with the right knee flexed to 30°, the right proximal-lateral portal is made with a No. 11 blade scalpel. The trocar (arrow) is then inserted with angulation in the direction of the right lateral femoral condyle. The arthroscopic camera is inserted into this proximal portal and remains there for the duration of the procedure. (B, C) A spinal needle (arrows) is inserted directly over the right lateral femoral epicondyle. It is visualized by the arthroscopic camera, which is located in the right proximal portal. A No. 11 blade scalpel is used to create the working distal portal directly over the right lateral epicondyle.

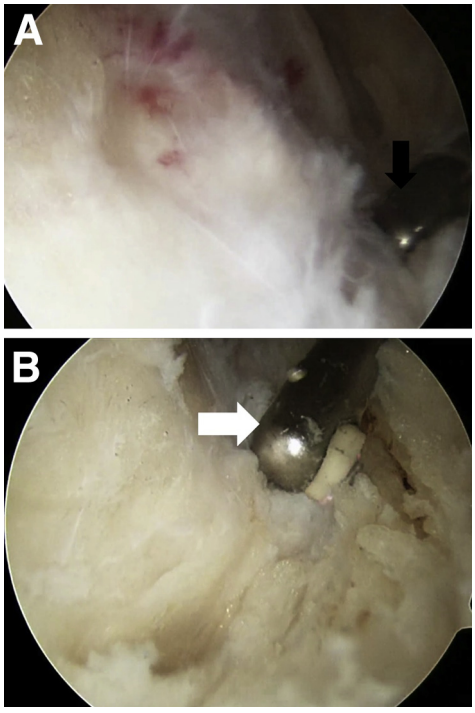

Fig 3. (A) A bursectomy is performed deep to the iliotibial band with an arthroscopic shaver (Smith & Nephew) (arrow) in the right distal-lateral portal and the arthroscopic camera in the right proximal-lateral portal. (B) The bursectomy is completed with hemostasis being achieved by the Arthrocare-1 wand (arrow) in the right distal-lateral portal. The camera remains in the proximal portal during this step.

condyle, the fibular head, and the Gerdy tubercle are identified and marked (Fig 1).

Step 2: Portal Creation

A No. 11 blade scalpel is used to make a proximal-lateral portal, and a blunt trocar and sheath are inserted under the IT band with the trocar angled toward the lateral femoral condyle, where an arthroscopic camera is inserted (Fig 2A). A spinal needle is then used to

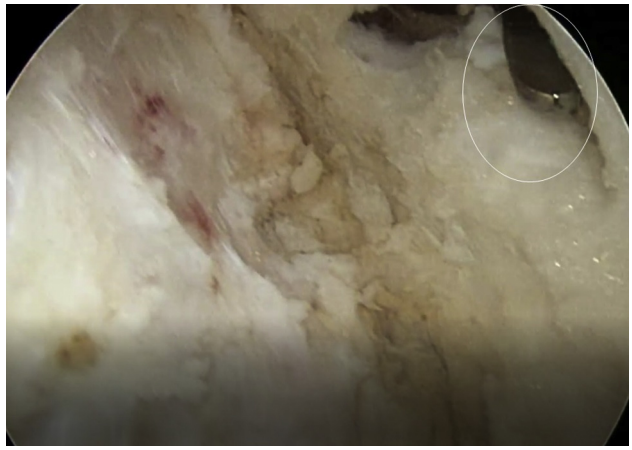

Fig 4. By use of the right distal-lateral portal, Metzenbaum scissors (oval) are used to spread the tissue of the overlying skin of the iliotibial band, thus protecting the skin during lengthening. Visualization using the arthroscopic camera occurs through the proximal portal.

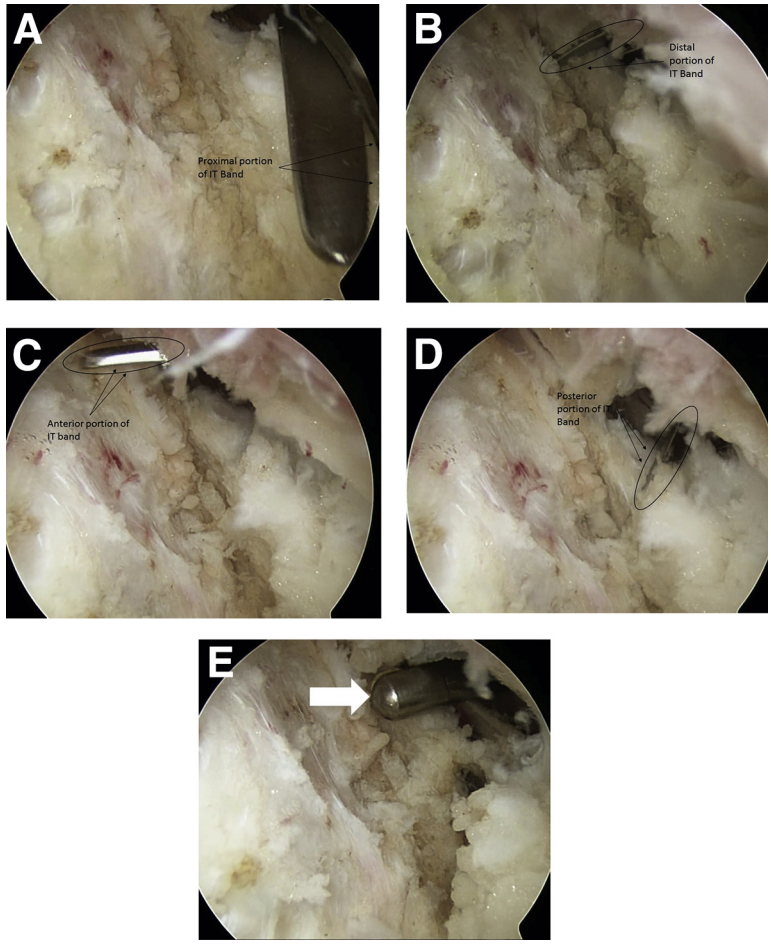

Fig 5. (A-D) With the arthroscopic camera still in the right proximal portal, by use of the Metzenbaum scissors (ovals) inserted into the distal-lateral portal, the lengthening is performed proximally (A), distally (B), anteriorly (C), and posteriorly (D) from its point of insertion at the Gerdy tubercle. The arrows with labels are used to show the orientation at each dimension of the lengthening. (IT, iliotibial.) (E) The Arthrocare-1 wand (arrow) is inserted into the right distal portal and is used to complete the lengthening with care taken not to damage the overlying skin. The arthroscopic camera remains in the right proximal portal for appropriate visualization.

localize the insertion point for the distal-lateral portal directly over the lateral epicondyle at the site of the patient's pathology (Fig 2 B and C). It is imperative to ensure adequate visualization of the spinal needle before the procedure continues. A No. 11 blade is then used to create the portal over the lateral condyle and incise the IT band longitudinally.

Step 3: Bursectomy

With the arthroscopic camera in the proximal-lateral portal, the shaver is inserted into the distal-lateral portal and a bursectomy is performed deep to the IT band (Fig 3A). Care is taken to ensure a complete bursectomy is performed for appropriate visualization of the IT band. Once completed, hemostasis is achieved with an Arthrocare-1 wand (Smith & Nephew, Austin, TX) (Fig 3B).

Step 4: Protection of Skin

Metzenbaum scissors (Smith & Nephew) are inserted into the distal-lateral portal used to spread the tissue over the IT band, creating separation between the skin and the IT band, thus protecting the overlying skin until completion of the procedure (Fig 4).

Step 5: Lengthening of IT Band

Cruciate IT band lengthening is then performed (Fig 5). The arthroscopic camera remains in the proximal-lateral portal, and scissors are inserted into the distal portal. Metzenbaum scissors are used to incise

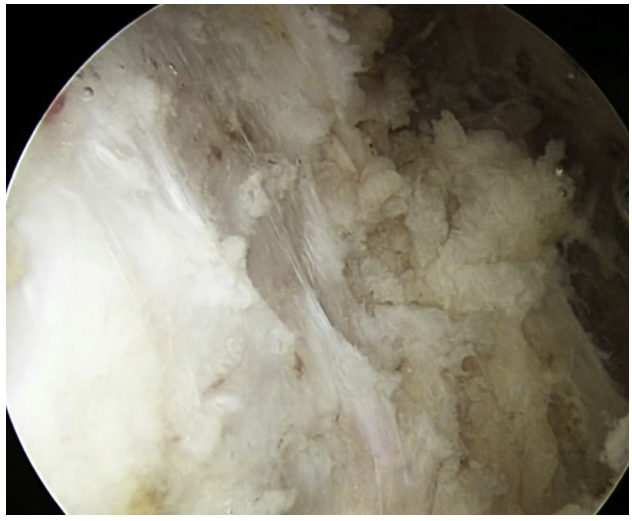

Fig 6. Completed iliotibial band lengthening.

Table 1. Pearls and Pitfalls

Step	Pearls	Pitfalls
1. Preparation	The surgeon should ensure that the knee is flexed to 30°.	Inadequate flexion leads to difficulty visualizing the IT band.
2. Portal creation	Creation of the distal portal over the lateral femoral condyle becomes critically important because this will be the working portal of the procedure.	The surgeon should ensure visualization of the spinal needle before proceeding.
3. Bursectomy	Bursectomy should be completed with the Arthrocare-1 wand to ensure hemostasis.	The IT band may not be completely and appropriately visualized if the bursectomy is not complete.
4. Skin protection	Metzenbaum scissors allow for the appropriate separation of the skin from the IT band.	The overlying skin is at risk of being damaged during the lengthening without separation.
5. Lengthening	The surgeon should be aware of the overlying skin.	If the surgeon does not release proximally, distally, anteriorly, and posteriorly, there is an increased risk of recurrence of IT band syndrome.

IT, iliotibial.

the band proximally (Fig 5A) and distally (Fig 5B), as well as anteriorly (Fig 5C) and posteriorly (Fig 5D), from the point of initial insertion. A complete lengthening must be performed to minimize the risk of recurrent IT band syndrome. The Arthrocare-1 wand is then used to complete the lengthening (Fig 5E). Care is taken not to damage the overlying skin (Fig 6). Video 1 shows the complete technique.

Discussion

IT band syndrome is a painful condition that is often seen in persons who participate in activities such as running or cycling.[4,9,18] Despite the well-described techniques with satisfactory outcomes that have been reported in the literature, it is imperative that different surgical lengthening techniques are clearly described to optimize outcomes and return to activity.[11-13,17] Hence, we have presented our arthroscopic IT band—lengthening procedure that we believe allows for a complete lengthening of the IT band. Table 1 shows pearls and pitfalls.

There have been several small studies that have shown that IT band lengthening can appropriately treat chronic IT band syndrome refractory to conservative treatment modalities with a minimal risk of complications and a quick return to play (Table 2).[11-13,15,18] Hariri et al.[13] evaluated this in a series of 11 patients in whom a 6-month course of nonoperative treatment failed. The operation was performed with an open technique after a diagnostic arthroscopy. After a mean follow-up period of 38 months (range, 20-66 months), the cohort showed a substantial improvement in postoperative visual analog scale scores (from 8 to 2 points, $P < .001$). However, there was no difference between the preoperative and postoperative Tegner activity scores (6 points vs 5 points, $P = .47$). Yet, when further analyzed, 8 of the 11 patients had Tegner scores that were equal to or better than their preinjury scores. Similarly, Michels et al.[11] reported on a series of patients who underwent IT band lengthening performed by a completely intra-articular arthroscopic technique (34 lengthening procedures). After a mean 28-month follow-up period, all of the patients had returned to running activities within 3 months of the operation. Furthermore, by use of the scale created by Drogset et al.,[12] the authors found that 80% of the cohort achieved excellent results, with 17% having good results. Hence, different techniques may result in satisfactory outcomes.

Although the outcomes appear to not be solely dependent on the chosen surgical technique, there are potential advantages and disadvantages for each technique (Table 3). Our technique uses arthroscopy, whose less invasive nature may potentially lead to less pain, decreased blood loss, and a smaller incision with less dissection required, as opposed to its open counterparts, which could potentially lead to more pain, greater blood loss, and larger incisions with a greater dissection required. Furthermore, our technique allows for direct lengthening specifically at the area of pathology. Conversely, conventional open techniques offer the potential for a greater lengthening of the IT band with a larger Z-plasty technique. Given these advantages and disadvantages, we believe that our arthroscopic technique maximizes efficacy and safety.

In conclusion, our IT band—lengthening technique may be used in patients with chronic IT band

Table 2. Studies Detailing Outcomes of Surgical Iliotibial Band Lengthening

Authors	N	Mean Age, yr	Mean Follow-Up, mo	Return to Preinjury Activity, %	Complication Rate, %
Hariri et al.,[13] 2009	11	32 (range, 24-41)	38 (range, 20-66)	72	0
Michels et al.,[11] 2009	34	31 (range, 19-44)	28 (minimum, 6)	100	3
Drogset et al.,[12] 1999	45	27 (range, 14-46)	25 (range, 2-108)	—	2
Holmes et al.,[18] 1993	21	—	— (minimum, 3)	81	—
Martens et al.,[15] 1989	19	25 (range, 19-33)	45 (range, 24-132)	100	5

Table 3. Advantages and Disadvantages of Open and Arthroscopic Iliotibial Band Lengthening

Technique	Advantages	Disadvantages
Conventional open technique	Potential for greater lengthening using Z-plasty	Theoretically more pain Theoretically greater blood loss Larger incision with greater dissection required
Our arthroscopic technique	Theoretically less pain Theoretically less blood loss Smaller incision with decreased dissection required Localized lengthening that directly addresses pathology	Inability to perform greater lengthening

syndrome. We believe it may be easily replicated and allows for an appropriate lengthening that will greatly minimize the risk of recurrence. Future studies should analyze the outcomes of this surgical lengthening procedure and compare it with other techniques in the hope of definitively establishing an operative standard of care for this condition.

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