Case Study
Plantar Fasciopathy

Practice: Resonance Podiatry and Gait Labs
Patient: 43 year old female netball umpire

The plantar fascia is a tight band of thick connective tissue supporting the medial arch of the foot running from the calcaneus (heel) to the metatarsal heads. Plantar fasciopathy is one of the most common causes of heel pain and usually occurs at the medial tuberosity of the calcaneus. There are a number of predisposing factors contributing to plantar fasciopathy including obesity, occupations requiring people to stand on hard surfaces for long periods of time, excessive pronation or reduced mobility in the ankle, footwear or taking up activities such as running or suddenly increasing the run distance.

Current Situation

A 43-year-old female professional netball umpire presented with a 6-month history of right plantar medial heel pain. The onset of pain was triggered by increased umpire training to compete for spot in ANZ Championship.

The training regime consisted of:

- Running on flat interval running of 3 x 2km sprints; or 4-minute runs, 3-minute rests, up to 45 minutes.
- Agility training including ladder work, shuttle runs, working on pivoting technique, particularly off the right foot.
- Weight training
- Pilates x1 per week
- Swimming

Past Medical History

The patient has a history of left Achilles tendinopathy.

Previous Treatment Interventions include:

- Physiotherapy, foot mobilisation, foot strapping modalities, deep tissue massage (foot and calf), Hamstring and Calf stretching, lower Back Mobilisation.
- The patients training/umpiring shoes were Asics GT2000

Goals

The patient's goals were to achieve Level 17 on the Yo-Yo Intermittent Test and to obtain a spot as an ANZ Netball Championship Umpire.

Assessment

- Pain on palpation of the medial calcaneal tubercle.
- Pain on palpation of the Abductor Hallucis muscle belly.
- There was limited first ray, first MTPJ, midtarsal and subtalar joint, range of motion.
- A plantarflexed first ray, limited plantflexion, more dorsiflexion.
- The subtalar was pronated on stance.
- There was a tibial valgum position of the legs, Jack's Test was hard and delayed
- The first ray dorsiflexes functionally with Squat Test.
- Static pressure revealed right heel hypoloading, and lateral forefoot hyperloading.
- Dynamic pressure revealed hypoloading through first MTPJ and hallux.
- Dynamic pressure revealed low weightbearing surface area right foot, relative to left.

Biopostural Analysis

Static Pressure

- Right heel hypoload
- Right lateral forefoot hyperload
- Left central to lateral forefoot hyperload
- Left general limb hyperload (59%)

Biopostural Analysis Dynamic Pressure

- Dynamic Pressure bilaterally first MTPJ and hallux hypoload
- Peak loading central forefoot
- Low surface area right foot, relative to left

Video Gait Analysis: Walking

Plantar Fasciopathy

- Left lateral heel strike
- Right central heel strike
- The right foot is in a slightly abducted position.
- There is excessive pronation of the rear and midfoot throughout stance phase; thus, applying a dorsiflexion force on the first ray.
- As confirmed with dynamic pressure analysis, there is first MTPJ hypoloading, causing ineffective windlass firing and a lateral, low gear toe off.
- There is an increase in frontal plane motion through the pelvis.
- There is increased hip extension at toe off on the right side, more than left.
- Windlass propulsion is decreased on the right side.
- Increased knee flexion at heel strike, bilaterally.

Video Gait Analysis: Running

- Lateral heel strike, bilaterally
- As with walking the right foot is in a slightly abducted position.
- Pronation is well managed through midstance.
- Toe off is lateral on the right which causes a slight circumduction of the right limb through swing phase
- During late stance phase of the right limb, the left hip anteriorly rotates in order to help the right hip achieve adequate extension for propulsion.
- More hip extension occurring on the right side than left
- Backswing is higher on the right side compared to left
- Increased trunk torsion in the transverse plane

Diagnosis

The differential diagnosis is Chronic plantar heel pain, including abductor hallucis tendinopathy/overload, and plantar fasciopathy. Additionally, there could be a component of flexor hallucis brevis/longus weakness.

I felt the Asics 2000 was adding to the first ray dorsiflexion and ineffective windlass function, combined with the nature of her training/umpiring whereby she needs to pivot and turn; abductor hallucis was overworking and pulling on the medial calcaneal tubercle.

Treatment

- New footwear- torsionally structured, neutral, running shoe - Brooks Defyance, and Asics Cumulus for games.
- Dual Density Red Formthotics
- Exercise regime

Exercise Regime

- Continued physiotherapy
- Mobilisation
- Strength/Loading
- Strapping

Formthotics

Dual Density Formthotics customised with a right side medial rearfoot post, lateral forefoot post and a cluffy extension. These modifications encourage maximal first ray plantarflexion and optimise windlass activation and sagittal plane propulsion, to unload the plantar fascia and abductor hallucis, reduce excessive pronatory sheering forces, and decrease low gear toe off.

Increased sheering forces and greater peak dorsiflexion force on the first MTPJ have been recognised in the literature as contributing factors to plantar heel pain.

Footwear

Moving into a neutral running shoe; the patient went on to purchase the Brooks Defyance, and has been given the Asics Cumulus for her games. A running shoe is preferable for umpiring as most of the direction is forward running down the sideline, with pivoting only at the end of the court. Additionally, we had found from her previous left Achilles tendinopathy a netball shoe/cross training aggravated her Achilles.

Outcome

One Month Post Treatment

- Level 17 Yoyo Intermittent Test achieved pain-free, with only mild residual lateral forefoot discomfort, which resolved with foot massageAgility work and running is pain-free.

12 Months Post Treatment

- Selected to Umpire in the ANZ Championship
- Umpired the season pain-free.