

# Anterior and Posterior Subtalar Arthroscopy Via Anterolateral and Dorsolateral Portals



Tun Hing Lui, M.B.B.S., F.R.C.S.Ed., F.H.K.A.M.(Ortho), F.H.K.C.O.S., and Wing Chung Brian Luk, M.B.B.S.(H.K.)

**Abstract:** Sinus tarsi syndrome is the clinical syndrome of lateral heel pain with local tenderness at the sinus tarsi and is frequently associated with a history of inversion sprain to the ankle. The lateral heel pain can be due to the capsule-ligamentous structures lateral to the axis of the anterior and posterior subtalar joints. Anterior and posterior subtalar arthroscopies are needed to detect and treat the disorders of both joints. In this Technical Note, we describe the details of a 2-portal arthroscopic approach to both anterior and posterior subtalar joints. This allows complete examination of all the possible sources of lateral heel pain in sinus tarsi syndrome.

Sinus tarsi syndrome is the clinical syndrome of lateral heel pain with local tenderness at the sinus tarsi. It is frequently associated with a history of inversion ankle sprain.<sup>1</sup> The axis of the subtalar joint passes through centers of the talar head and the posterior calcaneal facet. During inversion sprain, the capsuloligamentous structures lateral to the axis can be injured. Compressive injury medial to the axis also rarely occurs and results in osteochondral lesion and synovitis.<sup>1</sup> The “zone of injury” centers on the sinus tarsi and can extend posteriorly to the lateral recess of the posterior subtalar joint, laterally to the lateral calcaneal wall, anteriorly to the lateral half of the anterior subtalar joint, and medially to the tarsal canal and medial subtalar recess.<sup>1</sup> Surgical debridement of the pathologic tissues is indicated when conservative treatment fails to control the symptoms.<sup>2</sup> Posterior subtalar arthroscopy is frequently the surgical approach

of choice.<sup>3,4</sup> This can be performed with the lateral or posterior approach.<sup>5</sup> The posterior subtalar arthroscopy can approach the sinus tarsi, lateral calcaneal wall, and lateral recess of the posterior subtalar joint but not the anterior subtalar joint.<sup>1</sup> To access all possible sources of the lateral heel pain in sinus tarsi syndrome, anterior subtalar arthroscopy<sup>1,6-9</sup> should be performed together with posterior subtalar arthroscopy. This requires a dorsolateral portal in addition to the anterolateral and middle portals of the posterior subtalar arthroscopy.

The purpose of this Technical Note is to describe the details of a 2-portal arthroscopic approach to both anterior and posterior subtalar joints. This was performed with the dorsolateral and anterolateral portals without the need of the middle or posterolateral portals. It is indicated for sinus tarsi syndrome refractory to conservative treatment, especially with the presence of pain and tenderness at the anterior subtalar joint. It is contraindicated if the lateral heel pain is due to lateral ankle (e.g. osteochondral lesions) or extra-articular

From the Department of Orthopaedics and Traumatology, North District Hospital (T.H.L.); and the Department of Orthopaedics and Traumatology, Tuen Mun Hospital (W.C.B.L.), Hong Kong, China.

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 February 9, 2020; accepted February 26, 2020.

Address correspondence to Tun Hing Lui, M.B.B.S., F.R.C.S.Ed., F.H.K.A.M.(Ortho), 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: [luithderek@yahoo.co.uk](mailto:luithderek@yahoo.co.uk)

© 2020 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/>).

2212-6287/20195

<https://doi.org/10.1016/j.eats.2020.02.019>

**Table 1.** Indications and Contraindications of anterior and Posterior Subtalar Arthroscopy via Anterolateral and Dorsolateral Portals

#### Indications

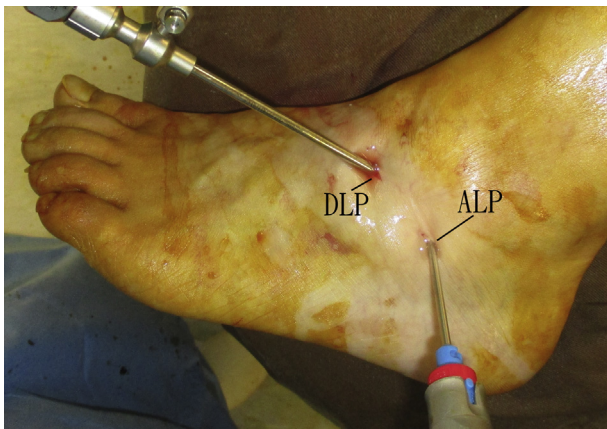
It is indicated for sinus tarsi syndrome refractory to conservative treatment especially with the presence of pain and tenderness at the anterior subtalar joint.

#### Contraindications

It is contraindicated if the lateral heel pain is due to lateral ankle (e.g. osteochondral lesions) or extra-articular (e.g. sural neuritis) pathology

Advanced subtalar osteoarthritis

Significant hindfoot valgus deformity



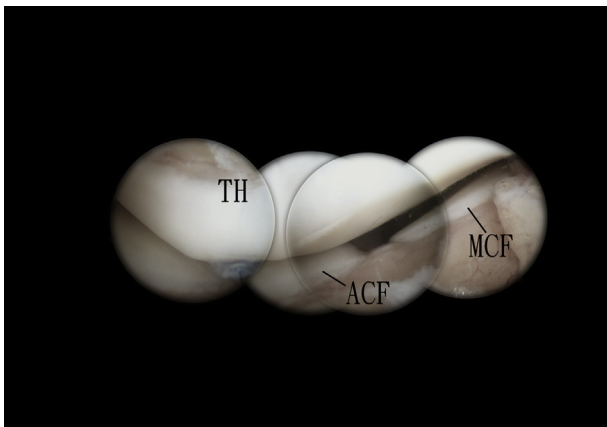
**Fig 1.** Anterior and posterior subtalar arthroscopy of the left foot via anterolateral and dorsolateral portals. The patient is in lateral position. The procedure is performed with the anterolateral and dorsolateral portals. The anterolateral portal is just dorsal to the angle of Gissane, and the dorsolateral portal is at the junction between the talonavicular and calcaneocuboid joints. (ALP, anterolateral portal; DLP, dorsolateral portal.)

(e.g. sural neuritis) pathology. Advanced subtalar osteoarthrosis and significant hindfoot valgus deformity are other contraindications (Table 1).

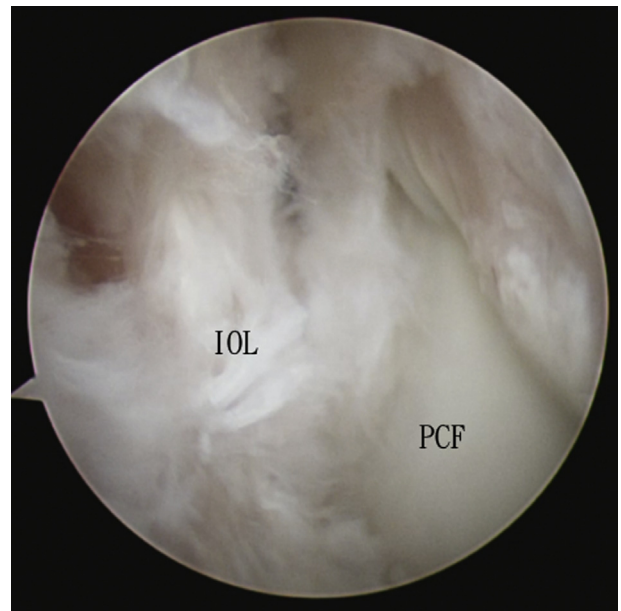
## Technique

### Preoperative Planning and Patient Positioning

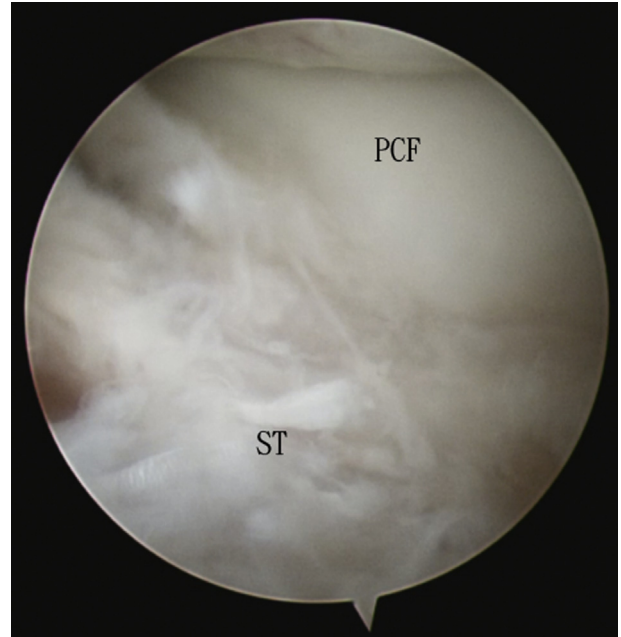
Clinical examination is the most important tool to determine the source of lateral heel pain. The tender spots should be located at the sinus tarsi and anterior subtalar joint, which is at the junction between the talonavicular joint and calcaneocuboid joint pointing



**Fig 2.** Anterior and posterior subtalar arthroscopy of the left foot via anterolateral and dorsolateral portals. The patient is in lateral position. The anterolateral portal is the viewing portal and the dorsolateral portal is the working portal. The lateral capsule is resected to expose the anterior subtalar joint. The cartilage of the anterior and middle calcaneal facets and talar head is examined for any osteochondral lesion. (ACF, anterior calcaneal facet; MCF, middle calcaneal facet; TH, talar head.)



**Fig 3.** Anterior and posterior subtalar arthroscopy of the left foot via anterolateral and dorsolateral portals. The patient is in lateral position. The anterolateral portal is the viewing portal and the dorsolateral portal is the working portal. The posterior subtalar joint and sinus tarsi are seen and the scar tissue of the partially torn interosseous talocalcaneal ligament is debrided. (IOL, interosseous ligament; PCF, posterior calcaneal facet.)



**Fig 4.** Anterior and posterior subtalar arthroscopy of the left foot via anterolateral and dorsolateral portals. The patient is in lateral position. The dorsolateral portal is the viewing portal and the anterolateral portal is the working portal. The sinus tarsi, lateral calcaneal wall, and lateral recess of the posterior subtalar joint are examined, and the scar tissue and inflamed synovium are resected. (PCF, posterior calcaneal facet; ST, sinus tarsi.)

**Table 2.** Pearls and Pitfalls of anterior and Posterior Subtalar Arthroscopy via Anterolateral and Dorsolateral Portals

<b>Pearls</b>
Portal tract from the dorsolateral portal along the plantar lateral talar head can avoid injury to the ligaments of the sinus tarsi.
The capsular reflection at the lateral calcaneal wall should be preserved during synovectomy of the lateral calcaneal wall and lateral recess of the posterior subtalar joint to avoid injury to the lateral talocalcaneal ligament and the calcaneofibular ligament.
<b>Pitfalls</b>
Associated hindfoot malalignment should be corrected
Other extra-articular or ankle pathology should be excluded
Forceful passage of instrument via the dorsolateral portal may injure the cartilage of the talar head

medially and posteriorly.<sup>1</sup> Magnetic resonance imaging is useful for detecting cervical ligament tears, sinus tarsi fat alterations, and synovial thickening, but it is inadequate for correctly detecting interosseous talocalcaneal ligament tears, which is the most common pathology detected with arthroscopy.<sup>4,10</sup> The other causes of chronic lateral heel pain, such as sural nerve neuritis, should be excluded by clinical assessment and investigations.

The procedure can be performed with the patient in a lateral or supine position, according to the needs of any planned concomitant procedures. In this illustrated case, the patient was in the lateral position. A thigh tourniquet is applied to provide a bloodless operative field. A 2.7-mm 30° arthroscope (Henke Sass Wolf GmbH, Tuttlingen, Germany) is used for this procedure. Fluid inflow is by gravity, and no arthro-pump is used.

**Portal Placement**

The procedure is performed with the anterolateral and dorsolateral portals. The anterolateral portal is just dorsal to the angle of Gissane, and the dorsolateral portal is at the junction between the talonavicular and calcaneocuboid joints (Fig 1). Skin incisions of 3 to 4 mm are made at the portal sites. Blunt dissection is performed with a hemostat, from the anterolateral portal toward the medial malleolus and from the

**Table 3.** Advantages and Risks of anterior and Posterior Subtalar Arthroscopy via Anterolateral and Dorsolateral Portals

<b>Advantages</b>
Flexibility of patient positioning
Fewer soft tissue complications such as wound dehiscence and infection
Both anterior and posterior subtalar joints can be approached via the same set of portals
<b>Risks</b>
Injury to the sural nerve
Injury to the dorsal intermediate cutaneous branch of the superficial peroneal nerve
Iatrogenic cartilage damage of the talar head.

dorsolateral portal along the plantar lateral side of the talar head.

**Anterior Subtalar Arthroscopy**

The anterolateral portal is the viewing portal, and the dorsolateral portal is the working portal. The lateral capsule is resected to expose the anterior subtalar joint. The cartilage of the anterior and middle calcaneal facets and talar head is examined for any osteochondral lesion (Fig 2). Synovectomy and resection of scar tissue is performed with an arthroscopic shaver (Dyonics; Smith and Nephew, Andover, MA).

**Posterior Subtalar Arthroscopy**

After completion of the anterior subtalar arthroscopy, the arthroscope is withdrawn until the posterior subtalar joint and sinus tarsi are seen. The scar tissue of the partially torn interosseous talocalcaneal ligament is debrided (Fig 3). After that, the arthroscope is switched to the dorsolateral portal, and the sinus tarsi, lateral calcaneal wall, and lateral recess of the posterior subtalar joint are examined, and the scar tissue and inflamed synovium are resected (Fig 4, Video 1, Table 2). After surgery, free mobilization of the foot and ankle is allowed, and the patient is instructed to begin weight-bearing walking with a wooden based sandal.

**Discussion**

This arthroscopic approach can deal with all the sources of lateral heel pain in sinus tarsi syndrome. If concomitant medial heel pain is present, which may be due to the compressive injury medial to the axis of the subtalar joint, tenderness can be elicited at the medial subtalar recess or the plantar medial talar head. Medial subtalar arthroscopy should be performed together with anterior and posterior subtalar arthroscopy with the patient in the supine position.<sup>11,12</sup>

This arthroscopic technique has the advantage of flexibility of patient positioning and fewer soft tissue complications such as wound dehiscence and infection. This approach allows access to both anterior and posterior subtalar joints via the same set of portals. The potential risks of this technique include injury to the sural nerve, dorsal intermediate cutaneous branch of the superficial peroneal nerve, and the cartilage of the talar head (Table 3).<sup>13,14</sup> This is not technically demanding and can be attempted by most foot and ankle arthroscopists.

**References**

1. Cheng SHS, Lui TH. A global view of arthroscopic management of sinus Tarsi syndrome. In: Lui TH, ed. *Arthroscopy and endoscopy of the foot and ankle: Principle and practice*. New York: Springer, 2019;223-230.

2. Subtalar arthroscopic debridement for the treatment of sinus tarsi syndrome: Case series. *Rev Assoc Med Bras* 2019;65:370-374.
3. Ahn JH, Lee SK, Kim KJ, Kim YI, Choy WS. Subtalar arthroscopic procedures for the treatment of subtalar pathologic conditions: 115 consecutive cases. *Orthopedics* 2009;32:891.
4. Lee KB, Bai LB, Song EK, Jung ST, Kong IK. Subtalar arthroscopy for sinus Tarsi syndrome: Arthroscopic findings and clinical outcomes of 33 consecutive cases. *Arthroscopy* 2008;24:1130-1134.
5. Lui TH, Tong SC. Subtalar arthroscopy: When, why and how. *World J Orthop* 2015;6:56-61.
6. Tai DHY, Lui TH. An overview of approaches to the anterior subtalar joint. In: Lui TH, ed. *Arthroscopy and endoscopy of the foot and ankle: Principle and practice*. New York: Springer, 2019;223-230.
7. Lui TH. Synovitis of the tarsal canal: An uncommon cause of lateral heel pain after triple arthrodesis. *J Foot Ankle Surg* 2017;56:255-257.
8. Lui TH, Chan KB, Chan LK. Portal safety and efficacy of anterior subtalar arthroscopy: A cadaveric study. *Knee Surg Sports Traumatol Arthrosc* 2010;18:233-237.
9. Lui TH. New technique of arthroscopic triple arthrodesis. *Arthroscopy* 2006;22. 464.e1-e5.
10. Lee KB, Bai LB, Park JG, Song EK, Lee JJ. Efficacy of MRI versus arthroscopy for evaluation of sinus tarsi syndrome. *Foot Ankle Int* 2008;29:1111-1116.
11. Lui TH. Medial subtalar arthroscopy. *Foot Ankle Int* 2012;33:1018-1023.
12. Lui TH, Chan LK, Chan KB. Medial subtalar arthroscopy: A cadaveric study of the tarsal canal portal. *Knee Surg Sports Traumatol Arthrosc* 2013;21:1279-1282.
13. Hsu AR, Gross CE, Lee S, Carreira DS. Extended indications for foot and ankle arthroscopy. *J Am Acad Orthop Surg* 2014;22:10-19.
14. Tryfonidis M, Whitfield CG, Charalambous CP, Baraza WK, Blundell C, Sharp RJ. The distance between the sural nerve and ideal portal placements in lateral subtalar arthroscopy: A cadaveric study. *Foot Ankle Int* 2008;29:842-844.