2025 DFACONFERENCE

# ABSTRACT SUBMISSION FORM

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**TITLE** Comparing offloading effects of felt adhesive padding and custom foot orthoses for diabetes-related foot ulceration: a plantar pressure study

**AUTHORS** Shannon Greaney1, Malia Ho2, Anita Raspovic3, Jaap van Netten4,5, Corey Joseph6,7, Rebekah Withers8, Michelle R Kaminski2,3,9

**EMAIL** Shannon.Greaney@mh.org.au **INSTITUTION** The Royal Melbourne Hospital

**ABSTRACT** (maximum 450 words. Please use the following or similar headings: Background/Methods/Results/Conclusions)

Background

Reducing peak plantar pressure is critical for promoting healing and preventing recurrence of diabetes-related foot ulcers (DFUs). Removable cast walkers (RCWs) are widely used for offloading, yet the optimal foot-to-device interface—whether felt adhesive padding or custom foot orthoses (CFOs)—remains unclear. This study aims to compare the offloading effectiveness of RCWs combined with felt padding versus two types of CFOs in individuals with active plantar neuropathic forefoot ulcers.

Methods

A within-subject, repeated-measures design was used to evaluate adults with diabetes and an active plantar neuropathic forefoot ulcer present for at least 4 weeks. Participants were excluded if they were unable to walk 10 metres without the use of a walking aid or whilst wearing a RCW, had known allergies to felt and/or adhesives, a deep/penetrating ulcer (WIfI wound 2), peripheral artery disease (WIfI ischaemia 1), or an active infection (WIfI infection 1). Four offloading conditions were assessed: (1) RCW alone (control), (2) RCW with 30mm felt adhesive padding, (3) RCW with an Ethylene-Vinyl Acetate (EVA) CFO, and (4) RCW with a PA11 Nylon CFO. Conditions were randomised to minimise order effects. Participants underwent clinical foot assessments, foot scanning for CFO prescription, and plantar pressure measurements using the Pedar-X® in-shoe system during walking trials. At minimum of three trials per condition were recorded. Outcome measures included peak plantar pressure, contact area, contact time, and subjective comfort ratings. Data analysis will involve one-way repeated-measures ANOVAs, with between-condition differences reported as mean differences and 95% confidence intervals.

Results

Nineteen participants (mean age 60.6 years [SD, 11.3]; 84.2% male) were included, with 73.7% residing in Melbourne's outer metropolitan areas. Type 2 diabetes was present in 89.5% of participants, with an average duration of 19.2 years and a mean HbA1c of 8.5%. Mean ulcer volume was 105.9 $mm^3$, with 84.2% located on the forefoot (excluding toes) and 78.9% classified as recurrent ulcers. Comfort ratings on a -50 (least comfortable) to +50 (most comfortable) scale indicated that Nylon CFOs had the highest mean comfort score (34.2), followed by felt padding (33.4), EVA CFOs (31.2), and RCW alone (23.2). Plantar pressure data analysis is ongoing and is expected to be completed by July 2025. Final results will be presented at the conference.

Conclusions

This study will provide novel insights into the comparative effectiveness of different foot-to-device interfaces used with RCWs. Findings are expected to support clinical decision-making in offloading strategies, with potential implications for improving ulcer healing, reducing recurrence and preventing complications, such as infection or amputation. Should CFOs demonstrate superior offloading performance, their broader clinical adoption may offer long-term benefits, including reduced healthcare costs and improved outcomes in DFU management.