ISSN: 3033-358X

Research Article

Journal of Orthopedics and Physiotherapy

Minimally Invasive (Endoscopic) Plantar Fascia Release- Does it Improve the Outcomes? Two Years Follow Up

Gil Genuth[1*], Nadav Moses[2], Konstantin Hramov[3] and Lukas D Iselin[4]

[1]*Assuta Medical Centre, Tel Aviv, Israel. 90 Rothchild Blvd. Tel Aviv, Israel*

[2]*Wolfson Medical Centre, Holon, Israel. 65 Halohamin st Holon Israel*

[3]*Assuta Medical Centre, Ashdod, Israel. Menachem Begin Blvd 126, Ashdod, Israel*

[4]*Orthopadische Klinik Luzern AG. St Anna Strasse 28, 6006 Luzern, Switzerland.*

[*]**Corresponding author**
Gil Genuth, Assuta Medical Centre, Tel Aviv, Israel. 90 Rothchild Blvd. Tel Aviv, Israel.

Received: May 27, 2025; **Accepted:** June 04, 2025; **Published:** June 12, 2025

ABSTRACT

Plantar fasciitis (PF), affecting 10% of individuals during their lifetime, is a leading cause of heel pain. While conservative management remains the primary treatment, endoscopic plantar fasciotomy (EPF) has emerged as a minimally invasive surgical option for refractory cases. This study evaluates outcomes of EPF in 80 patients, performed by a single surgeon, with a two-year follow-up.

Eighty patients (25 males, 55 females; mean age: 54.8 years, BMI: 28.75) with chronic PF unresponsive to six months of conservative therapy underwent two-portal EPF from January 2021 to December 2022. Data collected included Visual Analogue Scale (VAS) scores, American Orthopaedic Foot & Ankle Society (AOFAS) hindfoot scores, patient satisfaction, time to return to sports, and complications at 12 and 24 months postoperatively.

AOFAS scores improved from 34.3 preoperatively to 86.9 at one year and 90.2 at two years ($p < 0.05$). VAS scores decreased from 7.9 preoperatively to 3.3 at one year and 1.7 at two years ($p < 0.05$). Most patients (87.5%) resumed sports within nine months. Satisfaction was high (89%), though 8% reported persistent pain, and 6% experienced minor wound infections resolved with topical treatment.

EPF is a safe and effective option for chronic PF, yielding substantial pain and functional improvements. Persistent heel pain affected 8% of patients, highlighting the need for individualized treatment strategies.

Keywords: Plantar Fascia Release, Endoscopic Plantar Fascia Release, Two Portal Technique, Plantar Fasciitis, Heel Pain

Introduction

Plantar fasciitis (PF) is one of the most common causes of plantar heel pain, affecting up to 10% of the U.S. population [1]. It is estimated that approximately 2 million individuals seek medical attention for PF annually, representing 11% to 15% of professional visits related to foot pain [2-4]. PF is typically a self-limiting condition, with conservative treatments proving successful in 90% to 95% of cases [5,6]. However, in 5% to 10% of patients, symptoms persist beyond 6 to 12 months, making surgical intervention a potential consideration [7]. Treatment strategies for PF vary due to the lack of consensus on the most effective surgical approach. Common conservative treatments include the use of orthotic insoles, nonsteroidal anti-inflammatory drugs (NSAIDs), weight management, stretching exercises, and physical therapy [8]. For cases with refractory symptoms, more invasive treatments such as corticosteroid injections (CSIs), extracorporeal shock wave therapy (ESWT), platelet-rich plasma (PRP) injections, or surgical release of the plantar fascia may be explored.

Endoscopic plantar fasciotomy (EPF) is a minimally invasive procedure designed to release the plantar fascia with reduced surgical trauma compared to traditional open techniques.

Citation: Gil Genuth, Nadav Moses, Konstantin Hramov, Lukas D Iselin. Minimally Invasive (Endoscopic) Plantar Fascia Release- Does it Improve the Outcomes? Two Years Follow Up. J Ortho Physio. 2025. 3(2): 1-5. DOI: doi.org/10.61440/JOP.2025.v3.24

The indications for EPF are the same as for the open plantar fasciotomy technique, but EPF offers the advantage of a minimally invasive approach. First described by Barrett and Day in 1991 EPF significantly reduces surgical time and trauma typically associated with plantar fascia release, allowing patients to return to daily and sports activities more quickly and with less pain compared to conventional methods [8].

A current concept review by Malahias et al. [9] found weak evidence supporting the safety and efficacy of EPF for treating chronic PF, with an overall postoperative complication rate of 11%. The most common complications which were recorded were persistent heel pain (5.6%), paraesthesia or numbness (4.3%), soft tissue healing problems (1.7%), and superficial infection (0.4%). More recently, Papathanasiou et al. [10] reviewed the literature and concluded that EPF is an effective and safe treatment option for chronic, recalcitrant PF, offering favourable early postoperative outcomes.

O'Malley et al. [11] evaluated the outcomes of EPF in 16 patients (20 feet), reporting significant improvements in the American Orthopaedic Foot & Ankle Society (AOFAS) hindfoot scores. Their study found that patients with unilateral symptoms had better outcomes than those with bilateral symptoms, and no iatrogenic nerve injuries were reported. They concluded that EPF is a valid alternative to open plantar fascia release for patients with persistent heel pain.

A retrospective study by Chia Chen Cuo et al. found that patients who underwent endoscopic plantar fasciotomy experienced significantly greater improvement in function and pain reduction within the first three months postoperatively compared to those who had open surgery. However, long-term outcomes were similar between the two techniques.[12]. A study by Kinley et al. reported that patients who underwent endoscopic plantar fasciotomy experienced less postoperative pain, a quicker return to normal activities, and fewer surgical complications compared to those who had open surgery.[13]

Given the limited and sometimes conflicting evidence regarding EPF in the foot and ankle literature, this study aims to present the outcomes of a single surgeon's case series of EPF with two years of follow-up, in hopes of clarifying some of the uncertainties surrounding the procedure.

Materials and Methods

This study is a case series conducted by a single surgeon, involving 80 feet in 80 patients diagnosed with recalcitrant plantar fasciitis (PF), all of whom underwent endoscopic plantar fasciotomy (EPF). A retrospective review was performed using prospectively collected data as part of routine clinical care. The study was classified as a service evaluation by the local ethics committee (AMC 0063-24).

A total of 80 patients (25 males and 55 females) were prospectively enrolled between January 2021 and December 2022. Each patient had suffered from plantar fasciitis for at least six months and had undergone conservative treatment prior to EPF. Conservative treatments included options such as orthotics, physical therapy, and nonsteroidal anti-inflammatory medications.

Preoperative magnetic resonance imaging (MRI) was performed on all patients. (On average 2-4 weeks prior to surgery). The diagnosis of plantar fasciitis was confirmed by the presence of a thickened plantar fascia at its insertion on the medial calcaneus. Measuring plantar fascia thickness was done on T2 weighted sagittal image, at the thickest point 5-10mm distal to the calcaneus insertion. Thickened plantar fascia was diagnosed if the thickness was ≥4.0mm. Additionally, an increased T2-weighted signal at the plantar fascia's insertion site was used as a diagnostic criterion for PF [figure 1].

Figure 1: T2 MRI Scan showing signs of plantar fasciitis.

MRI T2 sagittal view showing thickened plantar fascia with edema at it's insertion to the calcaneus.

The following data were collected: patient age, comorbidities, body mass index (BMI), preoperative and postoperative visual analogue scale (VAS) scores at 12 and 24 months, and preoperative and postoperative American Orthopaedic Foot & Ankle Society (AOFAS) hindfoot scores at 12 and 24 months. Additional data included patient satisfaction rates (Likert scale), time to return to sporting activities, and complications arising after EPF

Surgical Approach

All procedures were performed in the same manner. The patient was positioned supine, and the endoscopic plantar fasciotomy (EPF) was carried out under general anaesthesia with the application of a thigh tourniquet. The Endo blade™ soft tissue release system (Arthrex, Naples, FL) was utilized in all cases [14].

A small incision, approximately 0.5 cm in length, was made 1.5 cm from the plantar skin and slightly anterior to the medial calcaneal tubercle. A blunt instrument, such as a hemostat, was then inserted to carefully locate the correct surgical plane, ensuring the fascia was not penetrated. A Plane Finder instrument was introduced through the medial incision and advanced laterally in the space just inferior to the plantar fascia, avoiding any damage to the fascia itself. The advancement of the Plane Finder continued until tenting of the lateral skin was observed, typically 1.5–2.0 cm below the course of the sural nerve.

A small incision was made on the lateral side of the heel to allow for the exit of the Plane Finder, creating a lateral portal for insertion of the endoscope into the correct plane. A clear

cannula was then inserted into the lateral portal over the Plane Finder to maintain proper positioning. Once the Plane Finder was removed, several cotton swabs were passed from the lateral to medial direction to clear any soft tissue from the cannula that might obstruct visualization.

A 4 mm 30-degree arthroscope was introduced into the lateral portal via the cannula, and a cutting blade was inserted through the medial portal. Under direct visualization, and with upward pressure applied, the plantar fascia was released. In all cases, approximately 50–60% of the plantar fascia was released to minimize disruption of the windlass mechanism [figure 2].

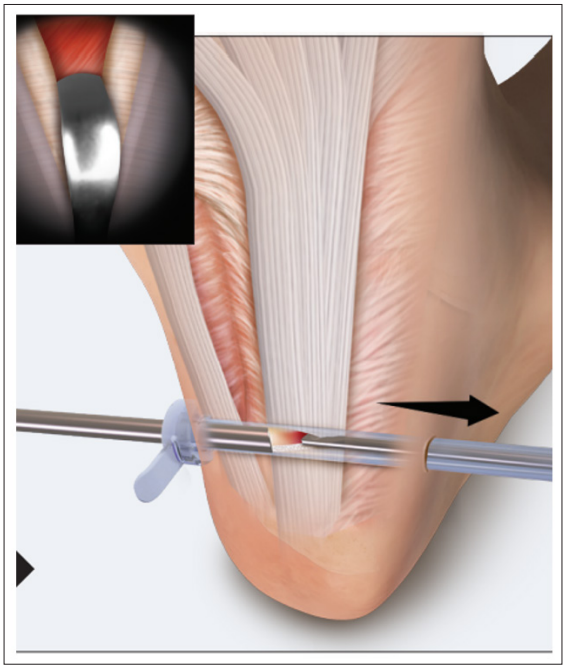

Figure 2: Arthrex Endobladetm soft tissue release system

The cutting blade is introduced into the medial portal. While applying upward pressure the plantar fascia is released towards the medial side under direct visualization. (Curtesy of Arthrex NaplesTM)

Postoperative Protocol

Patients were permitted immediate full weight-bearing using a below-the-knee walking boot without a heel lift for the first two weeks postoperatively. After this period, patients transitioned to wearing sports shoes and initiated physical therapy. Return to sports activities was permitted approximately 6 to 8 weeks after the procedure, based on the patient's progress and functional performance.

Statistical Analysis

Descriptive statistics for patient characteristics, clinical variables, and outcomes were reported as mean, range, and percentages. A paired t-test was used to compare preoperative and postoperative American Orthopaedic Foot & Ankle Society (AOFAS) and Visual Analog Scale (VAS) scores, with statistical significance defined as a p-value of less than 0.05. Critical T was calculated for 95% confidence interval and 158 degrees of freedom and was equal to 1.6. All statistical analyses were performed using SPSS software (IBM version 29).

Results

Between January 2021 and December 2022, 80 patients with recalcitrant plantar fasciitis (PF) underwent endoscopic plantar fasciotomy (EPF). Of the 80 patients, 25 were male (30%) and 55 were female (70%), with an average age of 54.8 years (range: 22–71). Ten patients (12.5%) had controlled diabetes mellitus, and five (6%) had rheumatoid arthritis. The average body mass index (BMI) was 28.75 (range: 22–42) [Table1]. All patients had received at least six months of conservative treatment, including stretching exercises, insoles, and physical therapy, before surgery. Preoperative MRI scans confirmed thickened plantar fascia and increased signal at the plantar fascia insertion to the calcaneus.

Table 1: Patients Characteristics and study results:

Characteristics		Measurement	Paired T test
Age		54.8 (Range:22-71)	-
BMI		28.75 (Range: 22-42)	-
Time to return to sport		9 months (2-14)	-
VAS (Visual Analogue Score) Score	Before treatment	7.9 (Range: 6-9)	-
	12 months post	3.3 (Range:1-8)	P value<0.05 (Critical T =1.6, CI=95%)
	24 months post	1.7 (Range:1-4)	P value<0.05 (Critical T =1.6, CI=95%)
AOFAS (American Orthopaedic Foot and Ankle Society score) score	Before treatment	32.3 (Range:22-46)	
	12 months post	86.9 (Range:62-94)	P value<0.05 (Critical T =1.6, CI=95%)
	24 months post	90.2 (Range: 75-98)	P value<0.05 (Critical T =1.6, CI=95%)
Return to sport activities without restrictions		70/80 (87.5%)	-
Residual heel pain within study period		7/80 (8%)	-
Other complications	Superficial wound infection	5/80 (6%)	-

The table describes the patient's demographics and study endpoints. Descriptive statistics were reported for all measures and outcomes, using mean, range, and percentage. A paired T-test was employed to compare pre- and post-treatment AOFAS and VAS scores. Critical T was calculated for 95% confidence interval and 158 degrees of freedom and was equal to 1.6.

The average follow-up period was 24 months (range: 20–34 months). The American Orthopaedic Foot & Ankle Society (AOFAS) hindfoot scores improved significantly from a preoperative average of 34.3 (range: 22–46) to 86.9 (range: 62–94) at one year postoperatively ($p < 0.05$), with further improvement to 90.2 (range: 75–98) at two years postoperatively ($p < 0.05$). The average preoperative Visual Analog Scale (VAS) score was 7.9 (range: 6–9), which decreased to 3.3 (range: 1–8, $p < 0.05$) one year after surgery, and further improved to 1.7 (range: 1–4, $p < 0.05$) two years postoperatively [table 1].

A total of 87.5% of patients (70/80) returned successfully to their pre-surgery sports activities following the surgical procedure, on average 9 months post-surgery (range: 2–14 months). High satisfaction rates were reported by 89% of patients. The average score on the Likert scale 24 months after surgery was 8.9 (range: 5-10).

Seven patients (8%) continued to experience persistent heel pain two years after surgery. MRI imaging showed no recurrence of PF in these patients; however, clinical signs of lateral column overload were present, with no medial pain at the PF insertion site on the calcaneus. These patients did not require further surgical treatment and were treated conservatively. None of these patients showed signs of Tarsal Tunnel Syndrome on clinical examination. Six percent (6%) of patients developed superficial wound infection, which was managed with topical treatments. No cases of nerve injury were reported [Table 1].

Discussion

Plantar fasciitis (PF) is a frequent cause of foot pain, and patients with recalcitrant symptoms often seek orthopaedic consultation. Surgical intervention is typically considered when symptoms persist for longer than six months and conservative treatments have been exhausted. Traditionally, open plantar fasciotomy has been the preferred surgical treatment, but it is associated with complications and a prolonged recovery period. In recent years, endoscopic plantar fasciotomy (EPF) has emerged as a minimally invasive alternative, offering benefits such as quicker recovery, reduced postoperative pain, and fewer complications.

A prospective review by Barrett et al. examined 652 patients treated with EPF by 25 surgeons. The study found that 97% of patients reported complete heel pain resolution, with most patients returning to normal shoe wear within five days postoperatively [12]. Mao et al. conducted a systematic review and meta-analysis to further understand the impact of EPF, concluding that while most studies had low evidence quality and poor recommendation grades, EPF yielded favourable outcomes in terms of pain relief [15]. Johannsen et al. found significant improvements in pain and function three months after EPF, with additional benefits observed at one year after surgery [16].

Conservative treatment is effective for the majority of patients with PF. However, for those with recalcitrant symptoms, surgical intervention may offer significant relief. This study aims to clarify the effectiveness of EPF in treating persistent PF symptoms. Our findings demonstrate that EPF is a viable surgical option. With a two-year follow-up of 80 patients, we observed significant improvements in both pain and function at one year postoperatively, with further improvements at two years. A substantial proportion of patients (87.5%) returned to sports by an average of nine months post-surgery. Only 8% of patients continued to experience heel pain two years after surgery, and this was attributed to lateral column overload rather than PF recurrence. The superficial wound infection rate in this study was 6%, managed effectively with topical treatment. No other complications, including nerve injuries, were reported. The complication rate observed here is notably lower than those reported for open plantar fasciotomy [17].

This study has some limitations. It is a retrospective review conducted by a single surgeon, which may limit generalizability. However, the follow-up period of two years is relatively long compared to other studies published in the literature, and the cohort size of 80 patients is substantial. Importantly, this study did not compare EPF to open plantar fasciotomy or other surgical techniques, as it was not designed as a comparative or non-inferiority study. Nevertheless, Fallet et al. reported that patients undergoing EPF experienced less postoperative pain and faster return to full activity compared to those treated with the open techniques, supporting the advantages of EPF [17]. This study focused on the two-portal EPF technique, and while other EPF techniques, such as the one-portal method, exist, this study did not aim to compare them.

The AOFAS Hindfoot Score, though widely utilized, is considered outdated due to its lack of patient-reported outcomes (PROMs) and limited sensitivity to specific foot and ankle conditions. While it integrates both subjective and objective components, its reliance on clinician-assessed metrics may not fully reflect the patient's experience of pain, function, or quality of life. Alternative scoring systems, such as the Foot and Ankle Ability Measure (FAAM) and the Victorian Institute of Sports Assessment-Achilles (VISA-A), offer validated, patient-centred assessments tailored to specific conditions. Nonetheless, the AOFAS Hindfoot Score remains a valuable comparative tool due to its longstanding use and familiarity within the orthopaedic community. Moreover, it is the only questionnaire that has been translated and validated in the country where this study was conducted, supporting its use to ensure cultural and linguistic relevance while maintaining consistency with previous research. [18-19].

The majority of the study population successfully returned to their pre-surgery sports activities following EPF. Our analysis focused on whether patients were able to resume their desired sport rather than examining the specific type of sport performed. This approach allowed us to assess the overall functional recovery and the ability to engage in physical activity post-surgery without differentiating between various sports disciplines.

In conclusion, our findings support that EPF is a safe and effective treatment for patients with recalcitrant PF. The high satisfaction rates and prompt return to sports highlight the procedure's success. These results should encourage both surgeons and patients to consider EPF when conservative treatment options have been exhausted and heel pain persists.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work the author(s) used Chat GPT4 in order to improve the quality of the text. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

References

1. Rompe JD. Plantar fasciopathy. Sports Med Arthrosc. 2009. 17: 100-104.
2. Li S, Wang K, Sun H. Clinical effects of extracorporeal shock-wave therapy and ultrasound-guided local corticosteroid injections for plantar fasciitis in adults: a metaanalysis of randomized controlled trials. Medicine (Baltimore). 2018. 97: 13687.
3. Luffy L, Grosel J, Thomas R, So E. Plantar fasciitis: a review of treatments. JAAPA. 2018. 31: 20-24.
4. Dyck DD, Boyajian-O'Neill LA. Plantar fasciitis. Clin J Sport Med. 2004. 14: 305-309.
5. Gill L. Plantar fasciitis: diagnosis and conservative management. J Am Acad Orthop Surg. 1997. 5: 109-117.
6. Mas JL, Christensen JC, Kravitz SR. The diagnosis and treatment of heel pain: a clinical practice guidelinerevision. J Foot Ankle Surg. 2010. 49: 1-19.
7. Neufeld SK, Cerrato R. Plantar fasciitis: evaluation and treatment. J Am Acad Orthop Surg. 2008. 16: 338-346.
8. Barrett SL, Day SV. Endoscopic plantar fasciotomy for chronic plantar fasciitis/heel spur syndrome: Surgical technique- early clinical results. J Foot Surg. 1991. 30: 568-570.
9. Michael-Alexander Malahias, Erwin Brian Cantiller, Vikram V Kadu. The clinical outcome of endoscopic plantar fascia release: A current concept review, Foot Ankle Surg. 2020. 26: 19-24.
10. Maria Papathanasiou, Paraskevas Georgoulas. Evanthia Perikleous Endoscopic Plantar Fasciotomy as an Effective and Reliable Treatment for Plantar Fasciitis: An Overview of the Literature J Am Podiatr Med Assoc. 2023. 113: 21-239.
11. Malley MJO, Page A, Cook R, Endoscopic plantar fasciotomy for chronic heel pain, Foot Ankle Int. 2000. 21: 505-510.
12. Andrew Chia Chen Chou, Sean Yung Chuan Ng, Kevin Oon Thien Koo. Endoscopic Plantar Fasciotomy Improves Early Postoperative Results: A Retrospective Comparison of Outcomes After Endoscopic Versus Open Plantar Fasciotomy, J Foot Ankle Surg. 2016. 55: 9-15.
13. Kinley S, Frascone S, Calderone D, Wertheimer SJ, Squire MA, et al. Endoscopic plantar fasciotomy versus traditional heel spur surgery: a prospective study J Foot Ankle Surg. 1993. 32: 595-603.
14. Arthrex Endobladetm soft tissue release system surgical technique.
15. David Weijia Mao, Darshana Chandrakumara, Qishi Zheng, Carmen Kam, Charles Kon Kam King. Endoscopic plantar fasciotomy for plantar fasciitis: A systematic review and network meta-analysis of the English literature, Foot (Edinb). 2019. 41: 63-73.
16. Finn Johannsen, Lars Konradsen, Robert Herzog, Michael Rindom Krogsgaard. Plantar fasciitis treated with endoscopic partial plantar fasciotomy-One-year clinical and ultrasonographic follow-up, Foot (Edinb). 2019. 39: 50-54.
17. Lawrence Fallat M, Todd Cox J, Ruby Chahal, Pamela Morrison, John Kish. A retrospective comparison of percutaneous plantar fasciotomy and open plantar fasciotomy with heel spur resection, J Foot Ankle Surg. 2013. 52: 288-290
18. Hisateru Niki, Haruhito Aoki, Suguru Inokuchi, Satoru Ozeki, Development and reliability of a standard rating system for outcome measurement of foot and ankle disorders I: development of standard rating system, J Orthop Sci. 2005. 10: 457-465.
19. Martin RL, Irrgang JJ, Burdett RG, Conti SF, Van Swearingen JM. Evidence of validity for the Foot and Ankle Ability Measure (FAAM). Foot & Ankle International. 2005. 26: 968-983.
20. Barrett SL, Day SV, Pignetti TT. Endoscopic plantar fasciotomy: A multi-surgeon prospective analysis of 652 cases. J Foot Ankle Surg. 1995. 34: 400-406.