



Plantar Fasciitis

Plantar fasciitis (PF) is a degenerative syndrome of the plantar fascia resulting from repeated trauma at its origin on the calcaneus¹ and is reported to be the most common cause of inferior heel pain in adults². Plantar fasciitis is also known as painful heel syndrome, heel spur syndrome,³ runner's heel, policemen's heel, subcalcaneal pain, calcaneodynia, and calcaneal periostitis.⁴

The fascia is a band or layer of fibrous tissue and is characterized by its inability to stretch and contract like muscles, its origin is at the medial tubercle and anterior aspect of the heel bone or calcaneus. The term plantar is indicative of its position within the foot structure as it relates to the sole of the foot.

Plantar Fasciitis (Heel Spur Syndrome) or heel pain can be extremely debilitating and can severely limit patient's mobility and for this reason one needs to identify the underlying causative factor to provide relief to the patient.

The etiology or cause of this condition is not clearly understood and is probably multi-factorial in nature. Weight gain⁵, occupation-related activity⁵, anatomical variations, poor biomechanics, over exertion, and inadequate footwear are all contributing factors.

Pain associated with the plantar fascia can be experienced under the arch or in various locations within the heel such as the medial, centre and lateral aspects.

When a patient presents at an initial consultation they will generally outline a Point of Pain (P.O.P) and will be looking to gain quick, if not immediate relief. Practitioners should initially focus on the P.O.P, whilst at the same time endeavouring to identify the root cause which has triggered the symptomatic pain (in non-trauma cases

only).

Excessive subtalar joint pronation lowers the arch structure causing the foot to elongate and traction forces are then placed on the Plantar Fascia resulting in inflammation of the plantar calcaneal attachments (Warren, 1990; Kibler et al, 1991).

First identify where the pain is felt by the patient - medial heel pain, lateral heel pain or central heel pain. The point of pain (POP) is important as this will help determine the underlying cause and ultimately the best treatment.

There are three aponeuroses under the foot, medial, central and lateral attachments to the calcaneus.

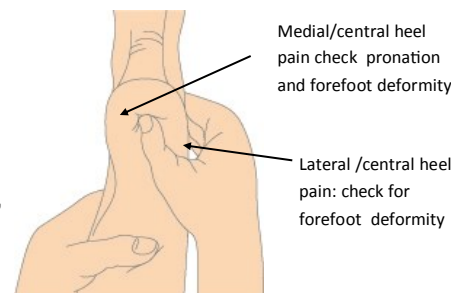
Thus, it is critical to identify the point of pain, as it will greatly assist in the diagnostic process and subsequent treatment. Valmassy and Subotnick⁶ indicate that the position of pain may indicate the underlying foot mechanics issue. Medial heel pain due to Pronation, Lateral heel pain due to Supination and centre Heel pain possibly a combination of supination and pronation which allows the plantar fascia to exhibit stress at the central attachment point.

Medial Heel Pain - is associated with excessive pronation - more than the 4° - 6° the body allows for shock absorption. Excessive pronation causes the medial plantar fascia to elongate or stress causing inflammation and pain, ultimately detachment from the calcaneus may occur.



Fig 1: pain can be central, medial or lateral

Central Heel Pain - is associated with high lateral heel strike in gait to mid foot collapse, and pronation at mid stance of gait, together with a forefoot valgus deformity. When the foot lands laterally the ground, reaction forces propel the foot into pronation as it enters mid stance phase, causing middle or central plantar fascia elongation to occur, by creating a 'point of tear effect'.



Medial/central heel pain check pronation and forefoot deformity

Lateral /central heel pain: check for forefoot deformity

Fig 2: Lateral heel pain

Lateral Heel Pain - is associated with a Pes Cavus foot structure or a high forefoot valgus which causes the lateral plantar fascia to strain at the attachment. A fixed plantar flexed 1st ray can also cause lateral heel pain due to foot mechanics positional shift during gait. Subotnick⁶ notes that there is 'a greater lateral instability and higher incidence of lateral sprains for the ankle' with an inflexible cavus foot.

All the above will affect either Lateral heel pain, medial heel pain or centre heel pain and may also have a bearing on knee pain

Treatment

1. Check if the patient is pronating or supinating. Look at the amount of pronation by correcting the feet to neutral (Neutral Calcaneal Stance Position), then allowing the patient to relax (Resting Calcaneal Stance Position). This will identify the total pronation factor.

2. Check the patient's weight, against the most suitable ICB Orthotic density, i.e. supporting the patients arch without collapsing under their body weight.

3. Identify if there is a forefoot valgus. If a forefoot deformity exists, attach the appropriate size forefoot addition to the orthotic prior to heat moulding. Then proceed to heat mould the orthotic, with the patient's foot in the neutral calcaneal stance position.

4. When fitting orthotics always check if there is a structural leg length difference. If a leg length difference is detected the fitting of orthotics will remedy any long leg compensation. If the patient has a structural short leg add a heel lift (i.e. 4mm) and build up gradually to the required height.



5. Check the patient for a tight plantar fascia (See Figure 3 below) as this may cause orthotic compliance problems and irritation in the patients' arch.



Fig 3: Check for tight fascia using Windlass

If the patient does exhibit a tight plantar fascia, a plantar fascial groove will need to be made into the arch of the orthotic, after the heat moulding process.



Placing Plantar Fascial groove into ICB orthotic

For more information on how to create a plantar fascial groove, go to: www.icbmedical.com/modifying.

Post-Compliance Issues

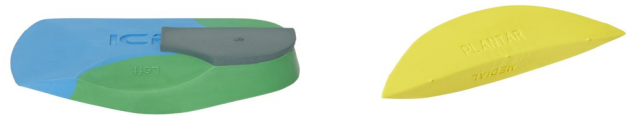
If after the wearing-in period the patient complains of pain under the arch caused by the orthotics, check the following:

1. Is the orthotic sufficiently controlling the pronation?
2. Is the patient's Neutral Calcaneal Stance Position greater

than the 5° built into the ICB orthotics? If this is the case: :

a. Check the density guide (www.icbmedical.com/fitting) and upgrade the patient to a more supportive controlling device, eg. change from an ICB Mid density Blue orthotic to a Sports model or Firm Green orthotic.

b. If the density is correct, however the device is not controlling the pronation, increase the inversion angle by adding a Rearfoot Varus Addition to the existing orthotic or attach a MLA –medial Longitudinal arch infill to reduce arch collapse.



c. If the patient's ideal or NCSP measures higher than the 5° rearfoot varus angle built into each ICB Orthotic follow step b. and add the required Rearfoot Varus Addition and re-mould the orthotic.

Additional Treatments

- Low Dye Strapping: to assist or mimic an orthotic
- Protection with padding + .R.I.C.E
- Foot Mobilisation
- Deep Tissue Massage - to break down fibrous tissue

Differential Diagnosis

Entrapment of the medial calcaneal branch of the tibial nerve.

Tarsal Tunnel Syndrome, Dupuytren's contracture & Plantar fibromatosis

References:

1. CORNWALL MW, McPOIL TG. Plantar fasciitis: Etiology and Treatment. J Orthop Sports Phys Ther 1999;29:756-76.
2. SINGH D, ANGEL J, BRENTLEY G, TREVINO SG. Plantar fasciitis. BMJ 1997;315:172-17.S.
3. LEMONT H, AMMIATI KM, USEN N. Plantar Fasciitis: a Degenerative Process (fasciosis) without Inflammation. J Am Podiatric Med Assoc 2003;93:234-237
4. DAVIES MS, WEISS GA, SAXBY TS. Plantar Fasciitis: How Successful is Surgical Intervention? Foot Ankle Int 1999;20:803-807
5. RIDDLE D. L., PT, PHD., PULISIC M, PT OCS, P. PIDCOE, PT, PHD, R. E. JOHNSON, PHD. Risk Factors for Plantar Fasciitis: A Matched Case- Control Study 2003. JBJS.ORG VOLUME 85-A · NUMBER 5 · MAY
6. SUBOTNICK Steven I Sports Medicine of the Lower Extremity Ed2 1999 p131

General references

- MICHAUD, T.C. (1997) *Foot Orthoses and Other Forms of Conservative Foot Care*, Sydney: Williams & Wilkins
- WARREN, B.L (1990) *Plantar fasciitis in Runners: Treatment and Prevention*, Sports Medicine, 10 (5): 338-345
- KIBLER, W.B., GOLDBERG, C., & CHANDLER, T.J. (1991) *Functional Biomechanical Deficits in Running Athletes with Plantar Fasciitis*, the American Journal of Sports Medicine, 19, (1): 66-71

facebook

Join us on facebook and keep up to date with exclusive case study discussions, treatment advice, promotions and much more.

Lower limb biomechanical assessment & treatment techniques now available to view online.

You Tube