

Case Study: Chronic Plantar Heel Pain/Plantar Fasciopathy

CASE STUDY PRESENTATION
by Resonance Podiatry and Gait Labs



THE PATIENT

- **43yo female, professional netball umpire**
- **6 month history right plantar medial heel pain**
 - Onset of pain triggered by increased umpire training to compete for spot in ANZ Championship
- **Training Regime:**
 - Running on flat interval running of 3x 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 Hx**
 - Hx of left Achilles tendinopathy
- **Goals**
 - Achieve Level 17 on the Yo-Yo Intermittent Test
 - Obtain spot as ANZ Netball Championship Umpire



Previous Treatment Intervention

- **Physiotherapy**
 - Foot mobilisation
 - Foot strapping modalities
 - Deep Tissue massage (foot and calf)
 - Hamstring and Calf stretching
 - Lower Back Mobilisation
- **Training Shoe/Umpiring shoe**
 - Asics GT2000



KEY BIOMECHANICAL FINDINGS

- Pain to palpate the medial calcaneal tubercle
- Pain to palpate Abductor Hallucis muscle belly
- **Limited** first ray, first MTPJ, midtarsal and subtalar joint, **range of motion**
- Plantarflexed first ray, limited plantflexion, more dorsiflexion
- Subtalar joint **pronated** on stance
- Tibial valgum position
- Jack's Test hard, **delayed**
- 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

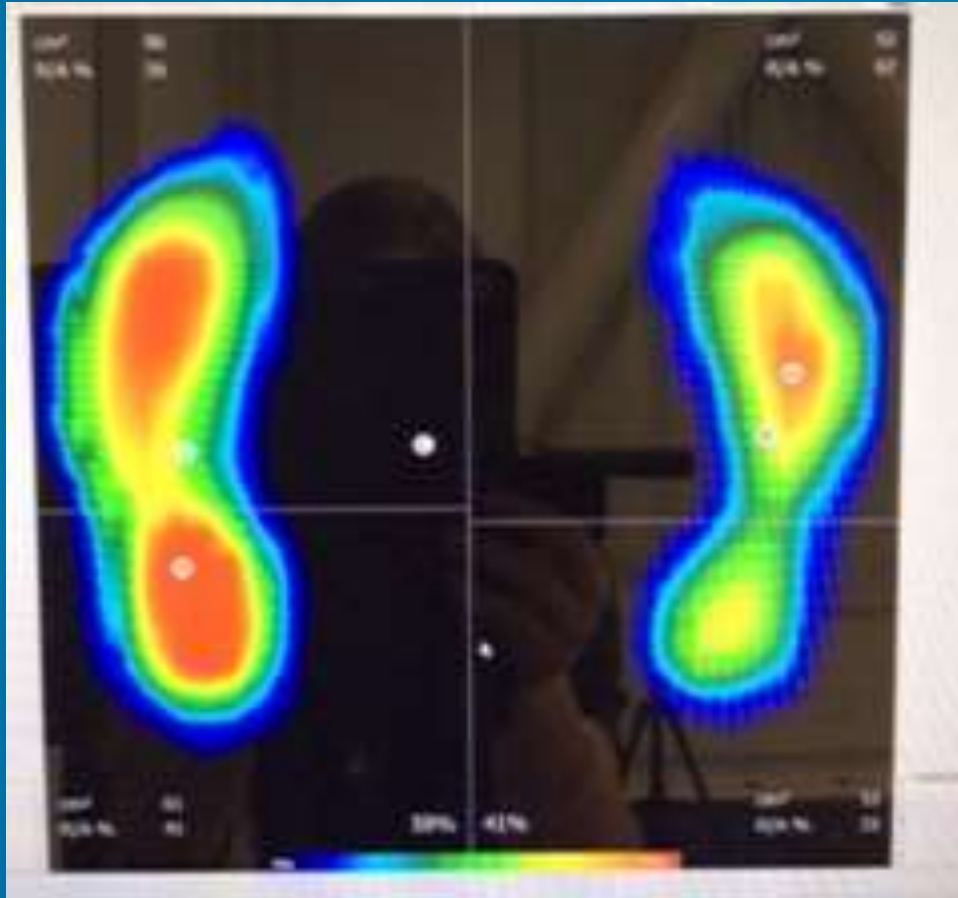


BIOPOSTURAL ANALYSIS

STATIC PRESSURE

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Static Footprint

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

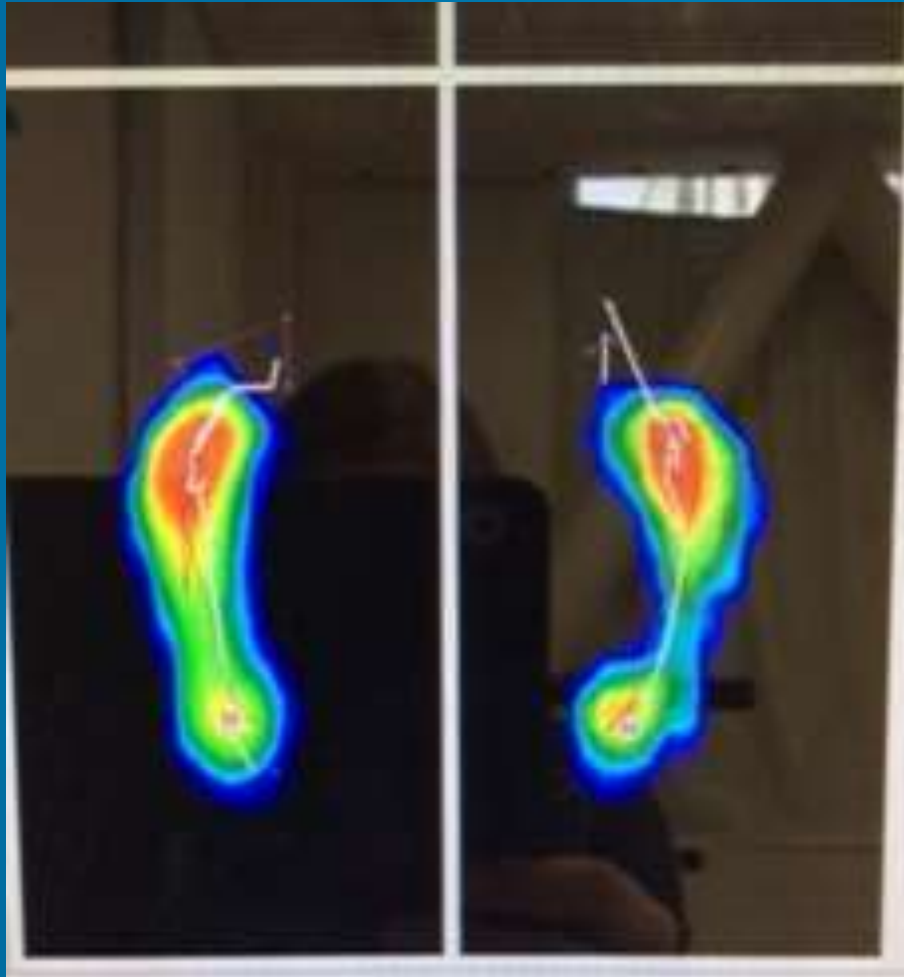


BIOPOSTURAL ANALYSIS

DYNAMIC PRESSURE

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Footprint Average

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



VIDEO GAIT ANALYSIS: Walking



Frontal plane camera view

Video gait analysis revealed

- 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.



VIDEO GAIT ANALYSIS: Walking

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Sagittal plane camera view



Video gait analysis revealed

- 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



Frontal plane camera view

Video Gait Analysis revealed

- 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.



Video Gait Analysis: Running



Sagittal plane camera view

Video Gait Analysis revealed:

- 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



ANALYSIS

“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”



MANAGEMENT

Physical Footwear Changes

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

Exercise Regime

- Continued physiotherapy
 - Mobilisation
 - Strength/Loading
 - Strapping



MANAGEMENT

“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 recognized in the literature as contributing factors to plantar heel pain”

“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 AT ONE MONTH

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



OUTCOME AT 12 MONTHS

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



About Us



Resonance are a team of specialist Podiatrists with an evidence-based, multidisciplinary approach to patient management.

Utilising leading edge technology, our Podiatrists manage a wide array of biomechanical injuries, functional ailments, and medical conditions.

<http://www.respod.co.nz>



A world-recognised selection of customisable foot orthoses that give ultimate support and comfort to the patient.

Formthotics™ provide the clinician with a versatile tool to fit the patient's foot and shoe, assisting treatment of lower extremity problems.

<http://www.formthotics.com>