

# Orthotic options for pressure redistribution in the high risk foot

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**Austin**  
HEALTH

You've only had to run so far so good  
But you will come to a place  
Where the only thing you feel  
Are loaded guns in your face  
And you'll have to deal with  
PRESSURE

*Billy Joel*

# Why do Total Contact Casts Work?

- Wound offloading
- Transfer of pressure to healthy tissue
- Biomechanically constant forces – reduce shear
- Non removable

Non removable walkers have been shown to be equally effective as  
TCCs <sup>1</sup>

Incentive to wear offloading devices...



# Motivation?



# Orthotic Options

## Customised

- Temporary Footwear
- Cam Walkers
- Prefabricated Insoles
- Depth Width shoes



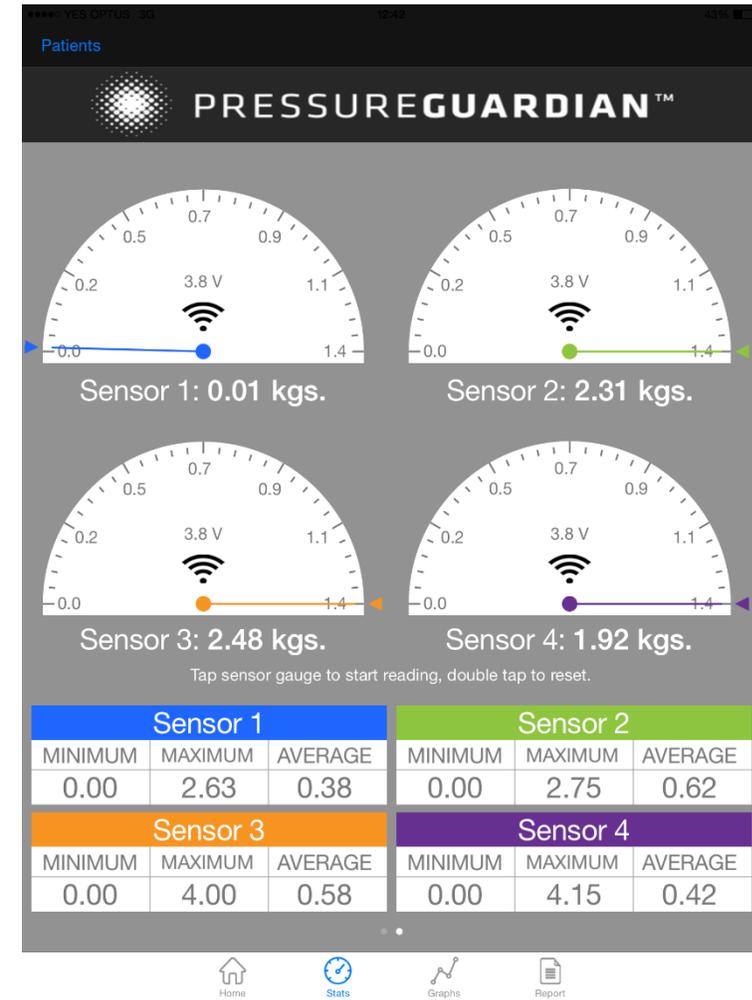
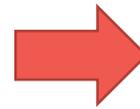
## Custom

- Foot Orthotics
- Custom Footwear
- CROW
- Arizona AFO



# Taking evidence to wherever you practice

“We’ll know it’s working, until it isn’t” vs “here’s how well this is working”



# Taking evidence to wherever you practice

When and why of measurements

- Recalcitrant wounds
- Less adherence to treatment regime
- Aim for <200kPa peak pressure or 30% reduction from current <sup>2,3</sup>

Implications

- Longer consultations
- Economic cost/benefit ratio?
  - To the clinician and the consumer



# The Quick & Reliable

Felt is our friend

Ready to fit footwear

Removable plug insoles

Cam boots

Diabetic Walkers

Vacuum

Air bladders

Conforming



# It's counter-intuitive but the numbers don't lie

## In a walker

Ankle plantarflexion reduces forefoot pressure and increases heel pressure

## Conversely

Ankle dorsiflexion reduces heel pressure and increases forefoot pressure

5 degrees change from neutral either way could decrease pressure by up to 20%<sub>3</sub>



# Austin In House Trial



Similar result to the Creshaw study using Pressure Guardian



# Can you trust an orthotist with a scalpel?

Posterior heel relief



# Modifying a cam walker

## Relief is Hard Work

30mm EVA footbed skived to evacuate heel – changed to full custom FO

Low Temp Thermoplastic Back Shell to avoid posterior migration

Liner applied post modifications



# Heel Relief

## Next client

Cam walker modifications as before

Normal liner in place with extra Velcro

Extended straps

Created soft well in sole plate at heel

## Post wound healing

Changed Custom FO into shoe with plantar heel well



# Custom Orthoses



Varied densities of EVA  
change support and  
relief areas



# Partial Foot



Carbon Fibre AFO with full length footplate and accommodative custom foot orthosis.

Centre of pressure moves beyond distal end of foot.

Improved mechanical push off for the wearer.



# When it has to be strong....

CROW – Charcot Restraint Orthotic Walker

Laminated posterior shell

Multi density foot bed

Thermoplastic front shell

Bespoke sole profile



# More Custom Options

- 3-D Scanners and Central Fabrication

Eg OWLS

- Arizona AFO with custom foot orthosis

Good control over alignment of ankle



# And Sometimes It Doesn't Go To Plan



My dog ate my offloading.



# References

1. Bus SA et al. IWGDF guidance on footwear and offloading interventions to prevent and heal foot ulcers in patients with diabetes. *Diabetes Metabolism Research and Reviews*. 2016; 32 (Suppl. 1): 25-36
2. Bus SA et al. Effect of custom made footwear on foot ulcer recurrence in diabetes: a multicenter randomized control trial. *Diabetes Care*. 2013; 36 (12): 109-116
3. Ulbrecht JS et al. Prevention of recurrent foot ulcers with plantar pressure based in shoe orthoses: the CareFUL prevention multicenter randomised control trial: *Diabetes Care*. 2014; 37 (7): 1982-1989.
4. Crenshaw et al. *The Effect of Ankle Position on Plantar Pressure in a Short Leg Walking Boot. FOOT & ANKLE INTERNATIONAL 2004.*

