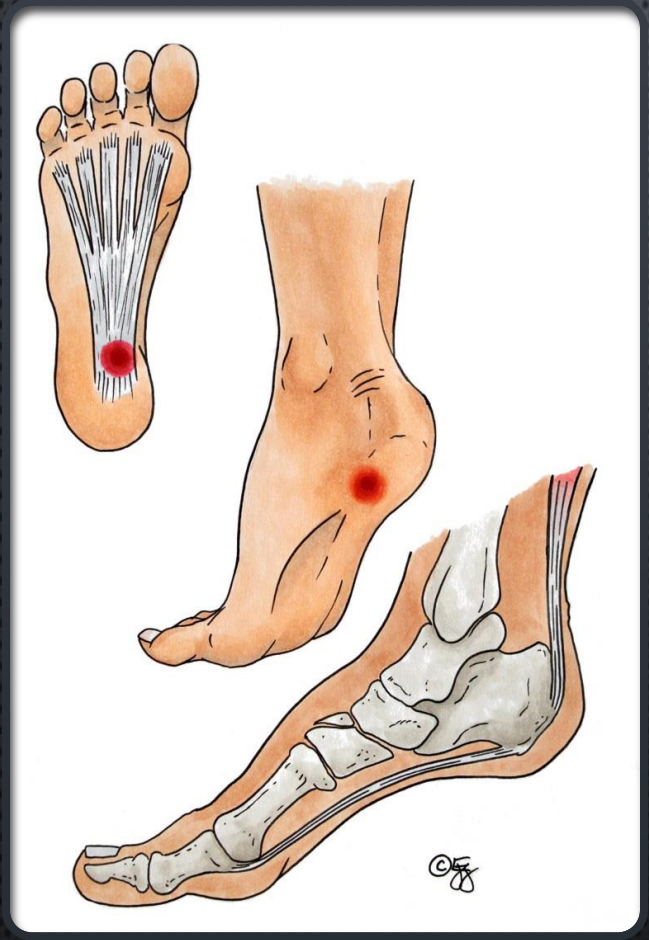
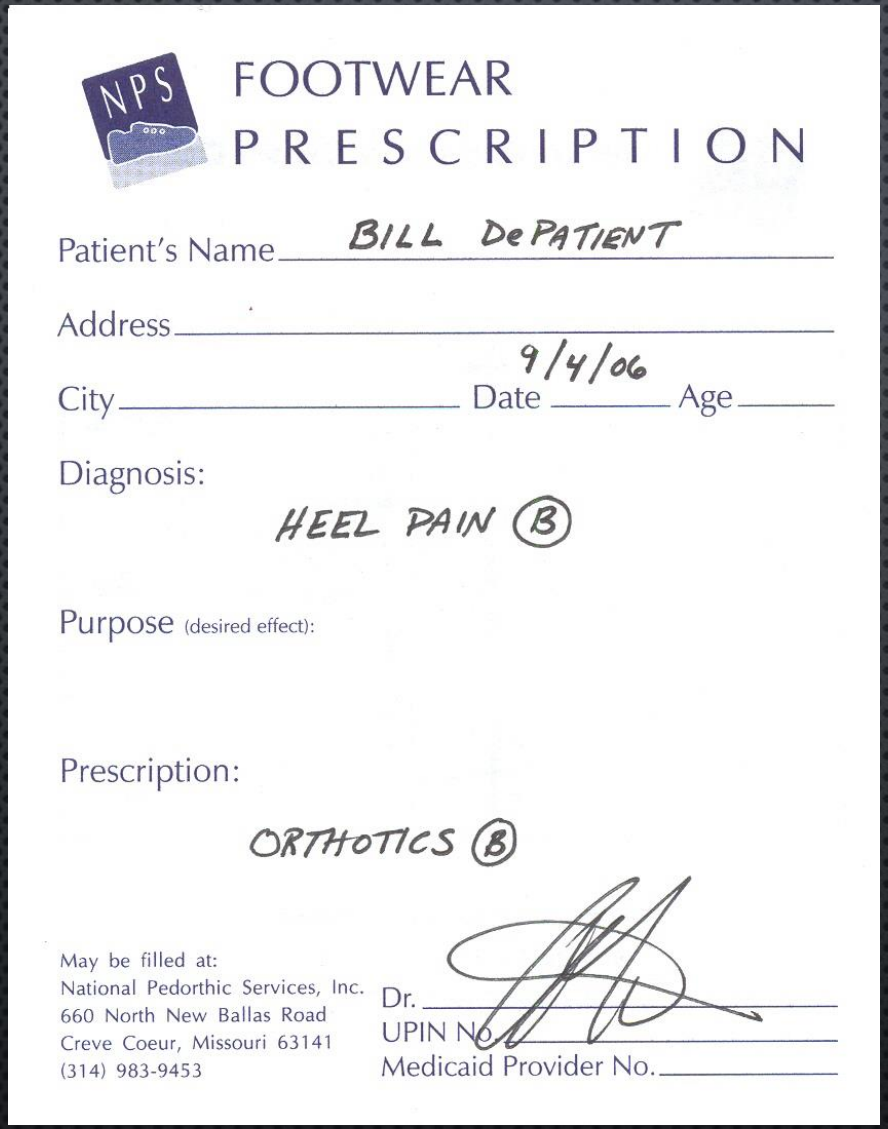


CONSERVATIVE TREATMENT OPTIONS FOR PLANTAR FASCIITIS

IN THIS SESSION…

- Plantar Fasciitis
  - Pathogenesis
  - Symptomology
  - Treatment Options/Prevention
  - Differential Diagnoses



FOOTWEAR
PRESCRIPTION

Patient's Name BILL DePATIENT

Address

City Date 9/4/06 Age

Diagnosis:

HEEL PAIN (B)

Purpose (desired effect):

Prescription:

ORTHOTICS (B)

May be filled at:
National Pedorthic Services, Inc.
660 North New Ballas Road
Creve Coeur, Missouri 63141
(314) 983-9453

Dr.
UPIN No.
Medicaid Provider No.

OK…NOW WHAT???

Heel Pain

Most Often Used Catch All Diagnosis

- AOFAS states heel pain affects more than 2 million and is most common foot problem seen by doctors
- Google search for "Heel Pain" yields over 500 million results

Heel Pain

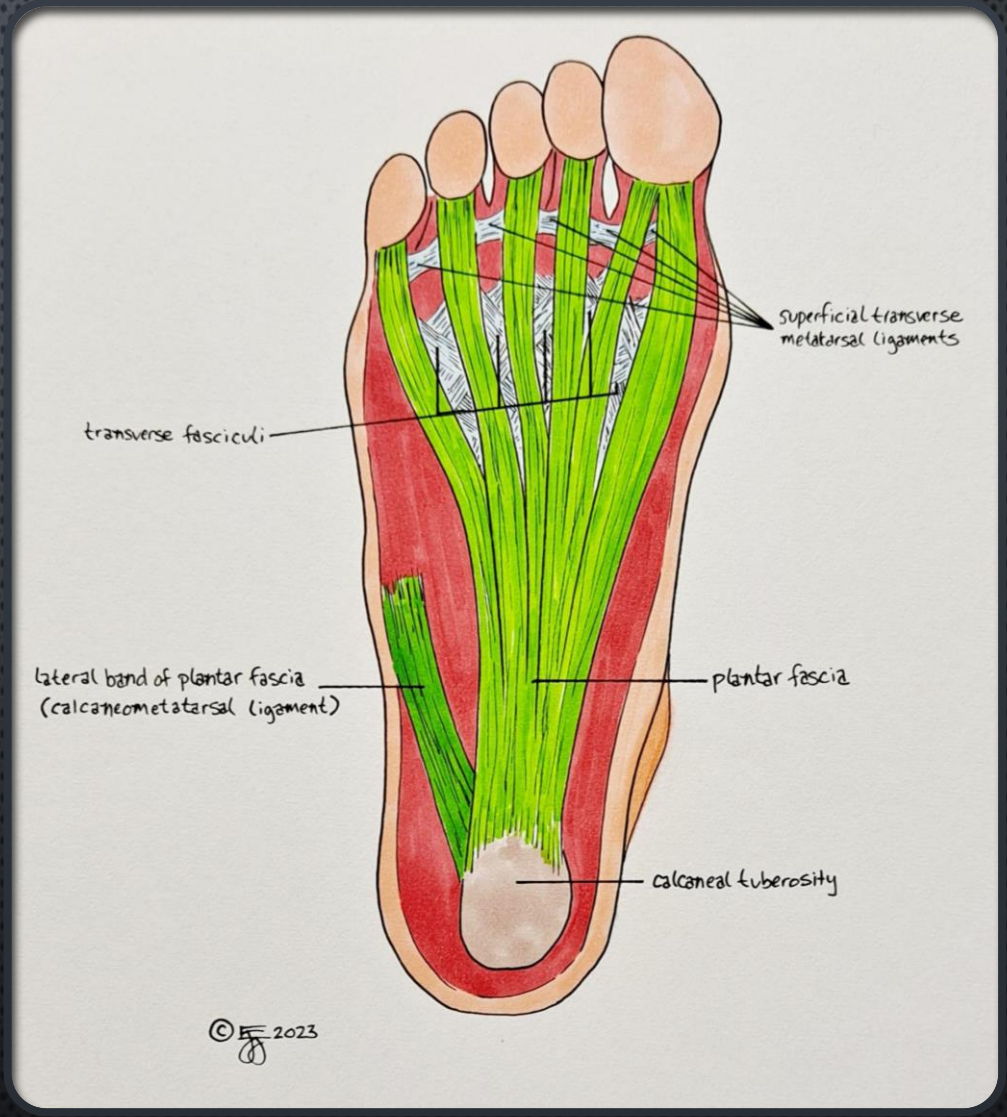
- 10% of US population will seek medical help for heel pain sometime in their lives.
- Potential causes could be:
  - Plantar Fasciitis
  - Tarsal Tunnel Syndrome
  - Calcaneal apophysitis
  - Calcaneal stress fracture
  - Insertional Achilles tendinitis
  - Retrocalcaneal bursitis
  - Central heel pain syndrome
  - Fat pad inflammation
  - Posterior tibial tendinitis
  - Heel spur???

Heel Pain

- Some Possible Etiologies
  - Repetitive Stress
  - Overactivity / Overuse
  - Dorsiflexion Restriction
  - Nerve Entrapment
  - Worn or Improper Fitting Footwear
  - Improper Footwear For Activity
  - Soft Tissue Change
  - Injury Allowing Increased Pronation
  - Increase in body weight

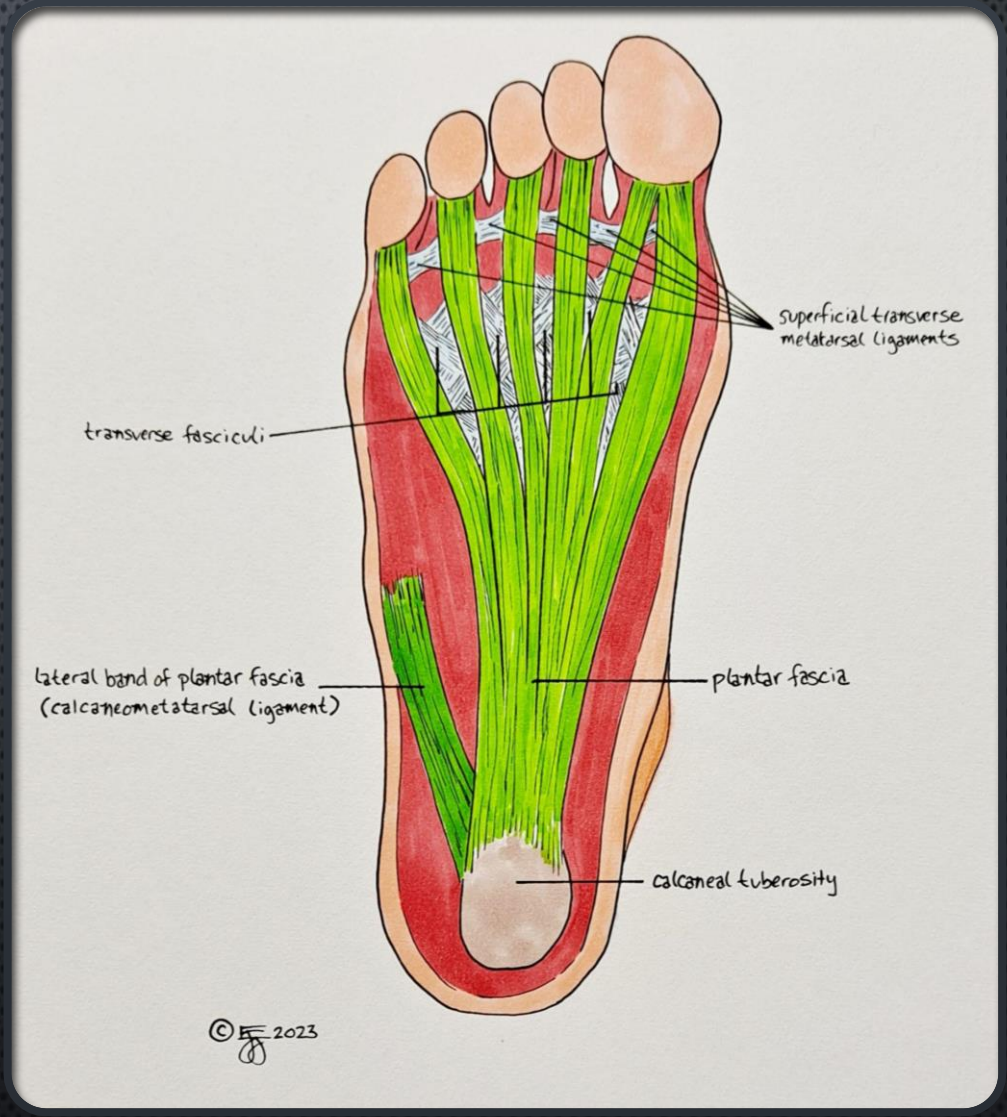
PLANTAR FASCIA

- The plantar fascia attaches to the heel bone (calcaneus) and to the base of the toes.
- It helps support the arch of the foot and has an important role in normal foot mechanics during walking.
- Tension or stress in the plantar fascia increases when you place weight on the foot, such as with standing or walking.
- Also referred to as the plantar aponeurosis.



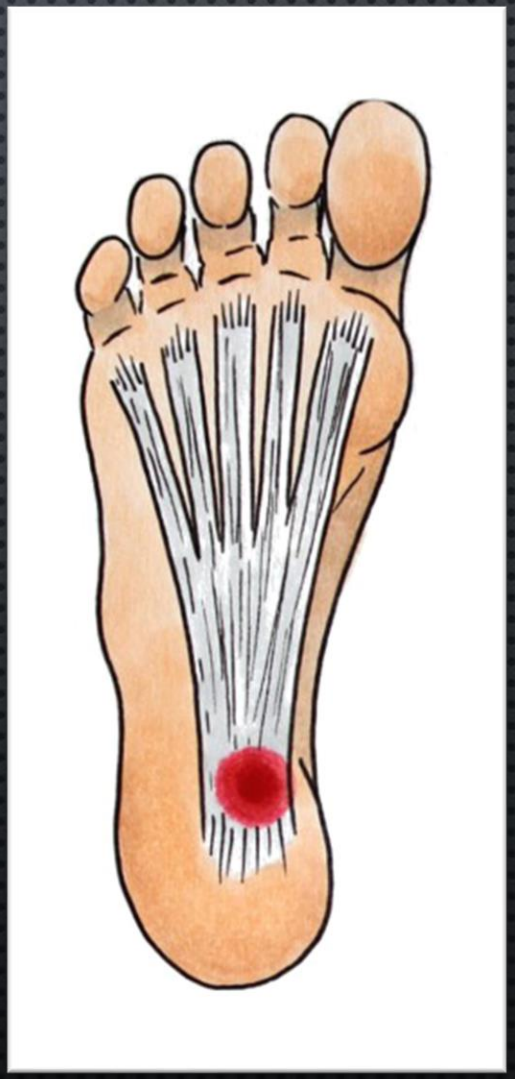
PLANTAR FASCIA

- The plantar fascia, while similar to a tendon or ligament, is neither. It is fascia.
- Fascia is the band of thin, fibrous connective tissue that wraps around and supports every structure in your body.
- Fascia is a stringy, white substance made mostly of collagen. Fascia is soft, loose and made up of multiple layers. A liquid called hyaluronan is between each layer. Hyaluronan helps the fascia stretch with movement.



PLANTAR FASCIITIS

- Described by Dr. William Wood in 1812 as a complication of tuberculosis
- 1 in 10 Americans will develop plantar fasciitis
  - Riddle DL, Pulisic M, Pidcoe P, Johnson RE. Risk factors for plantar fasciitis: a matched case-control study.*J Bone Joint Surg Am*. 2003; 85-A(5):872-877.
- Intense sharp heel pain with the first couple of steps in the morning or after other long periods without weight-bearing.
  - Post-static dyskinesia
- Pain primarily on the plantar surface of the foot at the anterior aspect of the calcaneus, but it may radiate proximally in more severe cases.
- Limp may be present, and patients may prefer to walk on their toes.
- Associated paresthesias, nocturnal pain, or systemic symptoms should raise suspicion of other causes of heel pain.



PLANTAR FASCIITIS

- Initially, the pain decreases with ambulation or athletic warm-up
- Then increases throughout the day as activity increases.
- A dull ache may be felt in the heel at the end of the day, especially after extensive walking or standing.
- In addition to pain, patients may complain of stiffness in the foot and localized swelling in the heel.

Plantar Fasciitis

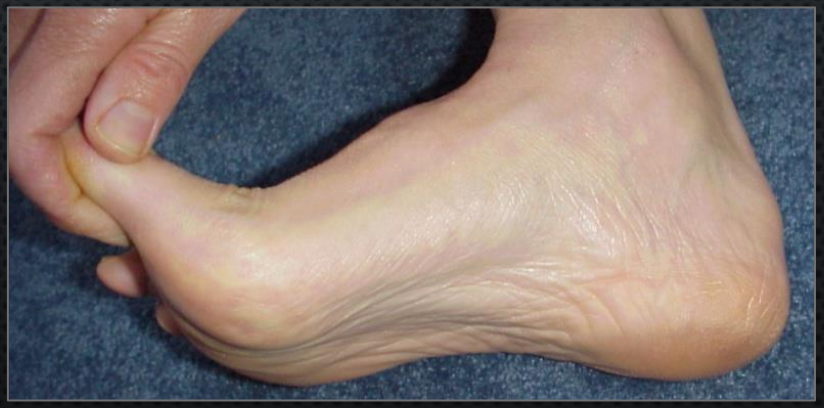
- Patients may report that before the onset of pain, they had increased the amount or intensity of activity including, but not limited to, running or walking
- They may have also started exercising on a different type of surface
- Or may have recently changed footwear (started a barefoot style running program)
- They may have sustained previous trauma to the foot (falls, motor vehicle accidents, work-related injuries)
- Pregnancy or other sudden weight gain

PLANTAR FASCIITIS

- Most patients report that the pain usually is most severe during the first few steps after prolonged inactivity, such as sleeping or sitting
- Patients may report that symptoms typically are relieved by unloading the affected foot (via sitting, elevation, or other means)
- Pain may be worsened by walking barefoot on hard surfaces or by walking up stairs
- In athletes, the pain may be particularly aggravated by sprinting
- Patients who are generally on their feet all day report that the symptoms may actually worsen by the end of the day

PLANTAR FASCIITIS

- Affects 10%-20% of injured athletes
- Prevalence in runners as high as 22%
- Accounts for 1 million doctor visits in US annually
- Tenderness along taut plantar aponeurosis that may increase when additional pressure is applied along the plantar aspect of the midfoot
- Although thought of as an inflammatory process, plantar fasciitis is a disorder of degenerative changes in the fascia, and may be more accurately termed plantar fasciosis



Plantar fasciitis

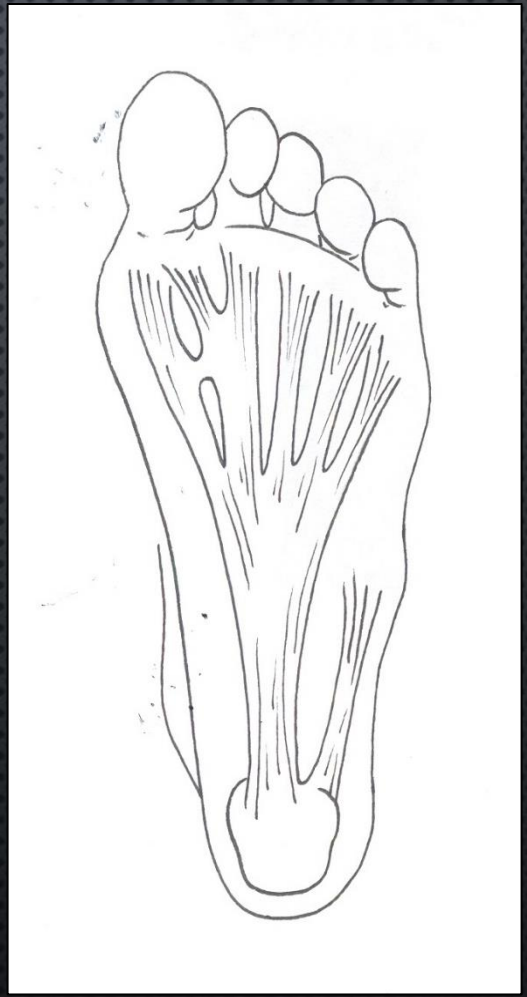
- Multifactorial in etiology
  - Intrinsic factors
    - Age
    - Excessive foot pronation
    - Obesity
    - Limited ankle dorsiflexion*
  - Extrinsic factors
    - Occupational prolonged weightbearing
    - Inappropriate shoe wear
    - Rapid increases in activity level
  - These factors combine to create a pathologic overload of the plantar fascia at the calcaneal insertion, causing microtears in the fascia that subsequently lead to perifascial edema and increasing heel pad thickness.

*Limited Ankle Dorsiflexion

- This study demonstrates the efficacy of stretching because improved Achilles tendon flexibility decreases the tension applied directly to the plantar fascia.
  - Viel E, Esnault M. The effect of increased tension in the plantar fascia: a biomechanical analysis. Physiother Pract. 1989;5:69–73.
- The literature reports heel-cord tightness in patients with plantar fasciitis Ankle dorsiflexion is necessary during the gait cycle to allow the body to pass over the foot; a tight Achilles tendon limits the amount of dorsiflexion available during gait.
  - Bolgla LA, Malone TR. Plantar fasciitis and the windlass mechanism: a biomechanical link to clinical practice. *J Athl Train*. 2004;39(1):77-82.
- People with tight Achilles tendon are **20x** more likely to develop plantar fasciitis
  - Riddle DL, Pulisic M, Pidcoe P, Johnson RE. Risk factors for plantar fasciitis: a matched case-control study.*J Bone Joint Surg Am*. 2003; 85-A(5):872-877.

PLANTAR FASCIITIS

- Important Considerations
  - Duration of Disease
    - 6 months +
  - Previous Treatment
    - Medical
    - Drug Store
  - Disease Causing Disability
    - Short Duration Upon Rising
    - Ambulatory Assist Devices Required
  - Activity
    - Recent Changes
    - Non Appropriate Activity

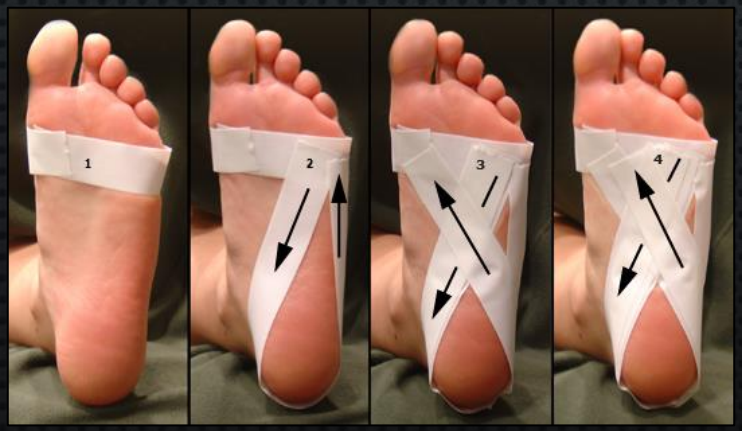


PLANTAR FASCIITIS

- Objective
  - Limit/Decelerate Pronation Motion
  - Control Hyperextension at the MTP's Reducing “Windlass Effect"
  - Ensure Correct Positioning During Stretching Program
  - Transfer force from sensitive calcaneal tubercle (??)
  - Reduce Tension & Shock Along Plantar Aponeurosis & Triceps Surae
  - Evaluate Activity and Foot Shape for Proper Fitting & Appropriate Type of Footwear for Activity
  - Limit or Delay End Range Motion

PLANTAR FASCIITIS

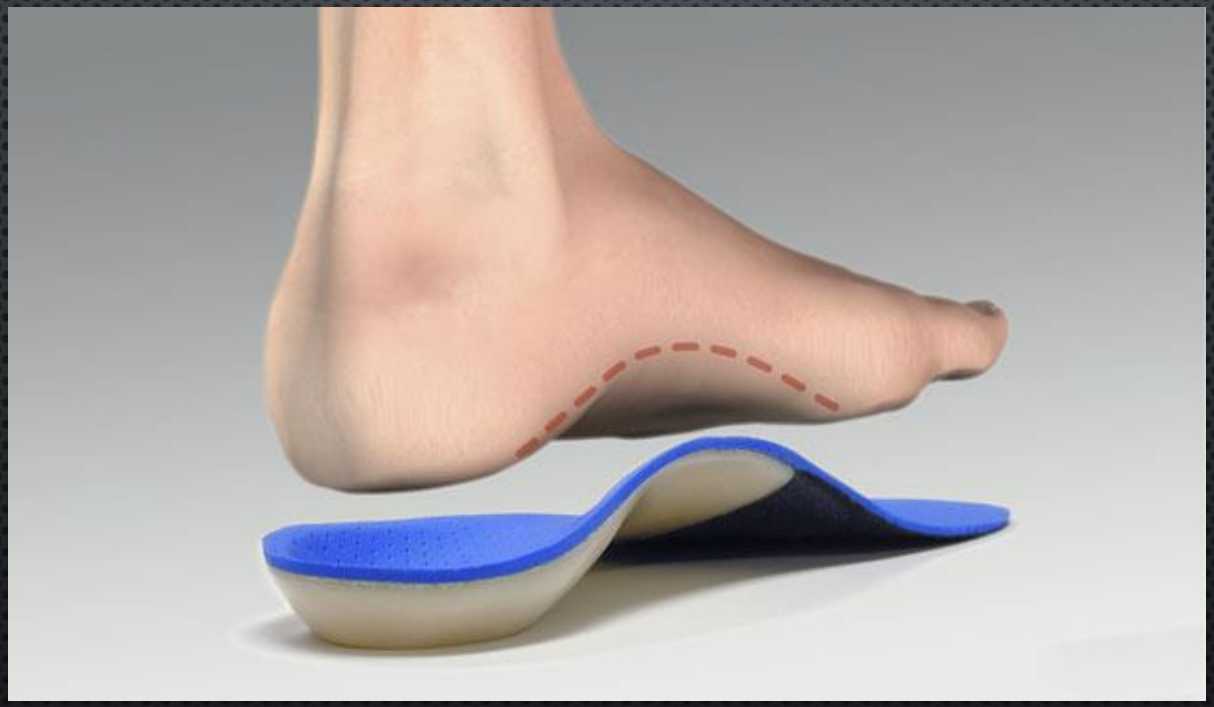
- Modalities
  - Effectiveness of Foot Orthoses to Treat Plantar Fasciitis
    - Landorf et al., Arch Intern Med 2006:166:1305
  - Plantar fascia-specific stretching exercise improves outcomes in patients with chronic plantar fasciitis. A prospective clinical trial with two-year follow-up
    - Digiovanni B, et al., JBJS 2006 **88** (8): 1775–81
  - Low-Dye Taping Versus Medial Arch Support in Managing Pain and Pain-Related Disability in Patients With Plantar Fasciitis
    - Abd El Salam MS, Abd Elhafz YN., Foot Ankle Spec. 2010 Dec 1.
  - Night splint treatment for plantar fasciitis. A prospective randomized study
    - Probe RA, et al., Clin Orthop Relat Res. 1999 Nov;(368):190-5.



PLANTAR FASCIITIS

- Initial In Shoe Treatment
  - Hard Heel Cup
    - Soft Tissue Confinement
  - Waffle Heel Cup
    - Pneumatic Resistance
  - Gel Heel Cup
    - Elevation/Attenuation
  - Off-The-Shelf Insert
  - Replace Worn / Inappropriate Footwear

FOOT ORTHOSES



Plantar Fasciitis

- Foot Orthoses
  - 3/4 to Full length
  - Isolate and control areas allowing hyperpronation
  - Utilize shock attenuating materials
  - Provide longitudinal arch support
  - Temporary heel elevation to decrease obligated dorsiflexion

PLANTAR FASCIITIS

- Modalities
  - Orthoses
    - Utilize a heel cup to control plantar fat pad
    - Carbon Fiber/Plastic Foot Plate to limit MTPJ motion
    - Off load (evacuate) area of point tenderness (??)

PLANTAR FASCIITIS

- Modalities
  - Shoe
    - Insure Adequate Width
    - Insure Adequate Length
    - Insure Proper Location of Break of Shoe
    - Firm shock absorbing sole

Plantar Fasciitis

- Landorf et al. *Effectiveness of different types of foot orthoses for the treatment of plantar fasciitis.* JAPMA 2004 Nov-Dec;94(6):542-9
  - FOs do have a role in the treatment of PF
  - Premades and custom work equally as well
  - Cannot be inferred that custom FOs are more effective
- Landorf et al. *Effectiveness of foot orthoses to treat plantar fasciitis: a randomized trial.* Arch Intern Med 2006 Jun 26;166(12):1305-10.
  - Foot orthoses produce small short-term benefits…and may also produce small reductions in pain for people with plantar fasciitis, but they do not have long-term beneficial effects compared with a sham device.
  - The customized and prefabricated orthoses… have similar effectiveness in the treatment of plantar fasciitis.

Plantar fasciitis

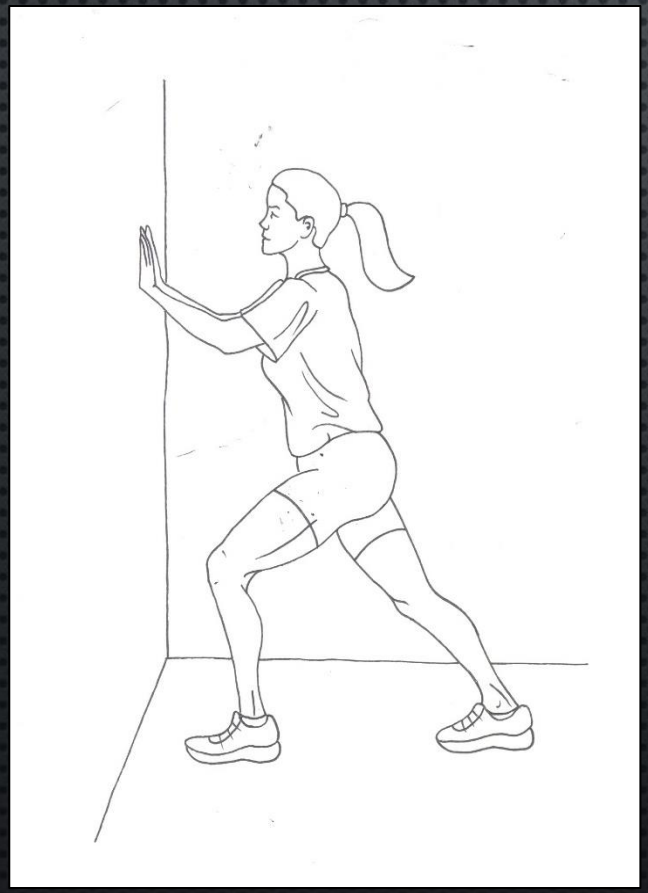
- Scherer PR, *Do prefab foot orthoses have a place in treating plantar fasciitis?* Podiatry Today 2007 Nov;20(11).
  - Semi-rigid PFOs work better than accommodative
  - Semi-rigid prefab FOs work just as well as custom
- Is plantar fasciitis simply a self-limiting condition?
  - **Yes!**
    - Goff JD, Crawford R. Diagnosis and treatment of plantar fasciitis. Am Fam Physician. 2011 Sep 15;84(6):676-82. PMID: 21916393.
  - ≈80-90% self-resolve within 11-12 months
    - Klein SE, Dale AM, Hayes MH, Johnson JE, McCormick JJ, Racette BA. Clinical presentation and self-reported patterns of pain and function in patients with plantar heel pain. *Foot Ankle Int*. 2012;33(9):693-698.

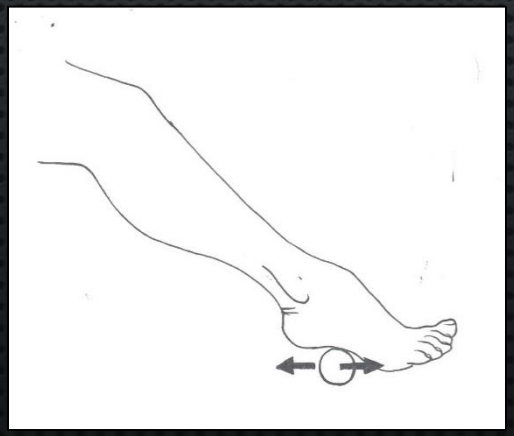
PLANTAR FASCIITIS

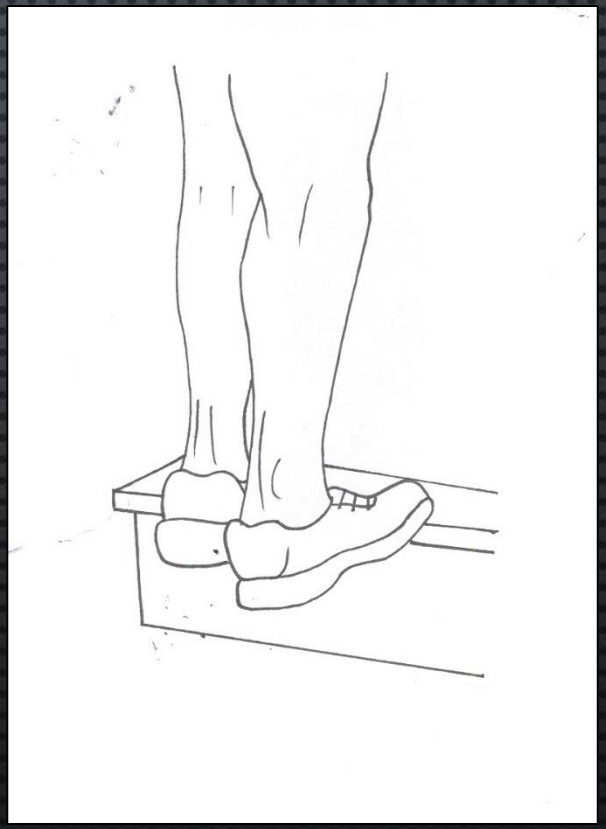
- CURE = STRETCHING!

This is *not* stretching.

PLANTAR FASCIITIS

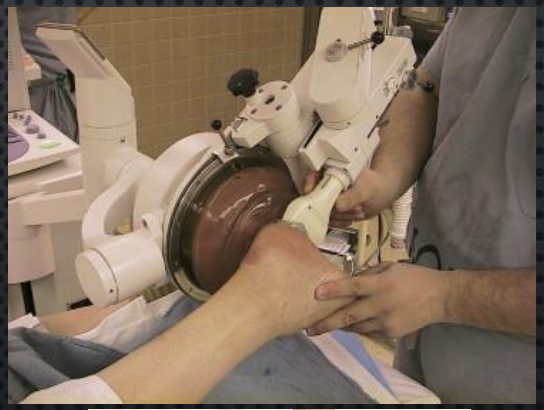






Podiatric/Orthopedic Intervention

- Steroid Injections
  - Kim C, Cashdollar MR, Mendicino RW, Catanzariti AR, Fuge L. **Incidence of plantar fascia ruptures following corticosteroid injection.** Foot Ankle Spec. 2010 Dec;3(6):335-7. doi: 10.1177/1938640010378530. Epub 2010 Sep 3.
  - Lee HS, Choi YR, Kim SW, Lee JY, Seo JH, Jeong JJ. Risk factors affecting chronic rupture of the plantar fascia. Foot Ankle Int. 2014 Mar;35(3):258-63.
    - **Conclusion:** Steroid injections for plantar fasciitis should be cautiously administered because of the higher risk for plantar fascia rupture.



- Extracorporeal Shockwave Therapy
  - Jessup RL, Oates MJ, Johnston RV, Buchbinder R. Shockwave therapy for plantar heel pain (plantar fasciitis). *Cochrane Database Syst Rev*. 2019;2019(11):CD013490. Published 2019 Nov 25. doi:10.1002/14651858.CD013490

- Surgery?

DIFFERENTIAL DIAGNOSES

Tarsal Tunnel Syndrome

- Compression of the medial branch of the tibial nerve within a portion of the fibro-osseous tunnel
- Often misdiagnosed

Interactive Foot and Ankle v2.0 2000 Primal Pictures Ltd.

Tarsal tunnel syndrome

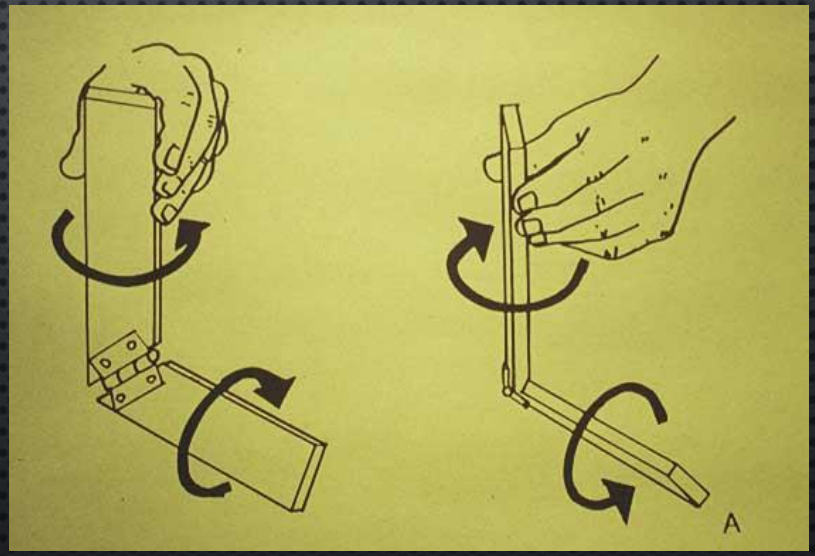
- The tarsal tunnel is a narrow space that lies on the inside of the ankle next to the ankle bones. The tunnel is covered with a thick ligament (the flexor retinaculum) that protects and maintains the structures contained within the tunnel.
- Symptoms:
  - Heel pain that may radiate toward the toes
  - Numbness, burning, tingling, electric shock-type pain
  - Nighttime and NWB pain

Tarsal tunnel syndrome

- Tarsal tunnel syndrome was first described by Ward in 1948.
- Decompression of the posterior tibial nerve was first reported in 1962 by Keck.
- The syndrome was reported by Lam in the same year, when the first decompression was performed in the UK.

Tarsal Tunnel Syndrome

- Objective
  - Correct foot position to reduce stress on nerve
  - Control pronation
  - Reduce compression of tissues located distal to medial malleolus

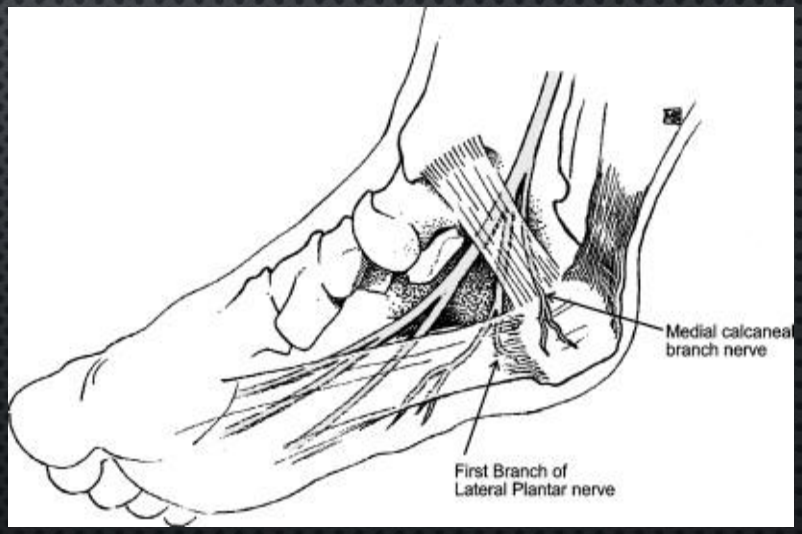


Tarsal Tunnel Syndrome

- Modalities
  - Orthoses
    - Isolate and controls areas allowing hyperpronaton
    - Post medially both distal and proximal 2-4 degrees
    - Return to most functional position gradually
    - Viscoelastic polymer under nerve route

Baxter's Nerve Impingement vs. Tarsal Tunnel Syndrome

- Baxter's nerve entrapment
  - First branch of lateral plantar nerve
  - Baxter believes this to be the cause of as much as 20% of heel pain
    - Baxter DE. "Release of the Nerve to the Abductor Digiti Minimi" in Master Techniques in Orthopaedic Surgery of The Foot and Ankle, ed by HB Kitaoka, p 359, Lippincott Williams and Wilkins, Philadelphia, PA, 2002.



Baxter's nerve impingement

- Baxter's nerve is a mixed sensory and motor nerve
- Baxter's nerve impingement can produce symptoms indistinguishable from plantar fasciitis
- While this diagnosis has been said to account for up to 20% of heel pain, it is often overlooked relative to other causes of heel pain

Baxter's nerve impingement

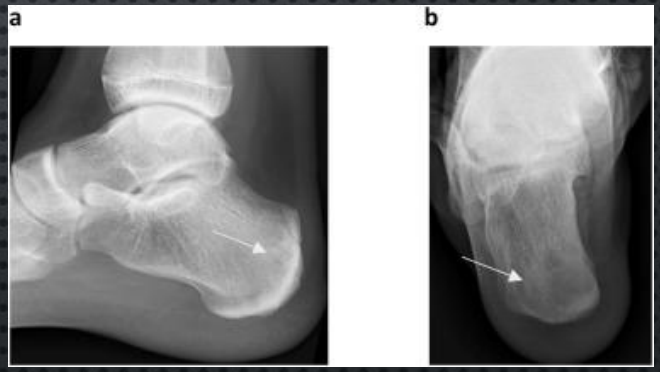
- Unfortunately, there is not much to be done from a pedorthic perspective.
- Possibly a semirigid FO with viscoelastic polymer under the entirety of the heel?

Heel Pain

- Calcaneal apophysitis (Sever's disease)
  - Inflammation in the open space between growth plates
  - Pain located inferior to Achilles insertion site
  - Seen in active, growing children and adolescents
  - Treatment may include
    - heel lift to reduce stress caused by Achilles
    - properly fitting shoes with good heel control
    - foot orthoses with cushioned heel to reduce shock on heel strike

Heel Pain

- Calcaneal stress fracture
  - Symptoms can mimic plantar fasciitis, but intense pain is caused by side-to-side compression of calcaneous
  - Considered one of the most disabilitating injuries
  - Intraarticular calcaneal fractures cause permanent osseous and soft tissue injury
  - Unsatisfactory outcomes 30% to 50% non-operative, 25% to 40% operative (Paley)
  - Gradual improvement of symptoms over 2 to 6 year period



Heel Pain

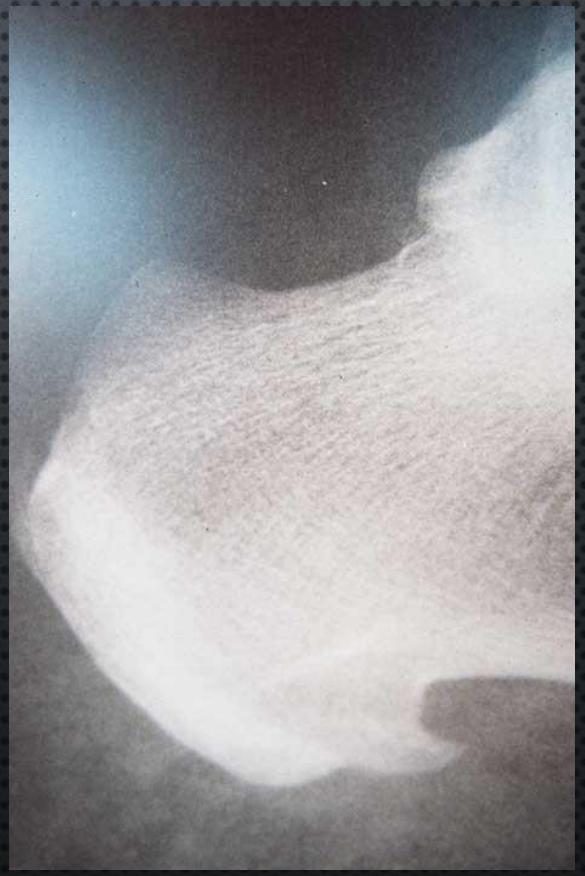
- Insertional Achilles tendinitis
  - Activity-related pain at the posterior heel, especially on an incline
  - Treated with a heel lift and stretching exercises
  - Chronic cases treated with immobilization such as a cast or walker boot

Heel Pain

- Centralized heel pain syndrome
  - Localized in the central or medial heel pad
  - No pain distally along the plantar fascia
  - Negative heel squeeze test
  - Can be related to plantar fasciitis, or it can be caused by an inflamed bursa deep in the heel pad

HEEL PAIN

- HEEL SPUR???
  - UNLESS IT IS FRACTURED, THE SPUR IS NOT THE CAUSE OF THE PAIN!
  - 50% OF PEOPLE WITH HEEL PAIN HAVE HEEL SPURS
  - 50% OF THE POPULATION HAS HEEL SPURS



The most important thing!

- The most valuable tool we have at our disposal is also the important thing we must accomplish to be successful.
- Expectation Management
  - Thoroughly explain Dx and Rx
  - Education
  - Compare and contrast with what patient has tried before
  - Alternatives and options
  - Outline benefits and potential pitfalls
  - Set realistic, attainable goals
  - Mutually agreeable (and documented) plan

Conclusion

- "Heel Pain" is a garbage descriptor, not a diagnosis.
- There are many causes for heel pain that are often overlooked.
- Tarsal tunnel syndrome is commonly misdiagnosed.
- Lay out realistic, attainable treatment goals for your patients and you will have a lot happier patients!
- Plantar fasciitis is a self-limiting condition.
- Tendoachilles stretching is where it's at!

THANK YOU!