

# Endoscopic Resection of Distal Femoral Exostosis That Causes Distal Iliotibial Band Syndrome



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**Abstract:** Distal iliotibial band (ITB) syndrome is the most common cause of lateral knee pain in runners. If the ITB is too tight, the repetitive knee flexion associated with sports may lead to compression of the vascularized fat pad in the sub-ITB space or development of sub-ITB adventitious bursitis as the band crosses over the lateral femoral epicondyle and the ITB itself is normal. Distal ITB syndrome usually responds to conservative treatment. The presence of any underlying causes, for example, exostosis at the sub-ITB space, should be explored in recalcitrant cases of distal ITB syndrome. Although open surgical excision is the treatment of choice for extra-articular exostosis, the surgical risk and complication rates have been reported as high as 13%. Endoscopic resection of extra-articular exostosis has been proposed to reduce the complication rates. The purpose of this technical note is to describe the details of arthroscopic management of endoscopic resection of distal femoral exostosis that causes distal ITB syndrome.

Distal iliotibial band (ITB) syndrome is the most common cause of lateral knee pain in runners.<sup>1</sup> If the ITB is too tight, the repetitive knee flexion associated with sports may lead to compression of the vascularized fat pad in the sub-ITB space or development of sub-ITB adventitious bursitis as the band crosses over the lateral femoral epicondyle and the ITB itself is normal.<sup>1-4</sup> Conservative treatment is usually successful but slow and includes activity modification, ITB stretching, hip muscle strengthening, oral nonsteroidal anti-inflammatory drugs, and local corticosteroid injections in combination with physical therapy and foot orthoses.<sup>1,3,4</sup> Surgery is indicated if conservative treatment fails. Surgical options include resection of a triangle in the posterior part of the ITB, close to the epicondyle; transverse sectioning of the posterior half of the ITB; limited release of deeper fibers at the

epicondyle or at the ITB insertion at the Gerdy tubercle; lengthening of the central part of the ITB while maintaining its anterior and posterior fibers; elliptical recession of the distal posterior ITB off the lateral femoral epicondyle; multiple mesh-like perforations to enlarge the ITB; digastric release of the ITB from the Gerdy tubercle; open or endoscopic Z-plasty or release; and isolated bursectomy and resection of the lateral synovial recess.<sup>1,2</sup> The outcomes are good to excellent with most open and endoscopic approaches.<sup>1</sup>

Sometimes, distal ITB syndrome is due to the presence of exostosis (osteochondroma) at the sub-ITB space close to the lateral femoral epicondyle. The logical surgical option should be excision of the exostosis. Preserving the ITB can minimize the risk of postoperative muscle weakness.<sup>2</sup> Although open surgical excision is the treatment of choice for extra-articular exostosis, the rates of surgical risks and complications, including arterial laceration, compartment syndrome, fracture, and nerve palsy, have been reported as high as 13%.<sup>5</sup> Endoscopic osteochondroma excision may be less painful and results in better cosmetic outcomes and a faster recovery, as compared with traditional open surgery.<sup>6</sup> Endoscopic techniques of resection of extra-articular exostosis around the knee have been reported.<sup>5-8</sup> The purpose of this technical note is to describe the details of endoscopic resection of distal femoral exostosis that causes distal ITB syndrome. This technique is indicated in case of distal ITB syndrome caused by distal femoral exostosis that

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**Table 1.** Indications and Contraindications of Endoscopic Resection of Distal Femoral Exostosis That Causes Distal Iliotibial Band Syndrome

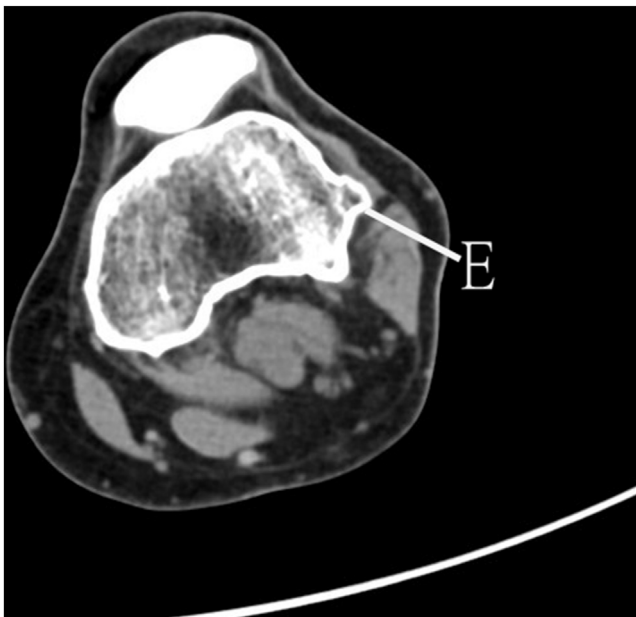
Indications
Distal iliotibial band syndrome caused by distal femoral exostosis that is recalcitrant to conservative treatment
Contraindications
Distal iliotibial syndrome due to other causes (e.g., varus knee deformity)
Malignant change of osteochondroma is suspected
Mass involving femoral insertion of lateral collateral ligament

is recalcitrant to conservative treatment. It is contraindicated if distal iliotibial syndrome is due to other causes, for example, varus knee deformity, or if malignant change of the osteochondroma is suspected or the mass involves the femoral insertion of the lateral collateral ligament (Table 1).

## Technique

### Preoperative Assessment and Patient Positioning

Clinical examination is important for identification of the location of the lesion. Crepitus can be felt over the distal femoral exostosis during knee flexion and extension. Computed tomography is a useful investigation to locate the exostosis (Fig 1). Magnetic resonance imaging is useful to assess any acute and chronic injury to the ITB.<sup>4</sup> Magnetic resonance imaging is also indicated if malignant change of the osteochondroma is suspected.



**Fig 1.** Endoscopic resection of distal femoral exostosis causing distal iliotibial band syndrome in left knee. The patient is in the lateral position. A transverse computed tomography image shows the exostosis (E) underneath the iliotibial band.

The patient is in the lateral position. A thigh tourniquet is applied to provide a bloodless operative field. A 4.0 mm, 30° arthroscope (Dyonics; Smith & Nephew, Andover, MA) is used for the procedure. Fluid inflow is driven by gravity, and an arthro-pump is not used.

### Portal Placement

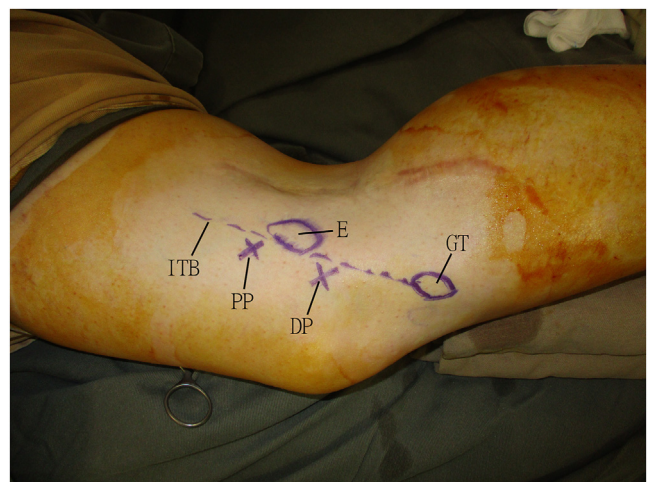
The procedure is performed via the proximal and distal portals along the anterior edge of the ITB, which are at the proximal and distal margins of the exostosis, respectively (Fig 2). The endoscopic working space is just deep to the ITB.

### Exposure of Exostosis

The distal portal is the viewing portal, and the proximal portal is the working portal. The soft tissue covering the exostosis is dissected from the exostosis by an arthroscopic shaver (Dyonics; Smith & Nephew) (Fig 3). Then, the arthroscope is switched to the proximal portal and the remaining soft tissue is dissected from the exostosis by the shaver via the distal portal (Fig 4). Rubbing of the ITB by the exostosis can be demonstrated by flexion and extension of the knee.

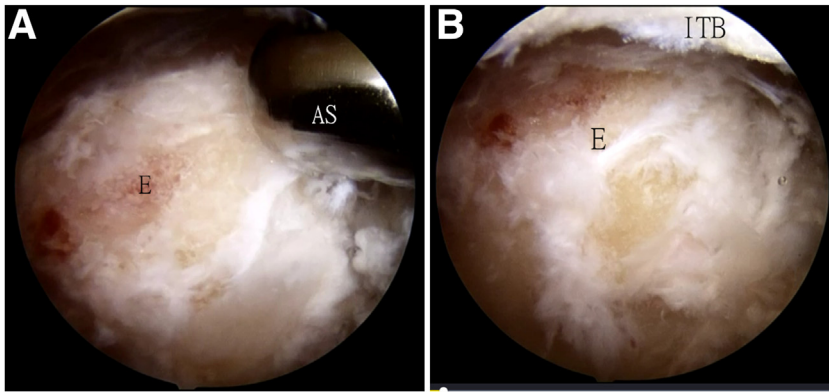
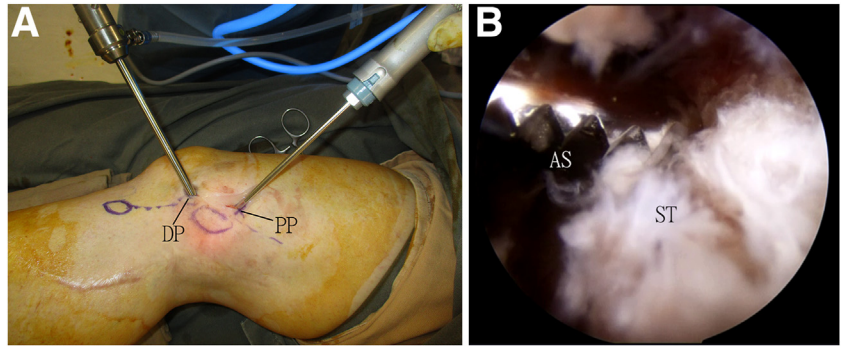
### Resection of Exostosis

The proximal portal is the viewing portal, and the distal portal is the working portal. The exostosis is resected by an arthroscopic acromionizer (Dyonics; Smith & Nephew) (Fig 5). It is important to achieve adequate resection of the edges of the lesion to be flush with the adjacent normal bone. The portals can be interchanged with the distal portal as the viewing portal and the proximal portal as the working portal to



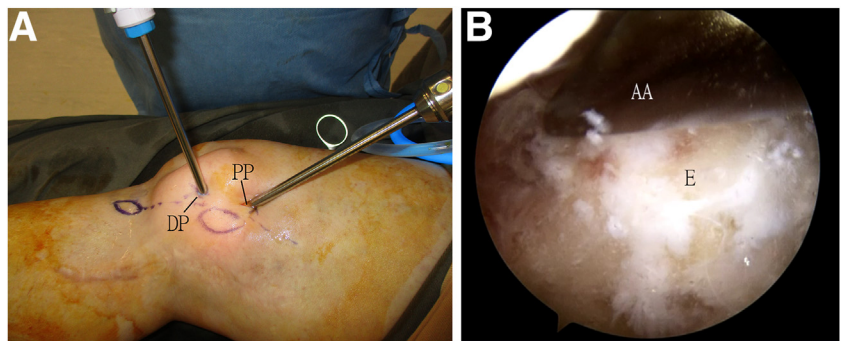
**Fig 2.** Endoscopic resection of distal femoral exostosis causing distal iliotibial band (ITB) syndrome in left knee. The patient is in the lateral position. The procedure is performed via the proximal portal (PP) and distal portal (DP) along the anterior edge of the ITB, which are at the proximal and distal margins of the exostosis (E), respectively. (GT, Gerdy tubercle.)

**Fig 3.** Endoscopic resection of distal femoral exostosis causing distal iliotibial band syndrome in left knee. The patient is in the lateral position. (A) The distal portal (DP) is the viewing portal, and the proximal portal (PP) is the working portal. (B) The soft tissue covering the exostosis (ST) is dissected from the exostosis by an arthroscopic shaver (AS).



**Fig 4.** Endoscopic resection of distal femoral exostosis causing distal iliotibial band (ITB) syndrome in left knee. The patient is in the lateral position. The proximal portal is the viewing portal, and the distal portal is the working portal. (A) The soft tissue covering the exostosis is dissected from the exostosis (E) by an arthroscopic shaver (AS). (B) After soft-tissue dissection, the exostosis (E) underneath the ITB is exposed.

**Fig 5.** Endoscopic resection of distal femoral exostosis causing distal iliotibial band syndrome in left knee. The patient is in the lateral position. (A) The proximal portal (PP) is the viewing portal, and the distal portal (DP) is the working portal. (B) The exostosis (E) is resected by an arthroscopic acromionizer (AA).



complete the resection (Fig 6, Table 2, Video 1). Postoperatively, the patient is allowed immediate weight bearing as tolerated by pain and knee and hip mobilization can be started immediately.

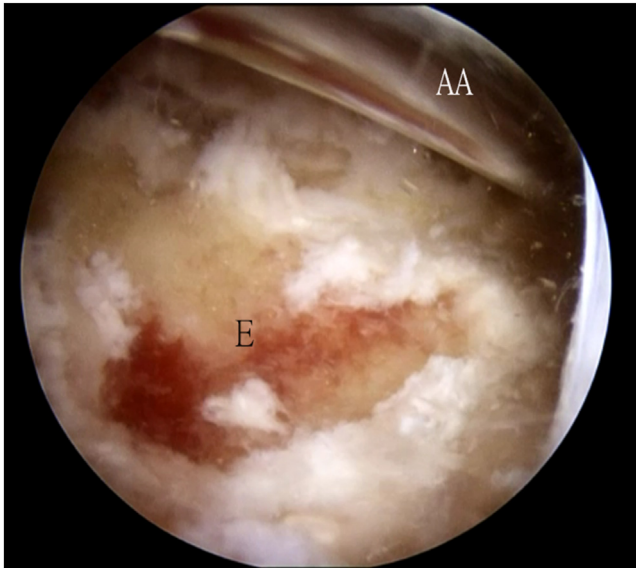
### Discussion

Distal ITB syndrome usually responds to conservative treatment. The presence of any underlying causes should be explored in recalcitrant cases of distal ITB syndrome. Exostosis at the sub-ITB space is one of the possible underlying causes and is readily detected by clinical examination and imaging. In our technique, the

portals are anterior to the ITB and the endoscopic working space is deep to the ITB. Therefore, the integrity of the ITB is preserved and a fast rehabilitation program can be adopted.

Paying attention to the technical details is of utmost importance for the avoidance of complications. Fluid inflow by an arthro-pump should be avoided to reduce the risk of development of compartment syndrome.<sup>8</sup> Excessive dissection and bone resection distally or posteriorly should be avoided to prevent injury to the popliteal neurovascular bundle or the femoral attachment of the lateral collateral ligament.





**Fig 6.** Endoscopic resection of distal femoral exostosis causing distal iliotibial band syndrome in left knee. The patient is in the lateral position. The distal portal is the viewing portal, and the proximal portal is the working portal. The exostosis (E) is resected by an arthroscopic acromionizer (AA).

**Table 2.** Pearls and Pitfalls of Endoscopic Resection of Distal Femoral Exostosis That Causes Distal Iliotibial Band Syndrome

Pearls	
An arthro-pump is not used to avoid excessive infiltration of the soft tissues and the possibility of development of compartment syndrome.	
It is important to achieve adequate resection of the edges of the lesion to be flush with the adjacent normal bone.	
The operative site should be continuously irrigated to remove the osteocartilaginous debris that may lead to relapse or heterotopic calcification.	
Pitfalls	
Excessive dissection and resection of the posterior part of the exostosis may injure the popliteal neurovascular bundle and its branches.	
Excessive dissection and resection of the distal part of the exostosis may injure the femoral insertion of the lateral collateral ligament.	

The advantages of our technique include small incisions and better cosmetic outcomes, minimal soft-tissue trauma, and accurate lesion assessment. The potential risks of this technique include injury to the femoral attachment of the lateral collateral ligament, iatrogenic fracture of the distal femur, injury to the popliteal neurovascular bundle and its branches, recurrence of the lesion, and development of

**Table 3.** Advantages and Risks of Endoscopic Resection of Distal Femoral Exostosis That Causes Distal Iliotibial Band Syndrome

Advantages	
Small incisions and better cosmetic outcomes	
Minimal soft-tissue trauma	
Accurate assessment of lesion	
Risks	
Injury to femoral attachment of lateral collateral ligament	
Iatrogenic fracture of distal femur	
Injury to popliteal neurovascular bundle and its branches	
Recurrence of lesion	
Development of heterotopic calcification	

heterotopic calcification (Table 3). This procedure is not technically difficult and can be attempted by average knee arthroscopists.

### Disclosures

Both authors (Y.Y.B.C., T.H.L.) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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