

TREATMENT OF PLANTAR HEEL PAIN

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Plantar heel pain is the most common foot pathology presenting to most podiatric practices. It has been estimated that upwards of 10% of the population will at some point experience plantar heel pain.¹ There are many synonyms utilized to describe plantar heel pain including; proximal plantar fasciitis, heel spur syndrome, and plantar fasciosis.²⁻⁵ Traditionally, mechanical factors, such as biomechanical stress or overuse of the plantar fascia, have been implicated as the origin of the painful symptoms associated with plantar heel pain.

PLANTAR FASCIITIS: THE PATIENT

Symptoms of plantar heel pain are well known and most patients describe a typical presentation that includes morning pain and post-static dyskinesia, or pain that develops after periods of rest. This pain is generally localized to the plantar and plantar medial aspect of the heel, although no acute inflammatory component is generally apparent. Some patients may present with an acute inferior calcaneal bursitis, although this is not typical. Patients may also describe pain that worsens during the day, particularly in individuals that work the greater portion of the day on their feet and on hard surface floors. Individuals may be of normal body mass or even slender morphology, although the typical presentation is that of an overweight individual.

Discussion regarding the etiology of plantar fasciitis has often centered on the windlass mechanism of the plantar fascia and the association of orthopedic architecture with pathology. During gait, body weight on the stance limb produces a pronatory change in the foot with relative elongation and tensile stress of the plantar fascia and the calcaneal enthesus. Cavus foot types frequently possess atrophy of the plantar fat pads, which may lead to decreased dissipation of stress forces on the plantar heel resulting in pain. Shoes are commonly implicated, by both patients and physicians, as triggering or worsening symptoms. Generally, barefoot walking and wearing shoes with a low heel may be contributory. Radiographs, although not diagnostic for plantar fasciitis, are helpful in distinguishing other potential

causes of heel pain (bone tumor, stress fracture, arthritides etc.). Although patients with heel pain commonly present with an evident plantar calcaneal spur, this is not required for the diagnosis, which is predominantly based upon clinical history and examination.

PLANTAR FASCIITIS: NONOPERATIVE TREATMENT

Plantar fasciitis is usually treated conservatively and most studies have concluded that 90-95% of patients will improve with nonoperative measures. Our protocol is typical of that recommended in the American College of Foot and Ankle Surgeons CPG document: mechanical heel pain utilizing a stepwise or tiered approach (Figure 1).^{6,7} Patients are often treated with a combination of Achilles stretching exercises, home physical therapy, including cryotherapy, and a home shoe program that involves the avoidance of going barefoot. Some type of arch support pads or in-shoe device is generally used. These measures may be further augmented with local corticosteroid injection and oral anti-inflammatory drugs. Night splints and prescription orthotic devices are recommended to patients with continued symptoms. Relief from plantar fasciitis is not always quick and symptoms may persist for several months despite appropriate care. Physicians must emphasize to their patients that perseverance with the

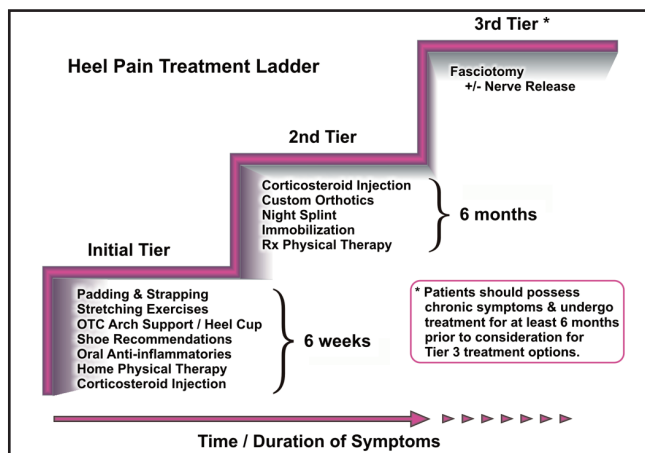


Figure 1.

nonsurgical treatment program will typically yield successful results. Generally, a period of 3-6 months of nonsurgical care is considered appropriate before recommending invasive or surgical management to patients with this very ubiquitous pathology.

STUDY

Due to the multiplicity of nonsurgical treatment options, the authors have felt that it would be beneficial to look at this very common problem from the standpoint of the patient that has failed conservative treatment and has undergone surgical management for plantar fasciitis. The authors selected a 2-year period, from January 2007-January 2009, to review charts on patients that have undergone surgery for the treatment of plantar fasciitis. Patients with plantar heel pain etiologies that were unrelated to the plantar fascia were excluded. During this period, 962 patients were seen with a diagnosis of plantar fasciitis, subsequently requiring almost 2,000 patient visits. Although, the percentages of plantar fasciitis patients requiring surgical intervention for the relief of symptoms has been reported as high as 10% in the literature, our results yielded a low percentage, with only 1.8% requiring surgery.

All patients were initially treated with patient educational measures including a description of pathology and explanation of usual treatment alternatives. Patients were generally given instructions for tendo Achilles stretching exercises, home cryotherapy, and a home shoe program with avoidance of going barefoot. Application of either a removable orthopedic strapping with an arch pad was performed or a longitudinal metatarsal pad was added to the insole of their shoes, if such was removable. Flip-flops, a very common foot wear choice in the South, were discouraged and supportive shoes were recommended including for daily wear. Generally, therapeutic injection of corticosteroids or prescription of oral anti-inflammatory agents were delayed for subsequent visits in patients that did not respond to the previously described measures. Both prefabricated type, heat molded orthotics and prescription orthotic devices were utilized. Night splints were also prescribed for patients with persistent symptoms. Physical therapy, other than patient directed, was not generally utilized. Nonsurgical treatment modalities for this group are summarized in Figure 2.

Undoubtedly, physicians encounter patients that have experienced symptoms for prolonged periods, have undergone extensive treatment, and come to you in search of a quick fix. These patients often request surgery during their initial office visit, but caution must be advised given the high rate of symptom resolution with nonsurgical treatment. Certainly, each patient presenting with plantar

heel pain must have a thorough physical examination, particularly with regard to differentiating other pathology contributing to their heel pain. Most notable are tarsal tunnel and various neuritic pathologies, including involvement of the medial calcaneal branch nerve and the first branch of the lateral plantar nerve to abductor digiti quinti.⁸⁻²¹ Elderly patients, those with very lean body mass, and even morbidly obese patients may present with a very poor infracalcaneal fat pad and this too must be identified and treated appropriately. The arthritides often have heel involvement, although will not generally have the typical presentation of plantar fasciitis. These patients will frequently demonstrate a positive history for inflammatory arthritis. There are numerous less common and diverse pathologies that may cause plantar heel pain that are beyond the scope of this document.

Surgical management of the patient with chronic recalcitrant plantar fasciitis is generally a plantar fasciotomy by various appropriate techniques. Today, most surgeons prefer a minimally invasive approach, involving severing 50 to 75% of the plantar fascia with little regard to any concomitant heel spur unless it is exuberant and believed to be contributory. ESWT or extracorporeal shockwave therapy has been advocated for the past 6 to 10 years as a less debilitating alternative, although it is still considered a surgical modality. Recent literature also describes the use of radiofrequency nerve ablation for those presenting with neuritic complaints. Any radiculopathy, entrapment neuropathy, or tarsal tunnel etiology must be excluded and properly addressed, if present.

In our group of 18 patients who went on to surgical management, all underwent a minimally invasive plantar fasciotomy utilizing either an instep or Koby surgical technique. The patients included 8 females and 10 males with ages ranging from 36-75 years, with an average age of 52.5 years. Of the 18 patients: 5 worked in a clerical

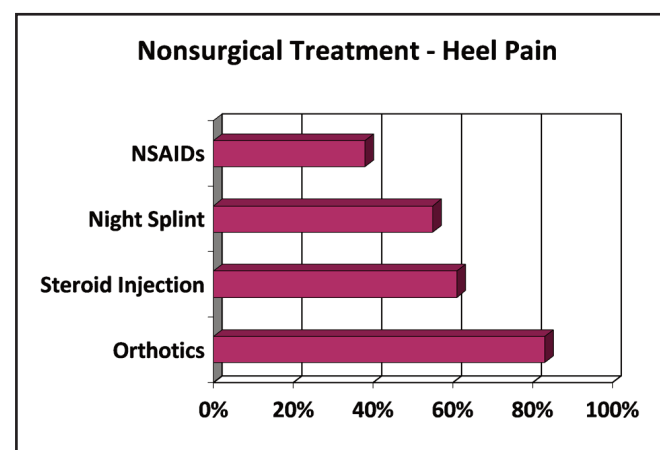


Figure 2.

environment, 5 were general laborers, and 8 were retired or disabled (Figure 3). Only 3 represented recurrences of heel pain.

The average body-mass index was 30.16 for the group. According to the National Institute of Health standards, a BMI of 30 or greater is defined as obese (Figure 4). The average length of symptomatology was 10.8 months. Upon initial presentation, 8 cases demonstrated bilateral involvement, 6 cases involved the left foot, and 4 involved the right foot. The average length of conservative therapy prior to surgery was 95.6 days. In reviewing nonsurgical treatment modalities: 83% of patients received orthotics, 61% underwent at least 1 plantar heel corticosteroid injection, 55% utilized a night splint, and only 38% were dispensed oral nonsteroidal anti-inflammatory drugs (Figure 2). Following conservative care, plantar fasciotomies were performed on 10 left feet, 7 right, and 1 bilateral case.

Preoperative radiographic evaluation of the group revealed an average calcaneal inclination angle of 21.7 degrees, with a range of 18-28 degrees. The average height of the heel fat pad was 11.05 mm. Generally, these patients possessed relatively normal foot types without any significant infracalcaneal fat pad atrophy. Of those who underwent surgery, 17 patients responded to a telephone survey regarding their heel pain. Fifteen patients reported they would still choose to undergo the surgery and would recommend it to a family member or friend. On a scale of 1-10, with 1 being not at all successful and 10 being completely successful, 9 patients rated their surgery completely successful. The average successful scale rating was 8.4 out of 10. Of the 17 surveyed, only 4 reported any recurrent or recalcitrant heel pain following surgery.

DISCUSSION

Plantar fasciitis is a commonly encountered condition for most podiatric and primary care practitioners. When patients present with heel pain, it is important to exclude any other possible contributing etiologies. It is widely reported that 90-95% of heel pain resolves with nonsurgical treatment. It is important to discuss this with your patients during initial treatment visits and provide encouragement during their recovery. Certainly, most patients today are in search of a “quick fix” and often must be convinced to commit to the program of nonsurgical care. Barefoot walking and flip flops may difficult to eliminate. It is commonplace to overlap

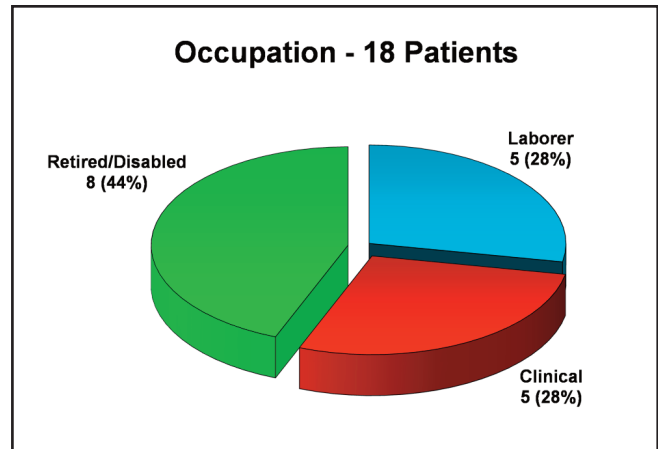


Figure 3.

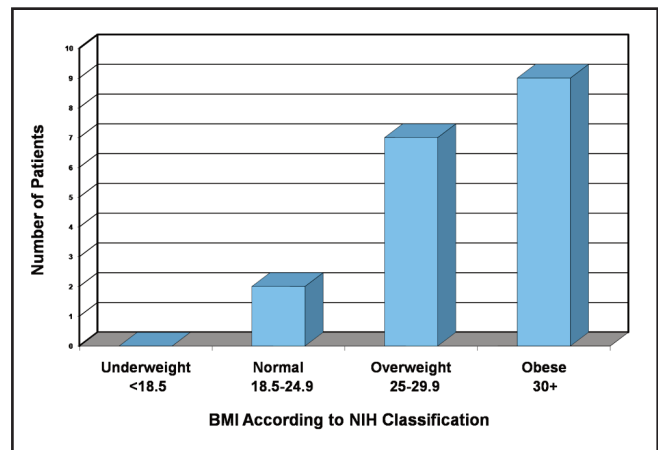


Figure 4.

multiple treatment modalities for the resolution of plantar heel pain, and no single modality has been proven as superior. A stepwise approach, as described by the American College of Foot and Ankle Surgeons heel pain protocol is recommended.

Surgery is recommended for patients with recalcitrant heel pain lasting more than 3-6 months, despite appropriate treatment. Many surgical techniques are indicated for the treatment of plantar fasciitis and plantar heel pain, each with its own inherent risks and varying reported degrees of efficacy. It is the finding of these authors that a stepwise approach to intensive conservative therapies, along with good patient compliance, results in a low percentage of patients requiring surgical care for the treatment of plantar fasciitis.

REFERENCES

1. Rompe JD, Furia J, Weil L, Maffulli N. Shock wave therapy for chronic plantar fasciopathy. *Br Med Bull* 2007;81:183-208.
2. Hammer WI. The effect of mechanical load on degenerated soft tissue. *J Body Mov Ther* 2008;12:246-56.
3. Lemont H, Ammirati KM, Usen N. Plantar fasciitis: a degenerative process (fasciosis) without inflammation. *J Am Podiatr Med Assoc* 2003;93:234-7.
4. League AC. Current concepts review: plantar fasciitis. *Foot Ankle Int* 2008;29:358-66.
5. LeMelle DP, Kisilewicz P, Janis LR. Chronic plantar fascial inflammation and fibrosis. *Clin Podiatr Med Surg* 1990;7:385-9.
6. Thomas JL, Christensen JC, Kravitz SR, Mendicino RWS, Vanore JV, Weil LS, et al. The diagnosis and treatment of heel pain. *Clinical Practice Guideline. Revision 2009. J Foot Ankle Surg* 2010.
7. Pribut SM. Current approaches to the management of plantar heel pain syndrome, including the role of injectable corticosteroids. *J Am Podiatr Med Assoc* 97:68-74, 2007.
8. Goecker RM and Banks AS. Analysis of release of the first branch of the lateral plantar nerve. *J Am Podiatr Med Assoc* 2000;90:281-6.
9. Louisia S, Masquelet AC. The medial and inferior calcaneal nerves: an anatomic study. *Surg Radiol Anat* 1999;21:169-73.
10. Schon LC, Glennon TP, Baxter DE. Heel pain syndrome: electrodiagnostic support for nerve entrapment. *Foot Ankle* 1993;14:129-35.
11. Baxter DE and Pfeffer GB. Treatment of chronic heel pain by surgical release of the first branch of the lateral plantar nerve. *Clin Orthop* 1992;229-36.
12. Davidson MR, Copoloff JA. Neuromas of the heel. *Clin Podiatr Med Surg* 1990;7:271-88.
13. Rondhuis JJ, Huson A. The first branch of the lateral plantar nerve and heel pain. *Acta Morphol Neerl Scand* 1986;24:269-79.
14. Przulucki H, Jones CL. Entrapment neuropathy of muscle branch of lateral plantar nerve: a cause of heel pain. *J Am Podiatry Assoc* 1981;71:119-24.
15. Cione JA, Cozzarelli J, Mullin CJ. A retrospective study of radiofrequency thermal lesioning for the treatment of neuritis of the medial calcaneal nerve and its terminal branches in chronic heel pain. *J Foot Ankle Surg* 2009;48:142-7.
16. Diers DJ. Medial calcaneal nerve entrapment as a cause for chronic heel pain. *Physiother Theory Pract* 2008;24:291-8.
17. Lui TH. Endoscopic decompression of the first branch of the lateral plantar nerve. *Arch Orthop Trauma Surg* 2007;127:859-61.
18. Chang CW, Wang YC, Hou WH, Lee XX, and Chang KF. Medial calcaneal neuropathy is associated with plantar fasciitis. *Clin Neurophysiol* 2007;118:119-23.
19. Kim J, Dellon AL. Neuromas of the calcaneal nerves. *Foot Ankle Int* 2001;22:890-4.
20. Fredericson M, Standage S, Chou L, Matheson G. Lateral plantar nerve entrapment in a competitive gymnast. *Clin J Sport Med* 2001;11:111-4.
21. Farooki S, Theodorou DJ, Sokoloff RM, Theodorou SJ, Trudell DJ, Resnick D. MRI of the medial and lateral plantar nerves. *J Comput Assist Tomogr* 2001;25:412-6.