Endoscopic Plantar Fascia Debridement for Chronic Plantar Fasciitis

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KEYWORDS
- Heel pain • Plantar fasciitis • Endoscopic • Debridement

KEY POINTS
- When conservative therapy fails for chronic plantar fasciitis, surgical intervention may be an option.
- Surgical techniques that maintain the integrity of the plantar fascia will have less risk of destabilizing the foot and will retain foot function.
- Endoscopic debridement of the plantar fascia can be performed reproducibly to reduce pain and maintain function of the foot.

Plantar heel pain is one of the most common conditions seen in the clinics of foot and ankle surgeons. Approximately 10% of the general population will experience heel pain in the form of plantar fasciitis at least once in their lifetime.1–4 The most commonly cited cause of plantar fasciitis is the pull of the proximal insertion of the plantar fascia on the calcaneus.5–8 The plantar fascia serves an important role in the gait cycle, because it helps to support the arch of the foot as well as aids in resupination of the foot during propulsion.1,9,10

When conservative treatment of chronic plantar fasciitis is not successful, surgical intervention may become an option. A popular method of addressing this chronic condition is to perform a plantar fasciotomy, whereby the medial one-third to one-half of the plantar fascia is transected.11 However, different investigators have shown that a plantar fasciotomy is not performed without consequence. Daly and colleagues12 found a significant decrease in the height of the longitudinal arch as well a less efficient gait in patients who had undergone plantar fasciotomy versus a control. A cadaveric study performed by Ward and colleagues13 showed that as the plantar fascia was released sequentially from medial to lateral, the force increased on the remaining lateral fibers, and the subtalar joint lost its ability to resupinate.
In light of these findings, the authors propose an innovative technique to address chronic plantar fasciitis surgically, without disrupting the integrity of the plantar fascia. This technique was introduced to the senior author (J.M.C.) (K Bramlett, MD, personal communication, 2011).

**OPERATIVE TECHNIQUE**

The patient is first given a popliteal nerve block in the preoperative holding area and is then brought in to the operating room. The patient is then placed supine on the operating table with the operative extremity in external rotation, so that the lateral border of the foot is allowed to lay flat against the table. A bump placed under the contralateral hip can be used to assist in positioning when necessary. Following exsanguination of the extremity, a thigh tourniquet is then inflated to 300 mm Hg. Using a surgical marker, the medial malleolus is then outlined, and a straight line is drawn from the posterior aspect of the medial malleolus to the heel. The first portal is marked out along this line at or slightly above the level of the plantar fascia. The second portal is then placed 2 cm distal to the first portal at or slightly above the level of the plantar fascia (Fig. 1). The intention is to enter the space directly superior to the plantar fascia, so it is helpful to place the portals slightly superior to the plantar fascia.

Full-thickness incisions can then be made with a number 11 blade at the portal sites. A curved hemostat is used for blunt dissection and to identify the plantar fascia. A 4.0-mm camera can then be placed into the distal portal, while a 3.5-mm shaver is introduced into the proximal portal (Fig. 2). A spinal needle is then inserted from the plantar fell into the most painful area, which should be identified preoperatively. This technique allows for direct visualization and debridement of the most painful part of the plantar fascia. This technique can also be used to orient the surgeon during the procedure, because bony landmarks are scarce. Debridement of inflammatory tissue along the superior aspect of the plantar fascia can then be debrided using the arthroscopic shaver under direct visualization (Fig. 3). The calcaneal spur can then be identified and removed as necessary (Fig. 4). Removal of the spur can then be confirmed with intraoperative fluoroscopy (Fig. 5). The plantar fascia can be thinned out with a

![Fig. 1. The operative extremity is positioned in external rotation, with the lateral border of the foot against the operating room table. The medial malleolus is traced, and a line is drawn along its posterior border. The proximal portal is established slightly superior to the level of the plantar fascia. The distal portal is established at the same level, 2 cm distal to the first portal.](image-url)
shaver or with an ablator to estimate physiologic thickness (Fig. 6). An arthroscopic probe is then used to confirm that the plantar fascia is intact, and that the integrity of the structure has not been compromised (Fig. 7). Once the surgeon is satisfied, the instrumentation can be removed, and the portal sites can be closed with 3-0 nylon suture (Fig. 8).

In the senior author’s practice, patients are allowed to bear weight on the operative extremity in a removable, below-the-knee, adjustable immobilization boot postoperatively. Physical therapy is typically initiated after 3 weeks, and patients are allowed to return to their normal shoes after 4 weeks.

RESULTS

This procedure has been performed on a series of 46 patients, who were followed up for a mean of 20.51 months. Mean patient age in this group was 52.8 ± 13.67 years.

Fig. 2. The 4.0-mm camera is placed into the distal portal, whereas a 3.5-mm shaver is placed into the proximal portal. Note that an 18-gauge spinal needle has been introduced through the plantar foot in the area of maximal tenderness. This assists the surgeon in orientation during the procedure.

Fig. 3. (A) Bright red inflammatory tissue noted along the superior aspect of the plantar fascia. (B) After initial debridement of the inflammatory tissue, the plantar fascia is identified. Note the tip of the arthroscopic probe is between the inferior aspect of the calcaneus and the plantar fascia origin.
old. The mean duration of conservative treatment before the index operation was 33.07 ± 37.49 months. The visual analogue scores in this patient group improved from 8.95 ± 1.41 preoperatively to 1.34 ± 1.25 postoperatively. The complication rate was low, with 6 cases (13%) of paresthesia along the plantar foot, all of which resolved without intervention within 10 months. There were also 3 patients (6.5%) who had delayed healing of a portal site, all of which were treated successfully with local wound care and oral antibiotics.

**DISCUSSION**

Chronic plantar fasciitis that does not respond to conservative treatment can be frustrating for the patient as well as the provider. There are several surgical options for treatment, but there is still not a consensus on the ideal surgical procedure.\(^{14}\) Plantar fascia release remains a popular option, although it has been scrutinized for its potential complications. Brugh and colleagues\(^{15}\) performed a prospective study reviewing the amount of the plantar fascia released and the association with lateral column...

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**Fig. 4.** The arthroscopic shaver can be placed in the interval between the superior plantar fascia and the inferior calcaneus, and the exostosis can be removed.

**Fig. 5.** Intraoperative fluoroscopy may be used to assist in removal of the spur.
pain. Although all of the patients were reported to have decreased heel pain following the procedure, pain along the lateral column increased significantly when more than 50% of the plantar fascia was released. Lundeen and colleagues\textsuperscript{16} examined 53 patients who had undergone endoscopic plantar fasciotomy. Although they reported a satisfaction rate of 81.1%, the unsatisfied group complained of metatarsalgia 50% of the time. Patients also reported continued pain in the arch of the foot.

With this information in mind, the authors present an innovative surgical approach to plantar fasciitis, which does not compromise the integrity of the plantar fascia insertion into the calcaneus. The technique has been shown to be effective at reducing pain in a series of patients. This technique also allows for endoscopic excision of a concomitant infracalcaneal exostosis when necessary.

Fig. 6. An arthroscopic ablator can be used to thin out the plantar fascia to its physiologic thickness.

Fig. 7. An arthroscopic probe is used to confirm the attachment of the plantar fascia remains after debridement.
REFERENCES


Fig. 8. Preoperative (A) and postoperative (B) lateral radiographs of a patient who underwent endoscopic plantar fascia debridement with infracalcaneal exostosis excision.