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Hindfoot pain

PLANTAR FASCITIS

- Plantar fasciitis is the most common cause of inferior heel pain.
- It is estimated that 11% to 15% of all foot complaints
- Plantar fasciitis is considered a self-limited condition.
- Symptoms resolve in 80% to 90% of cases within 10 months. *However, this long interval is frustrating for both patients and clinicians.*
- Without high-quality data to identify which treatments are successful, the clinical decision-making in the management of this condition is at times arbitrary and anecdotal.

ANATOMY/Pathology

- The plantar fascia is a strong, fibrous aponeurosis that originates from the plantar tuberosity of the calcaneus and fans out into 3 bands that insert into the bases of the proximal phalanges.
- Dorsiflexion of the toes, activates the windlass mechanism
- Plantar fasciitis is defined as a localized inflammation and degeneration of the proximal plantar aponeurosis. The most common site of involvement is near the origin at the medial tuberosity of the calcaneus. [*Foot & Ankle International/Vol. 29, No. 3/March 2008: 358*]
- Similar to chronic tendon disorders, pathological findings have included degenerative changes in the plantar fascia with fibroblastic proliferation and limited inflammatory tissue.
- *General agreement in the literature favors a process where mechanical overload and excessive strain produce microtears within the fascia, which eventually incites an inflammatory response.*

CLINICAL MANIFESTATIONS

- Insidious onset
- “start-up pain.”
- Start-up pain rapidly dissipates

WHO IS AT RISK FOR PLANTAR FASCIITIS?

- Although mechanical overload is frequently implicated as a primary factor, the etiology of plantar fasciitis is thought to be multi-factorial.
- Intrinsic factors such as advanced age, abnormal foot posture, elevated Body-Mass Index, and tight Achilles tendon, as well as extrinsic factors such as the use of poor footwear, the type and intensity of daily activity, and incidence of isolated or repetitive trauma have been proposed as risk factors in development of plantar fasciitis.
- However, no single factor has been reliably identified across multiple studies.

- Static and dynamic cadaveric studies have linked Achilles tendon tension and plantar fascia loading and the clinical significance
- 50 patients clinically diagnosed with unilateral plantar fasciitis were enrolled in the study. Two controls were matched to each patient on the basis of age and gender. Analysis of data reported as an adjusted odds ratio revealed that individuals who stand the majority of their workday had a significantly increased **risk of plantar fasciitis than those that did not stand [1]**.
- The authors also determined that the risk of plantar fasciitis increases in a “dose-response” relationship as the amount of ankle dorsiflexion decreases [2] or as the body-mass index increases. Each of these 3 variables was found to be an independent risk factor with **reduced ankle dorsiflexion being the most important [3]**.
- **IMAGING**
- Radiographs may also reveal plantar calcaneal spurs; however, their clinical relevance to plantar fasciitis has not been established.
- While bone scans have 60% to 98% sensitivity and up to 86% specificity when used to diagnose plantar fasciitis, they are more helpful to detect the presence of a calcaneal stress fractures.
- Magnetic resonance imaging may demonstrate thickening of the plantar fascia. The fascia of patients with plantar fasciitis has been measured at $7.40 \text{ mm} \pm 1.17$, while in asymptomatic volunteers it measured $3.22 \text{ mm} \pm 0.44$.

- Recently, ultrasonography has received increased attention for its diagnostic capabilities and its role in guiding the location of extracorporeal shock wave treatment.
- With ultrasound: The normal thickness of the plantar fascia thickness has been reported as
- between two and four mm, whereas a thickness between five and seven mm is found in patients with plantar fasciitis.

Stretching

- Porter [prospect] 94 patients with plantar fasciitis intermittent stretching of the Achilles tendon.
- The sustained group stretched 3 times a day for 3 minutes uring each session. The authors observed a correlation between stretching and an improvement
- The effect of stretching the Achilles tendon versus stretching of the plantar fascia in patients with plantar fasciitis has been investigated. DiGiovanni prospectively compared stretching the Achilles tendon to a
- plantar fascia-specific stretching technique .The group performing the plantar fascia specific
- stretching demonstrated a significant improvement in the pain subscale score of the Foot Function Index compared to the group stretching only the Achilles tendon. At 2 years, both groups had significantly improved pain scores compared to their respective baselines; however, there was no longer
- a difference in pain scores between both groups.
- Although previous investigations and general consensus have supported the use of stretching exercises in the treatment of plantar fasciitis, the evidence from these recent studies is insufficient (Grade I recommendation) to support their proposed modifications in the timing and technique of stretching.
- The work of DiGiovanni and colleagues suggests that a plantar fascia-specific stretching may be advantageous to Achilles tendon stretching alone for the short term relief of pain. Overall, larger, well controlled studies are necessary to determine the ideal program of stretching in the treatment
- of plantar fasciitis.

Orthoses

- Heel cups, arch supports, and foot orthoses have been used to treat plantar fasciitis.
- All patients performed plantar fascia and Achilles tendon stretching.
- silicone heel pad, felt pad, rubber heel cup, or a custom-made polypropylene orthotic device. The authors found no significant
- The results of these three trials demonstrate fair evidence to support the short-term use of foot orthoses in the treatment of plantar fasciitis (Grade B recommendation), with custom orthoses providing no measureable benefit over prefabricated orthoses.

Antinflammatory Agents

- **NSAID Oral**
- An injection, have been a cornerstone in the treatment of plantar fasciitis. The
- risk of fascial rupture or fat pad atrophy weighs against repeated or the immediate use of injections.
- Although the histological changes observed in diseased plantar fascia theoretically support the use of these agents, high-quality trials investigating their effectiveness
- have been lacking.
- In a prospective, randomized controlled trial
- Concluded that a single injection containing steroid provides effective short-term relief from the pain associated with plantar fasciitis, but no long-term therapeutic benefit was observed.
- The authors concluded that this treatment may not alter the natural history
- of plantar fasciitis, although they suggested that for patients in whom
- more immediate relief of pain is desired, such as competitive athletes.

EXTRACORPOREAL SHOCK WAVE THERAPY

- Claim it offers an effective means of treatment for chronic plantar fasciitis that has been non-responsive to other nonsurgical treatments.
- The mechanism is similar to lithotripsy for treatment of kidney stones, in which acoustic waves dissipate mechanical energy at the interface of two substances of differing acoustic impedance.
- Currently, all 3 techniques are available for clinical use and ESWT has been classified as either high- or low-energy treatments based on the magnitude of the shock wave generated by the device. High-energy ESWT requires local or general anesthesia and is administered in a single session, while the low-energy treatment avoids anesthesia and is usually administered in 3 weekly sessions.
- There were no significant differences between the treatment-dose and placebo-dose groups for any of the measured outcomes [in a prospective study].

- Rompe et al.³⁶ prospectively evaluated the results of ESWT with an electromagnetically generated low-energy device in a randomized, observer-blinded trial that enrolled 112 patients with at least 6 months of symptoms due to plantar fasciitis (Level I evidence.)
- The author's conclusion that ESWT is an effective treatment for plantar fasciitis is supported by their data.
- Ogden et al.²⁸ investigated the efficacy of ESWT with a high-energy device in a randomized, placebo-controlled, blinded, multi-center study. At 3 months, the authors reported 47% success in the actively treated group and 30% in the placebo group. This difference was statistically significant.
- The evidence to support the use of ESWT delivered by an electrohydraulic, electromagnetic, or piezoelectric generator is fair yet conflicting, and the trials investigating these techniques are flawed due to inconsistencies in their methodology. For these reasons, ESWT receives a Grade C recommendation in the management of plantar fasciitis.

OPERATIVE TREATMENT

- Isolated partial or complete release of the plantar fascia or a fascial release combined with resection of the plantar calcaneal spur, excision of abnormal tissue, or nerve decompression are surgical treatment options for recalcitrant plantar fasciitis.
- Potential complications include arch collapse, injury to the posterior tibial nerve and its branches, complex regional pain syndrome, and persistent or recurrent pain.
- Tomczak: Open Vs endoscopic:
At nine months followup, the endoscopic group returned to work sooner.
- Furthermore, concern that an endoscopic approach does not allow decompression of the first branch of the lateral plantar nerve (FBLPN), and may increase the risk of nerve injury limits the widespread use of this technique

- Baxter and Thigpen² differentiated nerve entrapment pain of the FBLPN from plantar fascia origin pain, and accordingly performed nerve decompressions without plantar fascia release.
- Histologic examination of the FBLPN has demonstrated evidence of perineural fibrosis and hypertrophy

However, Conflitti commented on the difficulty in differentiating pain from these

- 2 sources and recommended partial plantar fascia release with neurolysis.

Through an oblique, medial incision the deep and superficial fascia of the abductor

- hallucis muscle was released to decompress the nerve. The authors estimated two-thirds to three-quarters of the width of the plantar fascia was excised, with the remaining lateral fascia left intact to prevent arch collapse.

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Currently, insufficient data (Grade I recommendation) exists to support the various surgical procedures available for use in the surgical treatment of plantar fasciitis.

SUMMARY

- The quality of the trials to be generally poor and inadequate to yield poolable data. As a result, they attempted to provide a limited summary of nonoperative interventions.
- They were only able to conclude that limited evidence existed to support the short term effectiveness of local steroid injections. All other treatments could not be adequately judged for their effectiveness due to the lack of randomized, controlled studies.
- 1. Plantar fasciitis is a common cause of inferior heel pain. In most cases, its clinical course reflects a self-limited process with the resolution of symptoms occurring
 - within one year.
- 2. The diagnosis of plantar fasciitis is made clinically in most cases. A history of “start-up pain” and tenderness at the plantar medial aspect of the calcaneus supports the diagnosis.

- 3. The initial treatment of plantar fasciitis should be limited to nonoperative methods.
- 4. This may include the use of night splints, over-the-counter foot orthoses and routine stretching of the plantar fascia and/or the Achilles tendon. The use of anti-inflammatory agents administered orally, topically or by injection may be included
- 5. The evidence currently available to assess the efficacy of extracorporeal shock wave therapy lacks the quality and consistency to support its unconditional use in the management of plantar fasciitis. Failed to respond within six months, the use of extracorporeal shock wave therapy may be useful
- 6. High quality evidence to support the surgical release of the plantar fascia alone or in combination with a neurolysis of the posterior tibial nerve and its branches is lacking.