CHAPTER **33**

COBLATION FASCIOTOMY IN THE SURGICAL TREATMENT OF CHRONIC PLANTAR FASCIITIS

Joe T. Southerland, DPM

INTRODUCTION

Surgical treatment of chronic plantar fasciitis has certainly evolved over the years. When the author was in residency 10+ years ago, the procedure of choice was open resection of the heel spur. If one believed the spur to be the source of pain, this was a valid procedure. The procedure did work, but the recovery included an extended period of non-weightbearing and had potential complications such as a subsequent calcaneal fracture.

During this residency period, the Endoscopic Plantar Fasciotomy (EPF) was born. This, of course, was sectioning of the fascia through the same endoscope that had been used successfully for carpal tunnel surgery. With this, sectioning of the fascia, patients did improve, and the postoperative period was easier. However, some lessons were learned. Early on, when the entire fascia was sectioned, many patients experienced lateral foot and heel pain. This was attributed to the destabilization that followed full sectioning of the fascia.

With this complication, the procedure evolved to sectioning only the central band, which is the thickened, usually palpable band on the medial aspect of the plantar surface. This modification did decrease the incidence of lateral column pain, but did not eradicate it.

One of the problems associated with the EPF was the special training needed to get the instruments and perform the procedure. Because of this, the Instep Plantar Fasciotomy (IPF) was either reborn or gained prominence. The IPF is performed through a plantar incision over the central band. The central band is then sectioned under direct visualization. This is essentially the same procedure as the EPF, but through one plantar incision instead of a medial and lateral incision. Since beginning practice ten years ago, the author has performed both EPFs and IPFs and the IPF has become his procedure of choice. As mentioned before, the modified EPF and IPF did lead to occasional lateral column pain and this is what spurred the author to try a different approach. This approach consists of using the same incision as in an IPF, but using coblation on the plantar fascia versus simply sectioning it.

The thought behind this is that plantar heel pain caused by what has commonly been called plantar fasciitis may not necessarily be an inflammatory condition. In a recent article Lamont et al use the term plantar fasciosis. This term was used because of the presence of histological indicators of degeneration, and not inflammation.[1]

COBLATION

Coblation therapy, utilizing the Topaz Unit by Arthrocare, is similar to Extracorpeal Shock Wave Therapy (ESWT). Coblation and ESWT both cause tissue damage to create a healing response. The ESWT has one advantage in the fact that a skin incision is not needed and certain surgical complications are avoided. However, ESWT is not 100% effective and is not universally approved by insurance carriers, so its utilization is limited.

ESWT uses high intensity shock waves to create tissue damage and stimulate neoangiogenesis. Coblation, or cold ablation, uses bipolar radiofrequency to energize particles and cause controlled molecular disintegration, which can induce a healing response in the affected tissue. This technology has it roots in cardiac and wound healing literature, which has demonstrated controlled angiogenic healing with reduce pain and increased function.[2]

More specifically, coblation works by using a controlled radiofrequency plasma-based process which differs from electrocautery and other thermal methods fundamentally.[3,4] This plasma mediated process involves initiation by introducing a high voltage, between 100 and 300 V, across the active and return electrodes of the device. When this is combined with a conductive fluid, such as normal saline, it creates an ionized vapor layer, or plasma, approximately 75 micrometers thick. Charged

particles in the plasma are accelerated by the intense electrical field that is within the plasma layer and carry enough energy to promote molecular disassociation in tissue. Coblation technology creates a precise ablation pathway produced at a relatively low temperature, minimizing the penetration into surrounding tissue. This working temperature at the interface is between 40 and 70 degrees Celsius.[2] In these pathways, angiogenesis occurs.

PROCEDURE

The focus of pain is identified prior to patient anesthesia. With hemostasis provided by a pneumatic ankle tourniquet, the procedure is then performed through the same incision as an IPF. A 1-2 cm transverse incision is made over the central band of the plantar fascia just distal to the weight bearing surface of the heel (Figure 1). If the incision is too proximal, the scar can be a potential problem. If the incision is too distal, the scar can also be problematic, because of the lack of fat pad underneath. The area just distal to the heel pad is still protected by the distal portion of the heel fat pad. This makes dissection a little more difficult, but it allows the surgeon to reach proximally to the focus of pain.

Once the incision is made, superficial vessels are cauterized and sharp and blunt dissection is used to reach the plantar fascia. A self retaining retractor can be introduced to spread the fat pad proximally and distally. Senn retractors from the medial and lateral side make visualization of the fascia easier at this point (Figure 2).

With the central band of the fascia exposed, the Topaz Microdebrider tip is used to create a grid in the fascial tissue (Figure 3). This is done with the unit attached to a bag of sterile saline or Ringer's lactate flowing at 2-3 drips per second. The device allows for 0.5 second intervals and with light pressure will allow about 3-5 mm of penetration into the tissue. The grid created includes 12-15 penetrations spaced about 3-5 mm apart (Figures 4, 5).

The wound is irrigated and closed with a non-absorbable skin suture (Figure 6). A soft dressing is applied and the patient is placed in a fracture walker boot for a three-week period. Sutures are removed at that time and the patient returns to their regular shoe and orthotics as tolerated.

This postoperative period differs from what is seen in the company's brochure. The reason the author has chosen this postoperative treatment was because he did not want to do anything different from his IPFs other than the sectioning of the fascia. To date, four coblation fasciotomies have been performed and all four patients have improved. The main difference noted is that the coblation patients do not experience the immediate relief of their heel pain as seen with an IPF. However, there have not been any complaints of lateral column pain in this small sample.

OTHER INDICATIONS

Lower extremity use of coblation is not limited to just the plantar fascia. In fact, one of the original studies included Achilles tendinosis. These Achilles tendinosis patients showed an 88% improvement six months postoperatively based on AOFS hind foot evaluation scores.[5]

Based on this, information, the author has used this on two cases of posterior tibial dysfunction (Figures 6-10). In this example, the linear tear can be seen proximally and the zone of hypertrophic and atrophic degeneration can be seen at the distal end of the incision. The Topaz Microdebrider was used in this instance to create neoangiogenesis at this zone. The linear tear was concomitantly repaired with a non-absorbable braided suture. This patient was treated postoperatively with a month of non-weight bearing followed by protected weight bearing in a fracture walker boot and has subsequently done well.

The Topaz Microdebrider does offer another alternative in the surgical treatment of chronic plantar fasciitis. Like ESWT, it preserves normal architecture of the foot structure which should prove to eliminate lateral column pain seen with other forms of fasciotomy.

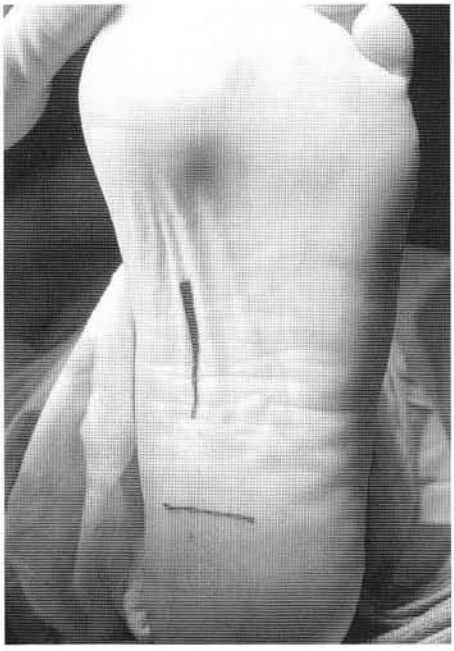

Figure 1. The incision placement for the plantar approach. The distal line is along the medial edge of the central band of the plantar fascia.

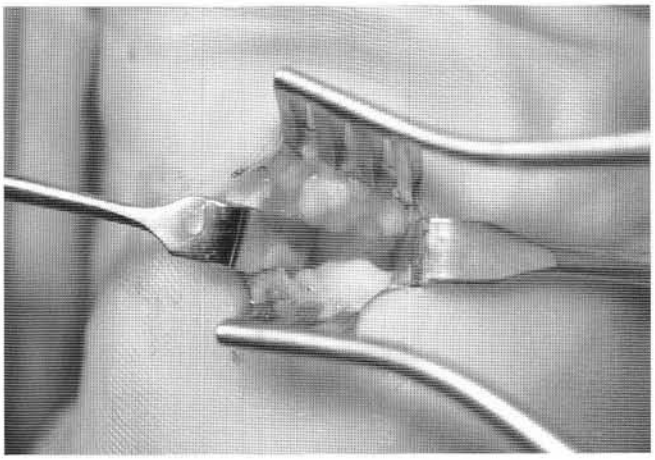

Figure 2. The exposure to the plantar fascia through this transverse incision.

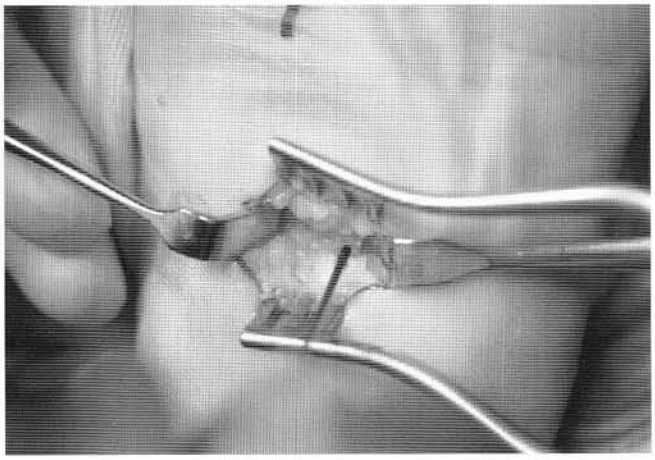

Figure 3. The Topaz Microdebrider being used in the plantar fascia.

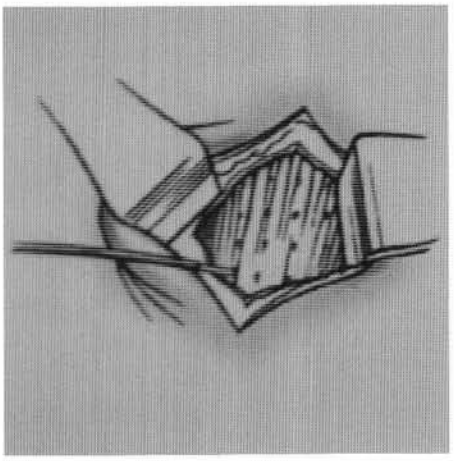

Figure 4. This schematic drawing depicts the grid pattern of ablation recommended by the manufacturer.

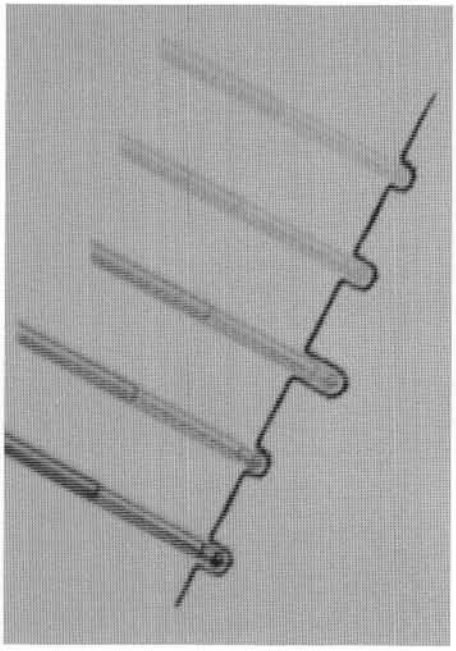

Figure 5. The various depths of penetration recommended by the manufacturer.

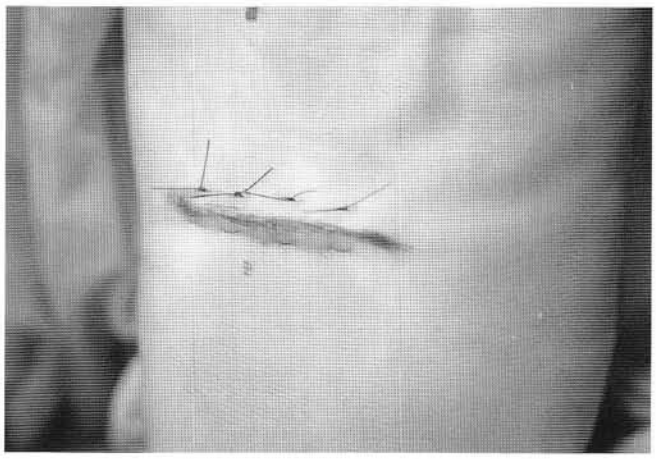

Figure 6. The incision after closure with a non-absorbable interrupted suture.

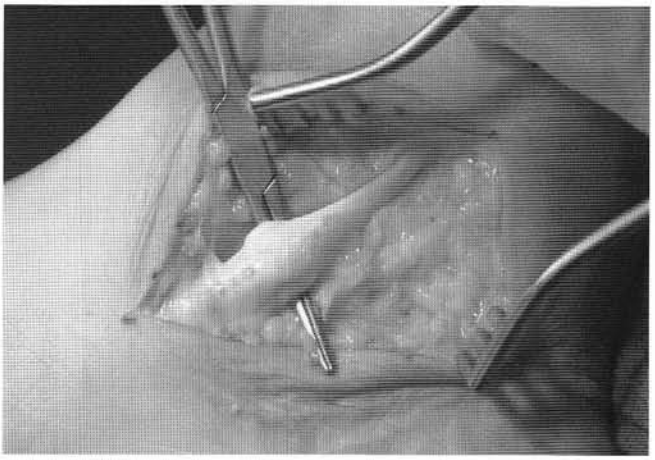

Figure 7. The posterior tibialis tendon. Note the area of hypertrophy and degenerative changes distally.

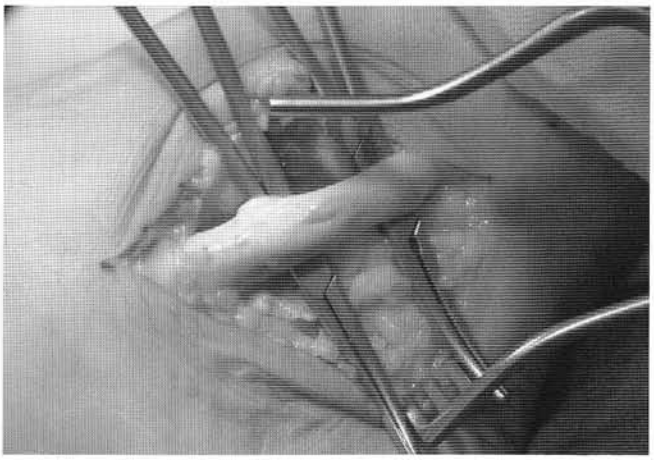

Figure 8. The same tendon. The linear tear located more proximal is visible here.

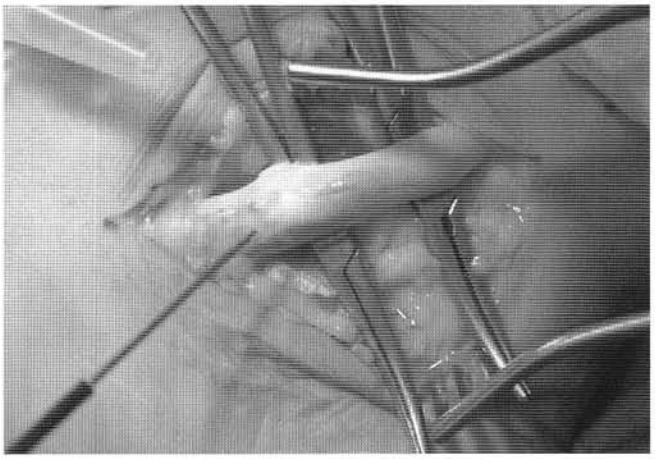

Figure 9. The Topaz Microdebrider is being used to create a grid in the degenerative area of the same tendon.

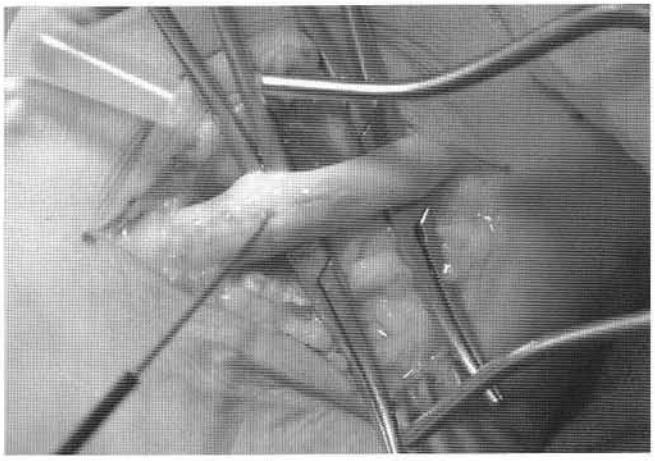

Figure 10. The Topaz Microdebrider is shown penetrating the tissue in this photo.

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