

# Endoscopic Release of Posterior Tibial Tendon Sheath for Stenosing Tenosynovitis of Posterior Tibial Tendon



Adam Yiu Chung Lau, M.B.B.S., and  
Tun Hing Lui, M.B.B.S. (H.K.), F.R.C.S., (Edin.), F.H.K.A.M., F.H.K.C.O.S.

**Abstract:** Stenosing tenosynovitis of the posterior tibial tendon is a cause of posteromedial ankle pain. Conservative treatment is often ineffective, and surgery is usually required for alleviation of symptoms. Stenosis of the tendon sheath can be overcome by release of the tendon sheath or deepening of the retromalleolar groove. These procedures can be performed endoscopically. The purpose of this Technical Note is to describe the technical details of endoscopic release of the posterior tibial tendon sheath with the advantage of minimal soft tissue dissection and titrated tendon sheath release according to the extent of stenosis. Associated tendon pathology and hindfoot malalignment should be treated accordingly.

Stenosing tenosynovitis of the posterior tibial tendon was first reported by Kulowski<sup>1</sup> in 1936. Pathologies include thickening of the tendon sheath; varying degrees of fibrosis of the tendon itself, with or without rupture; and reactive hypertrophy of the bone at the retromalleolar groove.<sup>2</sup> Stenosis of the posterior tibial tendon sheath is usually located posterior to the medial malleolus.<sup>2</sup> It can initially be seen with posteromedial ankle pain.<sup>3</sup>

Conservative treatment includes activity modification, anti-inflammatory medication, and orthosis. Injections of 1% xylocaine along the side of the tendon sheath proximal to the stenosed region can be tried, so as to distend the tendon sheath to release the adhesions.<sup>4</sup> However, conservative treatment is often

ineffective, and surgery is usually required for alleviation of symptoms.<sup>4</sup> If tenosynovitis of the posterior tibial tendon persists despite conservative therapy after 3 months, surgery is warranted to prevent further degenerative tendon changes.<sup>2,4</sup> Stenosis of the tendon sheath can be overcome by release of the tendon sheath<sup>5</sup> or deepening of the retromalleolar groove.<sup>2</sup> Associated tendon pathology and hindfoot malalignment should be treated accordingly.<sup>2-4</sup> Endoscopic synovectomy is an effective treatment for posterior tibial tenosynovitis.<sup>6,7</sup> It has the advantages of smaller scars, less wound pain, and a short hospital stay.<sup>6</sup> Techniques of endoscopic tendon sheath release<sup>4</sup> and endoscopic groove deepening<sup>8</sup> have been reported to be effective in management of stenosing tenosynovitis of posterior tibial tendon. The purpose of this Technical Note is to describe the

From the Department of Orthopaedics and Traumatology, North District Hospital, Hong Kong SAR, China.

The authors report 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 September 17, 2018; accepted October 16, 2018.

Address correspondence to Tun Hing Lui, M.B.B.S. (H.K.), F.R.C.S., (Edin.), F.H.K.A.M., F.H.K.C.O.S., Department of Orthopaedics and Traumatology, North District Hospital, 9 Po Kin Rd, Sheung Shui, NT, Hong Kong SAR, China. E-mail: [luith@ha.org](mailto:luith@ha.org)

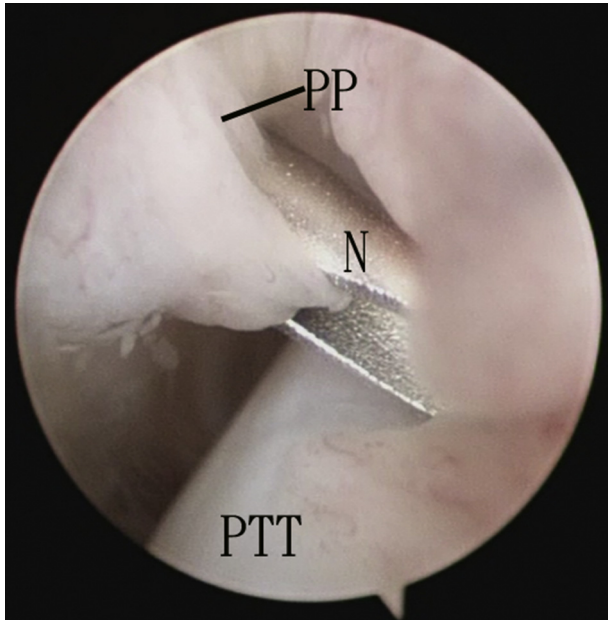
© 2018 by the Arthroscopy Association of North America. Published by Elsevier. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

2212-6287/181156

<https://doi.org/10.1016/j.eats.2018.10.003>

**Table 1.** Indications and Contraindications for Endoscopic Release of Posterior Tibial Tendon Sheath for Stenosing Tenosynovitis of Posterior Tibial Tendon

Indications	Contraindications
Symptomatic stenosing tenosynovitis of the posterior tibial tendon resistant to conservative treatment	Active operative site infection Extensive tendon pathology requiring tendon reconstruction Other source of posteromedial ankle pain Stenosis caused by bone impingement



**Fig 1.** Endoscopic release of the posterior tibial tendon sheath for stenosing tenosynovitis of the posterior tibial tendon of left ankle. The patient is in the supine position with the legs spread. The distal portal is the viewing portal. The proximal portal, just distal to the stenotic part of the posterior tibial tendon sheath, is identified endoscopically and marked with a needle. (N, needle; PP, proximal portal; PTT, posterior tibial tendon.)

technical details of endoscopic release of the posterior tibial tendon sheath. It is indicated for stenosing tenosynovitis of the posterior tibial tendon resistant to conservative treatment. It is contraindicated in the presence of active operative site infection or extensive tendon pathology requiring tendon reconstruction. It

is also contraindicated if another source of posteromedial ankle pain is possible. If the stenosis is owing to bone impingement, endoscopic groove deepening is more appropriate. Endoscopic tendon sheath release may lead to destabilization and dislocation of the posterior tibial tendon (Table 1).

## Technique

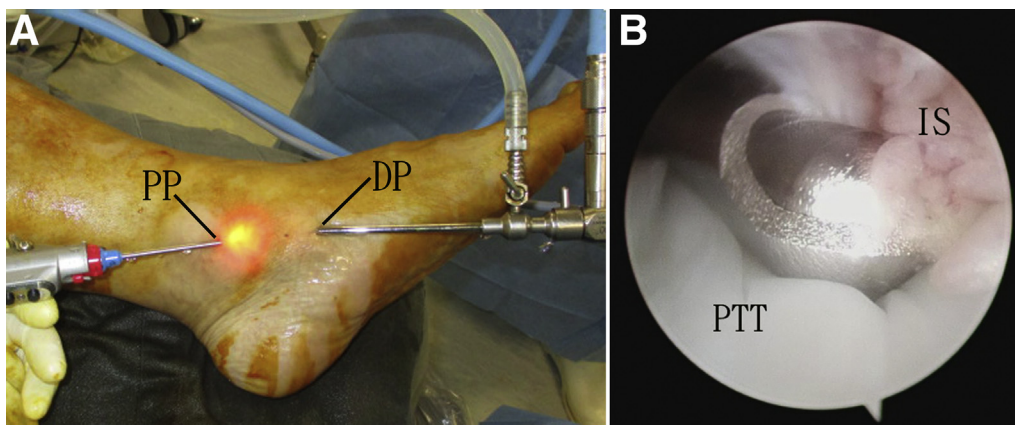
### Preoperative Planning and Patient Positioning

Tenderness will be detected along the posterior tibial tendon, with maximal tenderness at the site of stenosis of the tendon sheath. Abnormal hindfoot alignment should be noticed. Tenography can be used as an aid in the diagnosis of tendon entrapment and tendon sheath compression.<sup>4,9</sup> However, it does not allow direct visualization of tendons, so partial ruptures and longitudinal splits may go undetected.<sup>4</sup> Magnetic resonance imaging and high-resolution ultrasonography can be used for tendon visualization.<sup>3,4</sup> Sometimes, stenosis of the tendon sheath can only be detected during tenoscopy.<sup>3,10</sup>

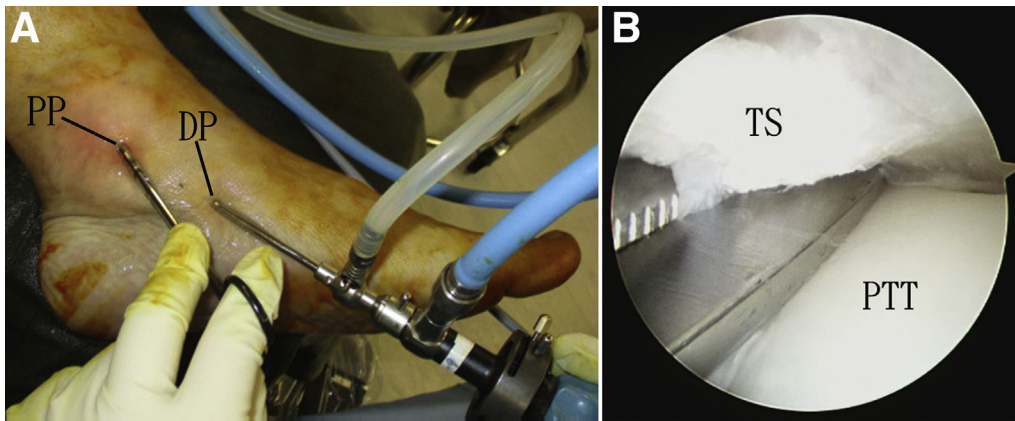
The patient is placed in the supine position with the legs spread. A thigh tourniquet is applied to provide a bloodless surgical field. Fluid inflow is by gravity, and no arthro-pump is used. A 2.7-mm 30° arthroscope (Henke Sass Wolf GmbH, Tuttlingen, Germany) is used for this procedure.

### Portal Placement

Two portals along the posterior tibial tendon sheath are used for this procedure. The distal portal is just proximal to the navicular tubercle. The proximal portal is just distal to the stenotic part of the posterior tibial tendon sheath. It is identified endoscopically with the distal portal as the viewing portal (Fig 1). A 3-mm



**Fig 2.** Endoscopic release of the posterior tibial tendon sheath for stenosing tenosynovitis of the posterior tibial tendon of left ankle. The patient is in supine position with the legs spread. (A) Posterior tibial tenoscopy is performed with the distal portal as the viewing portal and the proximal portal as the working portal. (B) Endoscopic synovectomy is performed. (DP, distal portal; IS, inflamed synovium; PP, proximal portal; PTT, posterior tibial tendon.)



**Fig 3.** Endoscopic release of the posterior tibial tendon sheath for stenosing tenosynovitis of the posterior tibial tendon of left ankle. The patient is in supine position with the legs spread. (A) The distal portal is the viewing portal, and the proximal portal is the working portal. (B) The stenotic part of the tendon sheath is released with Supercut scissors (Stille). (DP, distal portal; PP, proximal portal; PTT, posterior tibial tendon; TS, tendon sheath.)

longitudinal skin incision is made at each of the 2 portal sites. The subcutaneous tissue is bluntly dissected down to the tendon sheath, and the sheath is incised open.

#### Endoscopic Synovectomy of Distal Part of the Posterior Tibial Tendon Sheath

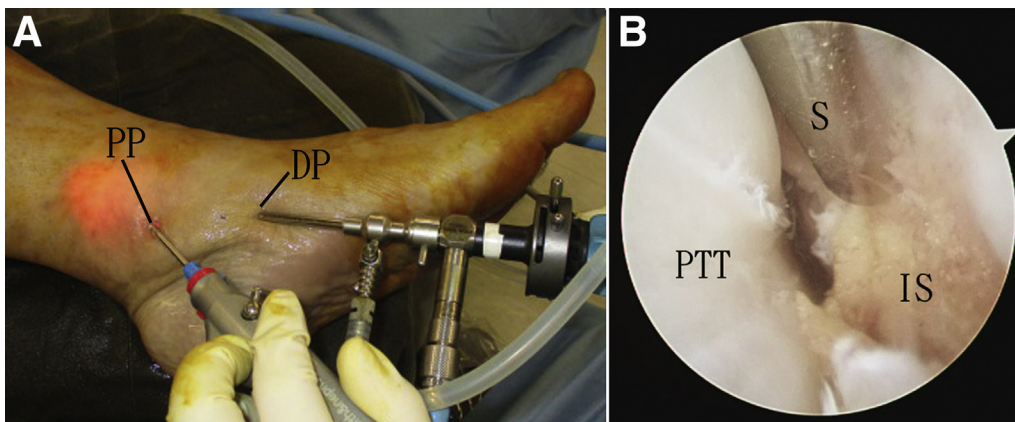
The distal portal is the viewing portal, and the proximal portal is the working portal. Endoscopic synovectomy is performed with an arthroscopic shaver (Dyonics; Smith and Nephew, Andover, MA) (Fig 2) along the whole circumference and length of the tendon sheath. The proximal and distal portals can be interchanged as the viewing and working portals to ensure complete synovectomy of the tendon sheath distal to the stenosis.

#### Endoscopic Release of the Posterior Tibial Tendon Sheath

The distal portal is the viewing portal, and the proximal portal is the working portal. The stenotic part of tendon sheath is released with a Supercut scissors (Stille, Lombard, IL). This is performed under strict endoscopic visualization to reduce the risk of tendon injury. The extent of release is titrated according to the extent of stenosis (Fig 3).

#### Endoscopic Synovectomy of the Proximal Part of the Posterior Tibial Tendon Sheath

The distal portal is the viewing portal, and the proximal portal is the working portal. The tendon and tendon sheath proximal to the stenotic sheath are



**Fig 4.** Endoscopic release of the posterior tibial tendon sheath for stenosing tenosynovitis of the posterior tibial tendon of the left ankle. The patient is in the supine position with the legs spread. (A) The distal portal is the viewing portal, and the proximal portal is the working portal. (B) Endoscopic synovectomy of the proximal portion of the posterior tibial tendon sheath is performed with an arthroscopic shaver. (DP, distal portal; IS, inflamed synovium; PP, proximal portal; PTT, posterior tibial tendon; S, arthroscopic shaver.)

**Table 2.** Pearls and Pitfalls of Endoscopic Release of Posterior Tibial Tendon Sheath for Stenosing Tenosynovitis of Posterior Tibial Tendon

Pearls	Pitfalls
1. The proximal portal is identified endoscopically.	1. Stenosis caused by bony impingement should not be managed by endoscopic tendon sheath release alone.
2. Endoscopic tendon sheath release should be performed under strict endoscopic visualization.	2. Complete synovectomy is needed for symptom relief.
3. The extent of release is titrated according to the extent of stenosis.	3. Hindfoot malalignment should be treated accordingly.

examined. Endoscopic synovectomy of the proximal portion of posterior tibial tendon sheath is performed with the arthroscopic shaver (Fig 4, Video 1, Table 2).

### Discussion

Wertheimer et al.<sup>4</sup> describe the technique of endoscopic release of the posterior tibial tendon sheath via a slotted cannula in which the whole length of the tendon sheath is released regardless of the extent of the stenosis. Limitations to this approach include significant fibrosis and pathologic constriction of the tendon sheath, which would impede entrance of the endoscopic cannula into the sheath.<sup>4</sup> Accessibility to a tendon, at its course about the ankle, may be too difficult because of the various contours of the ankle.<sup>4</sup>

Compared with the technique of Wertheimer et al.,<sup>4</sup> our endoscopic technique has smaller incisions and does not require use of a special instrument. It is feasible even for a patient with a severely stenosed

**Table 3.** Advantages and Risks of Endoscopic Release of Posterior Tibial Tendon Sheath for Stenosing Tenosynovitis of Posterior Tibial Tendon

Advantages	Risks
1. Better cosmesis can be achieved.	1. Injury to the posterior tibial tendon
2. Less soft tissue dissection is needed.	2. Incomplete release of the tendon sheath
3. Less postoperative pain is experienced.	
4. Extent of release can be titrated according to the extent of stenosis.	
5. Condition of the posterior tibial tendon can be examined endoscopically.	

tendon sheath, and the extent of release can be titrated according to the extent of stenosis. This will reduce the risk of too extensive release and destabilization of the posterior tibial tendon, which requires reconstruction of a new sheath from regional deep fascia.<sup>2,4</sup>

The advantages of this endoscopic technique include better cosmesis, less soft tissue dissection, and less postoperative pain. The extent of release can be titrated according to the extent of stenosis. The condition of the whole posterior tibial tendon can be thoroughly assessed after release. The potential risks of this procedure include injury to the posterior tibial tendon and incomplete release of the tendon sheath (Table 3).

This is not a technically demanding procedure and can be attempted by arthroscopists with average foot and ankle experience.

### References

- Kulowski J. Tenovaginitis (tenosynovitis). *J Missouri Med Assoc* 1936;35:135-137.
- Trevino S, Gould N, Korson R. Surgical treatment of stenosing tenosynovitis at the ankle. *Foot Ankle* 1981;2:37-45.
- van Sterkenburg MN, Haverkamp D, van Dijk CN, Kerkhoffs GM. A posterior tibial tendon skipping rope. *Knee Surg Sports Traumatol Arthrosc* 2010;18:1664-1666.
- Wertheimer SJ, Weber CA, Loder BG, Calderone DR, Frascone ST. The role of endoscopy in treatment of stenosing posterior tibial tenosynovitis. *J Foot Ankle Surg* 1995;34:15-22.
- Teasdall RD, Johnson KA. Surgical treatment of stage I posterior tibial tendon dysfunction. *Foot Ankle Int* 1994;15:646-648.
- Chow HT, Chan KB, Lui TH. Tendonoscopic debridement for stage I posterior tibial tendon dysfunction. *Knee Surg Sports Traumatol Arthrosc* 2005;13:695-698.
- Wake J, Martin K. Posterior tibial tendon endoscopic debridement for stage I and II posterior tibial tendon dysfunction. *Arthrosc Tech* 2017;6:e2019-e2022.
- Nishimura A, Nakazora S, Fukuda A, Kato K, Sudo A. Ultrasound guidance in performing a tendonoscopic surgery to treat posterior tibial tendinitis: A useful tool? *Case Rep Orthop* 2016;2016:7262413.
- Gilula LA, Oloff L, Caputi R, Destouet JM, Jacobs A, Solomon MA. Ankle tenography: a Key to unexplained symptomatology. Part II: Diagnosis of chronic tendon disabilities. *Radiology* 1984;151:581-587.
- Gianakos AL, Ross KA, Hannon CP, Duke GL, Prado MP, Kennedy JG. Functional outcomes of tibialis posterior tendonoscopy with comparison to magnetic resonance imaging. *Foot Ankle Int* 2015;36:812-819.