

Iliotibial band syndrome - demotion of the lateral femoral epicondyle as a surgical alternative

Abstract

Objective: Demonstrate an alternative surgery technique for the treatment of Iliotibialband syndrome (ITBS) refractory to conservative treatment, through the lowering of the lateral femoral epicondyle.

Methods: From 2005 and 2017, it was analyzed 9 patients diagnosed with ITBS refractory to conservative treatment. They underwent surgery using the main author's own technique (SM), which consists of lowering the lateral femoral epicondyle (LFE), with a mean follow-up time of 13 years, ranging from 5.5 to 16.6 years. They were assessed pre- and postoperatively for pain and return to sports activities.

Results: All 9 patients had immediate relief from the pain caused by ITBS. On average, three months after the surgery they were returning to their daily activities and sport practices.

Conclusion: The proposal technique of the demotion of the LFE showed excellent and immediate results in post op and long term related to pain and the return to sports activities. We believe that this technique is a great alternative for chronic and refractory cases of ITBS.

Keywords: iliotibial band syndrome, knee lateral pain, iliotibial band

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Introduction

The Iliotibial Band (ITB) originates from a dense fibrous connective tissue that surrounds the thigh known as deep fascia or fascia lata. In the hip, the ITB merges itself with the gluteal aponeurosis and follows distally through the lateral side of the thigh.¹⁻⁴ In the knee, the ITB is composed of three layers, and the superficial layer is its main component. This layer covers a huge part of the lateral side of the knee and consists of the longitudinal distal dense tissue of the fascia lata. It passes over the LFE and inserts itself in Gerdy's tubercle, in the lateral condyle of the tibia. Some of the fibers follow through Gerdy's tubercle to the tibial tuberosity.^{2,3,5} The ITB acts as a knee extensor when flexed less than 30°, but becomes a flexor when flexed more than 30°.⁶

Iliotibial band syndrome (ITBS) is a common cause of pain in the lateral region of the knee, particularly in runners and cyclists, and may also occur in other activities that perform repetitive cycles of flexion and extension. The incidence ranges from 1.6% to 12% in runners and 15% to 24% in cyclists.^{5,7}

The ITBS has a controversial and multifactorial etiology. The most accepted one refers to the repetitive friction between ITB and LFE during flexion-extension movements. This causes inflammation.² However, Fairclough et al.⁷ and Falvey et al.¹ found out by MRI that ITB compresses against LFE nearly to 30° of knee flexion. These authors also say that the ITB is not a loose structure. Therefore, it is unlikely that it can move from anterior to posterior along the LFE. They concluded that the most likely cause for ITBS is excessive compression of vascularized and innervated fat between ITB and LFE. Thus, both theories address an abnormal increase in compressive forces between ITB and LFE that causes tissue irritation and inflammation.^{7,8}

ITBS is diagnosed based on a clinical exam. The physician must pay attention to mechanical symptoms, for example: changes in the activity level, uphill run and the condition of the sneakers used in training.^{5,6,9} Moreover, anatomic factors such as internal tibial torsion,

hip abductor weakness, excessive feet pronation and genu varus can increase ITB tension.

Usually, it is known that the patients complain about lateral knee pain, mainly when it is 30° of flexion (Orchard et al. 1996; Frederickson & Lobo, 2005). Initially, the pain will occur at the end of the activity, but it can be present at the beginning and even at rest as the disease progresses. During physical exams, special tests for ITBS - Noble and Ober - are included. In the Noble one, the LFE is touched and then the knee is extended in 90° of flexion to 0° of extension. When the pain is felt in 30° of flexion, the test is concluded as positive. In the Ober test, the patient is placed in a lateral decubitus position with the knees bent 90°. Then, the examiner is positioned behind the patient, he abducts and extends the affected hip while supporting the knee. When there is movement restriction and lateral knee pain during the hip abduction in the extended position, the test is positive.¹⁰ To reach a diagnosis, imaging exams can help substantially. Knee X-ray, for example, is useful to discard other pathologies such as osteoarthritis, fracture or patellar tracking problems. Magnetic resonance imaging (MRI) of the knee can confirm the diagnosis, showing hypersignal adjacent to the ELF with distal ITB thickening¹¹. Ultrasonography (USG) can also show abnormal thickening of the distal ITB.¹²

Regarding treatment, ITBS responds well to the conservative treatment, with a success rate of 94% (Anderson, 1991; Kirk et al., 2000; Levin, 2003). Such as: oral anti-inflammatory drugs; physiotherapy with emphasis on stretching the ITB and strengthening the hip abductors; local injection therapy⁵ and extracorporeal shockwave therapy. It is known that resting is the best treatment for acute cases, however it becomes less useful as the condition develops into chronic pain, when there are bursae and periosteum alterations. There is limited evidence to support a specific approach for the ITBS treatment; however, if the objective is the return of sport practices, the combination of resting (2 to 6 weeks), stretching, pain management and change of running habits produce a higher rate of reaching the goal.¹³

Physiotherapeutic measures are helpful, such as trigger point or myofascial release techniques, as well as patient-led techniques, such as self-massage, intended to reduce tension and symptoms of ITBS.¹⁴ There are different perspectives concerning when the surgical procedure must be used. Martens et al. (2013) suggests that conservative treatments should be persisted for an average of 9 months before considering surgical intervention. There are others who based their decision for surgical procedure when the ITB posterior fibers are tighter against the LFE than the anterior fibers in 30° of flexion. In this case, to correct this problem, only a surgical release of the posterior fibers is possible.¹³

The surgical options in the refractory cases include percutaneous or open liberation, elongation in "Z" (z-plasty) of the ITB and arthroscopy techniques.¹⁵ If it is assumed that the tissue inflammation, which connects the ITB to the LFE, is the cause of the pain, this tissue can be removed arthroscopically.^{15,16} To conclude, we believe the compression between the LFE and ITB is the cause of adjacent tissue inflammation. We also get excellent results in most cases with non-operative treatment. However, due to failure related to conservative treatment and prior surgeries, we thought to demote the lateral epicondyle to eliminate the pressure of local tissues. Moreover, acting over ITB, by doing partial sections or z-plasty, is reckless, because one mistake could lead to lateral instabilities that would be difficult to repair. With our technique, all the operated cases had total cure. Our objective is to describe the proposed technique and to present the series of cases in which we had used it.

Methods

During the period of 2005 to 2017, 16 patients had undergone surgery with the technique created by the main author (SM). From March to October of 2022, we had contacted nine of them. Their age was between 30,5 to 49,9 years old; the average was 33,4 years. The post op follow-up varied from 5,5 to 16,6 years; the average was 13,0 years. All of them were sports practitioners. Initially, all of them were insistently submitted to a program of physiotherapy and sports postural correction, such as changing the height of the bicycle seat, wearing appropriate shoes, avoiding irregular terrain for a period.

Surgical technique

The procedures were performed under spinal anesthesia. The patients were positioned in horizontal dorsal decubitus, with pneumatic cuffs at the root of the thigh. With the knee flexed in 90°, a longitudinal incision of 3 cm is performed on the skin and on the ITB (Figure 1). The LFE and the Lateral Collateral Ligament (LCL) insertion are located (Figure 2). A LFE osteotomy is executed by taking out the LCL, keeping it fixed to the bone fragment (Figure 3). A curettage is performed in the bottom of the cavity - 3 to 7 mm - to remove spongy bone. An anchor is introduced in this cavity (Figure 4) and the LCL is reinserted more deeply, eliminating the LFE protrusion that once caused ITBS (Figure 5). Then, suture, bandage and tourniquet removal are performed. In the postoperative period, weight bearing is allowed as soon as the effects of anesthesia pass and physiotherapy is started early.



Figure 1 Access way.



Figure 3 Lateral epicondyle osteotomy preserving the LCL insertion.



Figure 2 Lateral femoral epicondyle with the lateral collateral ligament (LCL) insertion.



Figure 4 After removing the spongy bone by deepening in the cavity about 3 to 7 mm, an anchor is placed at the bottom of the cavity.



Figure 5 LFE and LCL reinserted more deeply to eliminate the protrusion that caused ITBS.

Results

All patients felt immediate relief from the FLE pain after surgery. The immediate postoperative pain was different from the preoperative one. On average, three months later, they were returning to sports.

Discussion

Due to ITBS great response with the conservative treatment (success rate of 94%),⁵ many non-surgical procedures have been suggested. The most common are: rest, swimming pool race, races reduction (in terms of intensity and quantity), ice, oral anti-inflammatory, physiotherapy with emphasis on ITB stretching and strengthening the hips abductors, local injection therapy to reduce inflammation and pain,⁵ and extracorporeal shockwave therapy. However, neither a consensus was reached about better practices for ITBS treatment nor when the surgical treatment should be implemented.

Some authors suggest that conservative treatment must be applied from 6 to 9 months,¹⁶ while others based their decision for surgical intervention on the observation of friction degree between ITB posterior fibers and LFE.¹³ The surgical treatment principle for ITBS is based on resection of the thickened part of the ITB to reduce the friction against the bone, relieving pain. Numerous surgical techniques include percutaneous release, open release, “Z” (z-plasty) stretching of the ITB, and arthroscopy surgery debriding the tissue interposed between LFE and ITB.

However, since the distal ITB contribute to rotational knee stability,^{5,16,17} the surgeon should be cautious with the amount of tissue excised to avoid compromising postoperative joint stability. This concern was what inspired Dr. Mainine to create the technique proposed here, by only cleaving the ITB as an access way, without changing its length and function. Then demoting the LFE. We also believe that the fatty tissue interposed between LFE and the ITB is so small that its arthroscopic debridement will have no effect, or it will recur. If the cause is the LFE's protrusion, eliminating it, we will cure the symptoms.

Conclusion

An alternative for the surgical treatment in chronic and refractory cases of ITBS is the demotion of the LFE proposed by Dr. Mainine,

who showed 100% excellent outcomes in this small series of nine cases. With quick rehabilitation for return to sports.

Acknowledgments

None.

Conflicts of interest

The authors declare no conflicts of interest.

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