

# Endoscopic Plantar Fasciotomy

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Endoscopic Plantar Fasciotomy for the treatment of chronic plantar fasciitis/heel spur syndrome is a relatively new procedure developed by Barrett and Day<sup>1</sup>. The procedure involves an endoscopic approach to the heel, allowing a plantar fasciotomy to be performed with delicate instruments, minimal dissection, and immediate weight bearing.

Reviewing surgical procedures for heel spur/plantar fasciitis, the most common form of treatment included complete release of the plantar fascia at its calcaneal insertion and removal of the plantar spur from the calcaneal tuber<sup>2-6</sup>. However, treatment protocols ranged from countersinking osteotomies<sup>7</sup> to calcaneal rotational osteotomies<sup>8</sup>.

Traditional open heel spur procedures, whether from a medial, plantar, or lateral approach all relate significant complications including infection, calcaneal fracture, and nerve entrapment. These procedures often resulted in greater disability to the patient than they initially presented with, therefore many surgeons refrain from early surgical intervention.

Bergmann<sup>9</sup> reported that 15% of all patient visits to a podiatric physician involve heel pain, while Kenzora estimated that 90% or more of all patients receiving conservative care obtained complete pain relief, in contrast with 70-80% of the patients as reported by Barrett and Day<sup>1</sup>. Fortunately, the majority of patients with heel or plantar fascia pain can be successfully treated with conservative means, including steroid injections, orthotic devices, anti-inflammatory medications, and physical therapy.

However, for the 10-15% of patients who do not obtain relief from conservative care, traditional surgical treatment offers less than ideal results, with potential complications outweighing surgical gains. In most instances, the traditional postoperative course includes non-weight bearing for a period of 3 to 8 weeks, followed by partial weight bearing for up to 2 weeks<sup>11</sup>.

Furthermore, in today's society where workman's compensation, medicare, and other government agencies dictate treatment protocols and rehabilitation restraints, keeping patients out of work for several weeks on end for elective surgical procedures is becoming an obsolete practice. Therefore, Endoscopic Plantar Fasciotomy offers the patient a means of obtaining complete relief from plantar fasciitis, with early return to work and a short postoperative rehabilitation.

It is essential that conservative care be exhausted before surgical intervention can be considered. Zirm and Jimenez<sup>12</sup> suggested conservative therapy for six months to one year before resorting to surgical intervention. Conservative care includes padding, taping, heel cups, casting, special shoes, orthotics, stretching exercises, injections of local anesthetics and hydrocortisone, anti-inflammatory drugs, and physical therapy.

Only after conservative care has failed should surgical intervention be considered. If the location of the pain is truly the plantar fascia, with or without radiographic evidence of an inferior spur, Endoscopic Plantar Fasciotomy should be considered. Proper training of the surgeon regarding instrumentation and surgical technique must be undertaken prior to performing the surgery. It is the author's opinion that course work and cadaveric procedures are not sufficient to master the technique. Endoscopic Plantar Fasciotomy is a very technically precise procedure, therefore it is suggested that one first assist a surgeon who has mastered this technique. This will help the training surgeon avoid the possible pitfalls of the procedure, which could very easily compromise the postoperative results. Prior clinical experience with the use of an arthroscope would be a clear advantage in learning this technique.

## INSTRUMENTATION

The instruments used to perform an Endoscopic Plantar Fasciotomy are manufactured by the Instratek Corporation<sup>13</sup>. These instruments are now available without taking an instructional course. The set of instruments consists of two locking knife handles, fascial probe, trocar, slotted cannula and a fascial elevator. The instruments are housed in a durable case which is used for transport and protection. The blades used with the knife handles must be purchased separately. Two blades are packaged together, one being a curved blade, the other being a triangle blade.

Direct visualization is afforded with the use of a standard arthroscopy system equipped with a monitor. A 30 degree lens should be used, with a scope diameter range from a 1.5 mm to a 4.5 mm. The inner core of the slotted cannula will only allow a 4.5 mm or smaller diameter scope to be used. It is the author's experience that a scope diameter of 2.5 to 3.5 mm achieves the best results. A scope diameter greater than 3.5 mm will not allow proper angulation within the cannula, which is required to maneuver around possible fat obstacles. A scope smaller than 2.5 mm may not allow proper visualization of the plantar fascia.

## PREOPERATIVE CONSIDERATIONS

When first performing the procedure, radiographic measurements should be obtained. Using a non-weight bearing lateral view, two measurements are recorded to ensure proper skin incision placement. A reference point is created by measuring from the posterior aspect of the skin of the heel to approximately 2-4 mm anterior to the spur, or anterior to the calcaneal tuber (average distance 44 to 54 mm). A second measurement is taken from the inferior aspect of the heel to the same reference point just anterior to the spur or calcaneal tuber (average distance 18 to 25 mm). The intersection of these two points is the location of the medial incision.

The procedure is usually performed under IV sedation with a sterile ankle tourniquet. Prior to beginning the procedure, the foot is prepped and draped in the usual sterile fashion. The tourniquet is then applied, the foot is exsanguinated with an esmarch or ace wrap and the tourniquet is inflated from 250-300 mm Hg.

## SURGICAL PROCEDURE

A local anesthetic can be injected prior to the foot scrub or after the prep and draping. It is the author's preference to use 1% Xylocaine with epinephrine mixed with 1% Xylocaine plain in a 50/50 mixture. A total of 9 cc can be used with 3 cc being infiltrated at the medial aspect of the heel, 3 cc being used at the lateral aspect of the heel and 1-3 cc can be placed at the inferior aspect of the heel. It is not necessary to perform a posterior tibial or sural nerve block, as local infiltration alone will be sufficient. One must be careful not to place more than 1-2 cc of anesthetic inferior to the plantar fascia, as this may distort positioning of the instrumentation.

Using the aforementioned measurements, a 0.5 cm vertical incision is placed at the skin mark. Using either a cured hemostat or small dissecting scissors, blunt dissection is carried down to the level of the medial expansion of the planter fascia. With the use of the fascial elevator, palpation of the fascia is performed. The angle of approach is very important, as one does not want to penetrate into the fascia. The inferior aspect of the fascia should be palpated and exposed. This will be a very distinct structure and should always be palpated. If the elevator penetrates the fascia, the canula will be placed superior to the plantar fascial ligament. However, if the canula is placed inferior to the plantar fascia, visualization of the inferior aspect of the plantar fascia will be obstructed by the fat pad of the heel. Therefore, proper positioning of the fascial elevator is critical. After correct positioning is achieved, the elevator is then used to channel a small area inferior to the plantar fascia, toward the lateral aspect of the foot. After a channel is created, the elevator is pulled anterior to posterior to ensure that the fat pad is separated from the plantar fascia. The elevator is then removed from the foot.

The trocar is then placed into the cannula and the trocar/cannula system is then inserted into the medial portal. The same motion is used to enter the portal as was used with the elevator, being certain not to penetrate the plantar fascia. The trocar/cannula is then passed inferior to the plantar fascia and palpated laterally. At the point where the trocar point is palpated laterally, a second vertical incision is made. This second incision is usually lower than the medial incision. This will aid in not cutting though the entire plantar fascial ligament. The trochar/cannula system

is then passed through the skin. In certain instances, the patient may feel some pressure at this point of the procedure. Once the cannula is left in place and the trocar is removed, the patient should not experience any further discomfort. At this time, sterile cotton swabs can be passed from lateral to medial to clear any interposed portions of fat that may obstruct the view of the endoscope.

The endoscope is then placed in the medial portal, while the fascial probe is inserted into the lateral portal. At this time it is very important to visualize the inferior aspect of the plantar fascia. The surgeon must visualize a distinct white structure in comparison to the yellowish content of fat. If the surgeon does not visualize the plantar fascia, repositioning must be performed. Once this is accomplished, the fascial probe is used to palpate the medial border of the central band of the plantar fascia, as well as the lateral border of the lateral band.

The probe is removed after relocating the medial border of the central band, and while maintaining position with the scope, the hook blade is engaged on the medial border of the central band and slowly pulled laterally. It is very important to have full control of the hook blade, to prevent cutting of the entire portion of the lateral band of the plantar fascia. The entire central portion of the plantar fascia is cut and only 1/2 to 2/3 of the lateral band is cut. If the entire lateral band is cut, the possibility of a calcaneocuboid syndrome may result. One should visualize the separation of the plantar fascia, as well as the muscle belly superior to the plantar fascia, without penetrating into the muscle belly.

The probe is then reinserted to identify the remaining portion of the lateral plantar fascia. At this time, the cannula is rotated 180 degrees to visualize the plantar fat pad, and to insure that one has not separated the plantar fascia medially while inserting the cannula. If a portion of the central band is remaining, as evidenced by direct visualization and palpation with the fascial probe, then this is cut. The endoscope is then removed, and the cannula is irrigated with sterile saline. The two stab incisions are then closed with 4-0 proline in a simple interrupted fashion. The surgical site is infiltrated with 3 cc of .25% Marcaine with epinephrine and 1 cc of dexamethasone. The tourniquet is released and the wounds are then dressed with sterile gauze and an ace wrap.

The patients are advised to be fully weight bearing immediately after surgery, and are dispensed a surgical shoe. The patient is seen in the office two days later for a dressing change. Band-aids are placed over the wounds, and the patient is instructed to return to shoes of their choice.

Postoperative complications have been minimal in the author's experience. It is very common for the patients to have medial arch pain for a period of 2-4 weeks after the surgery, however this will resolve with increased activities. Strappings and or arch supports can be used postoperatively to reduce this discomfort. The author has not experienced any postoperative wound complications, including nerve entrapment. To date, 40 procedures have been performed, with one resulting in failure. This was due to poor visualization of the plantar fascia, and subsequently, an improper release of the plantar fascia. The remaining 39 patients have had total relief of symptoms.

In the author's experience, Endoscopic Plantar Fasciotomy provides the patient with decreased postoperative morbidity and excellent relief of pain. The Endoscope allows for excellent visualization of the plantar fascia release, with minimal trauma to surrounding tissues, therefore reducing postoperative pain.

## REFERENCES

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