

# Foot & Ankle RESEARCH REVIEW™

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Issue 63 – 2025

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### Abbreviations used in this issue

**BMI** = body mass index  
**MRI** = magnetic resonance imaging

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## Welcome to Issue 63 of Foot and Ankle Research Review.

In this issue I have highlighted recent research in podiatric education and the impacts of foot orthoses on function. The research by Halstead et al., was particularly interesting, relating to MRI findings on people with midfoot pain. Imaging to detect early joint change is currently a hot research topic.

I hope you enjoy the issue.

Noho ora mai

**Professor Matthew Carroll**

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Research Review thanks Foot Science International for their sponsorship of this publication and their support for ongoing education for healthcare professionals.

## Association between clinical and MRI-detected imaging findings for people with midfoot pain, a cross-sectional study

**Authors:** Halstead J et al.

**Summary:** This cross-sectional, community-based study assessed bone, joint and soft tissue changes and associations between MRI-detected abnormalities and pain (median visual analogue scale [VAS] pain 31/100 mm) and disability (median Modified-Manchester Foot Pain Disability Index [MMFPDI] 30/48) in 61 adults (70% female, mean age 48.5 years, median BMI 28.6 kg/m<sup>2</sup>) with midfoot pain radiographically negative for osteoarthritis. Midfoot pain severity had a moderate association with the number of joints exhibiting joint space narrowing, and 31% (95% CI 3-68) worse VAS pain for each additional joint. More joints with cysts were associated with worse VAS pain and greater disability. MMFPDI pain was associated with effusion/synovitis. Age-associated changes were observed in bone marrow lesions, joint space narrowing, cysts and osteophytes. MRI abnormalities were commonly observed in the talonavicular joint, and first and second cuneometatarsal joints. Among those with dorsal foot pain there was more multijoint involvement, bone marrow lesions, joint space narrowing and cysts. In those with pain on midfoot movement, bone marrow lesions and cysts were common.

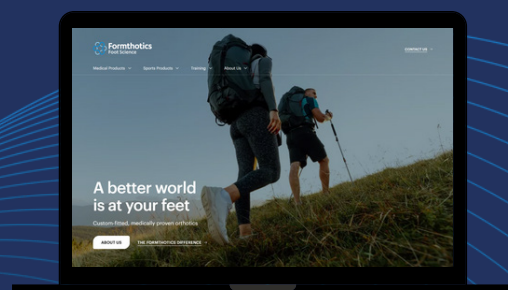
**Comment:** This study aimed to investigate the association between clinical symptoms and MRI-detected abnormalities in people with midfoot pain. The study included 61 participants with midfoot pain who underwent an MRI scan and completed questionnaires to assess their pain and disability. The results showed that MRI-detected abnormalities were common in the midfoot, particularly in the talo-navicular joint, first and second cuneo-metatarsal joints. The most common abnormalities were tenosynovitis, bone marrow lesions, and osteophytes. The study found a moderate association between the severity of foot pain and the number of joints with joint space narrowing. However, the association between MRI abnormalities and pain or disability was limited, and the study suggests that MRI features of osteoarthritis in multiple joints may be found in people with midfoot pain, but the clinical significance of these findings is yet to be determined. The study recommends further research to explore the added utility of MRI scans in older adults with midfoot pain compared to x-ray alone.

**Reference:** *J Foot Ankle Res.* 2025;18(1):e70019

[Abstract](#)

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## Efficacy of heel lifts for insertional Achilles tendinopathy (LIFTIT): A randomised feasibility trial

**Authors:** Bourke J et al.

**Summary:** This randomised feasibility trial examined the use of heel lifts versus a sham intervention (flat insoles) for reducing pain in 25 people (mean age 51 years) with insertional Achilles tendinopathy. Pre-determined thresholds for demand, acceptability, adherence, retention, pain intensity, function, quality of life and global rating of change were met and thresholds for adverse events, physical activity and use of co-interventions were partly met. Results suggest that 47 to 241 participants are required for a fully powered randomised trial.

**Comment:** The study aimed to evaluate the feasibility of a larger trial to assess the efficacy of heel lifts compared to a sham intervention for reducing pain in individuals with insertional Achilles tendinopathy. The trial involved 26 participants who were randomised into two groups, one receiving 12 mm heel lifts and the other receiving flat insoles as a sham intervention. The primary outcome was feasibility, assessed through demand, acceptability, adherence, adverse events, and retention, while secondary outcomes included pain intensity, function, physical activity, quality of life, and global rating of change. Preliminary findings suggested that heel lifts might improve pain, function, physical activity, quality of life, and global rating of change, although the study was not powered to conclusively evaluate efficacy. This study provides a foundation for further research on non-surgical interventions for insertional Achilles tendinopathy, highlighting the potential benefits of heel lifts and the importance of rigorous trial design.

**Reference:** *J Foot Ankle Res.* 2024;**17**(4):e70025

[Abstract](#)

## Measurement of plantar pressure differences in the contralateral limb when using offloading modalities for diabetic foot ulcerations

**Authors:** Ngui IRY et al.

**Summary:** This quantitative, randomised and within-subject repeated measures study examined the effect on peak plantar pressure and pressure-time integral of the contralateral limb of four offloading devices used to manage diabetic foot ulcerations (Darco APB™ All Purpose Boot, Darco APB™ All Purpose Boot with wool felt on the foot, DH Offloading Walker® and DH Offloading Walker® with Even-Up™ on the contralateral foot) in 22 adults (19 males; mean age 57.6 years). No regions of the foot on the contralateral limb showed a difference in peak plantar pressure or pressure-time integral between control and offloading modalities or between modalities.

**Comment:** The study investigates the impact of various offloading devices on plantar pressure in the contralateral limb of patients with diabetes-related foot ulcers. The study involved 22 adults with unilateral diabetes-related foot ulcers who walked with different offloading devices while their plantar pressures were measured using in-shoe pressure sensors. The devices tested included the Darco APB™ All Purpose Boot, Darco APB™ with wool felt, DH Offloading Walker®, and DH Offloading Walker® with Even-Up™ on the contralateral foot. There were no effects of offloading on peak plantar pressure or pressure-time integral on the contralateral limb. This suggests that offloading devices do not affect plantar pressure on the contralateral limb, indicating they may not increase the risk of ulceration in the contralateral foot. The authors note that clinicians should still consider the same risk factors for ulceration in both feet when using offloading devices.

**Reference:** *J Foot Ankle Res.* 2025;**18**(1):e70028

[Abstract](#)

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## Relationship of foot pain with the increased risk of falls in patients with Parkinson's disease

**Authors:** Jiménez-Cebrián AM et al.

**Summary:** This study examined the relationship between foot pain and risk of falls in 62 Parkinson's disease patients versus 62 healthy controls. Downton scale measurement of five dimensions: previous falls, medications, sensory deficit, mental state, and ambulation scale indicated a difference between both groups in all dimensions except mental state. Regarding the global result of risk of falls, Parkinson's disease patients had a high risk of falls (40.3% vs 3.2%;  $p < 0.05$ ). Downton scale results also showed a difference between groups (2.65 vs 1.31;  $p < 0.05$ ).

**Comment:** This study investigates the link between foot pain and the risk of falls in patients with Parkinson's disease. The study involved 124 participants, divided into two groups: those with Parkinson's disease and those without. Using the Downton fall risk scale, the data showed that participants with Parkinson's disease had a significantly higher risk of falls, with 40.3% at high risk compared to 3.2% in the control group. The study also revealed a strong positive correlation between foot pain and the number of falls, indicating that as foot pain increases, so does the risk of falling. The findings highlight the importance of addressing foot pain in Parkinson's patients to reduce fall risk and improve their quality of life. The study underscores the multifactorial nature of fall risk in Parkinson's disease patients and suggests that managing foot health is crucial in mitigating this risk.

**Reference:** *J Foot Ankle Res.* 2024;**17**(4):e70023

[Abstract](#)



INDEPENDENT COMMENTARY BY

**Professor Matthew Carroll**

Matthew is a Professor of Podiatry within the School of Clinical Sciences at Auckland University of Technology (AUT). His research focus is on chronic long-term conditions that affect the lower limb and foot. His postgraduate qualifications include a PhD (AUT), a Master of Educational Leadership (AUT), a Master of Podiatry (Curtin) and a Postgraduate Diploma in Sports Medicine (Otago). In recognition of his contribution to learning and teaching in the podiatry profession he has been awarded two fellowships; a Senior Fellow of the Higher Education Authority and a Fellow of the Faculty of Podiatric Medicine of the Royal College of Physicians and Surgeons of Glasgow. **FOR FULL BIO [CLICK HERE](#).**

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## Impact of different foot orthoses on gait biomechanics in individuals with chronic metatarsalgia

**Authors:** Payen E et al.

**Summary:** This cross-sectional descriptive study assessed whether medially wedged foot orthoses (MWFOs) further decrease peak plantar pressure under the metatarsal heads compared to standard foot orthoses (SFOs) in 23 individuals (17 female) with chronic metatarsalgia and considered the effects on foot and ankle 3D kinematics and kinetics. SFOs and MWFOs reduced plantar pressure under the metatarsal heads, ankle plantarflexion angle, and midfoot plantarflexion moment versus shod without orthoses. Both orthoses also increased plantar pressure under the medial midfoot. MWFOs produced a greater reduction in plantar pressure than SFOs under the 1<sup>st</sup>-2<sup>nd</sup>-3<sup>rd</sup> metatarsal heads during the second part of the stance phase and increased medial midfoot plantar pressure, while also decreasing midfoot dorsiflexion and inversion, ankle eversion, and ankle inversion.

**Comment:** The study examines the effects of SFOs and MWFOs with a metatarsal pad on gait biomechanics in individuals with chronic metatarsalgia. The study involved 23 participants who walked under three conditions: shod, with SFOs, and with MWFOs. The results showed that both SFOs and MWFOs reduced plantar pressure under the metatarsal heads and altered foot and ankle biomechanics compared to walking shod. However, MWFOs were more effective than SFOs in reducing peak plantar pressure under the 1<sup>st</sup>-2<sup>nd</sup>-3<sup>rd</sup> metatarsal heads and modifying lower limb biomechanics. These findings suggest that MWFOs may be more beneficial for reducing pain and improving physical function in individuals with chronic metatarsalgia by redistributing pressure from the metatarsal heads to the medial midfoot. The study highlights the importance of selecting appropriate orthotic designs to optimise treatment outcomes for patients with chronic metatarsalgia.

**Reference:** *Gait Posture* 2025;118:17-24

[Abstract](#)

## Effects of hybrid custom foot orthoses on running economy, running mechanics and comfort: A double-blinded randomized crossover study

**Authors:** Alsenoy KV et al.

**Summary:** This double-blind, randomised, crossover study assessed the effects of orthotic materials (ethyl vinyl acetate [EVA], thermoplastic polyurethane [TPU], and EVA plus TPU [HYB]) versus control on running economy, running mechanics, and footwear comfort in 18 athletes running on an instrumented treadmill. There were no differences in running economy between conditions, but all custom foot orthoses materials reduced peak heel impact force versus control ( $p < 0.001$ ). Compared to control conditions TPU reduced hysteresis at heel impact (-47.8 %;  $p = 0.016$ ), while HYB reduced flight time (-3.8 %;  $p = 0.016$ ) versus TPU and control (-3.1 %;  $p = 0.021$ ) and mean vertical loading rate (-4.0 %;  $p = 0.003$ ; -7.1 %;  $p < 0.001$ ). HYB versus TPU increased peak vertical loading rates (+7.4 %;  $p = 0.002$ ) and produced earlier impact peaks (-5.7 %;  $p < 0.001$ ). HYB compared to control gave a longer propulsive phase duration (+2.0 %;  $p = 0.003$ ) but a lower peak propulsive force (-3.3 %;  $p = 0.009$ ). Reductions were found for HYB versus TPU in 'overall comfort' (-26.4 %;  $p = 0.004$ ), 'comfort of heel cushioning' (-43.3 %;  $p < 0.001$ ), and 'comfort of forefoot cushioning' (-18.3 %;  $p = 0.048$ ), but 'comfort of forefoot cushioning' (+48.0 %;  $p = 0.032$ ) was increased compared to EVA.

**Comment:** The study investigates the impact of different orthotic materials on running economy, mechanics, and comfort. Eighteen recreational runners participated in the study, running under four different footwear conditions: control, EVA, TPU, and a hybrid of EVA and TPU. All orthotic materials reduced peak heel impact force compared to the control. The hybrid orthoses demonstrated shorter flight times and lower mean vertical loading rates but higher peak vertical loading rates than TPU. Comfort ratings varied, with HYB being less comfortable overall than TPU but more comfortable in forefoot cushioning than EVA. The study concludes that while combining materials can enhance comfort and induce subtle changes in running mechanics, neither EVA, TPU, nor their combination improved running economy compared to the control condition.

**Reference:** *Gait Posture* 2025;118:45-50

[Abstract](#)

## High risk of falling in elderly with hallux valgus evaluated by muscle and kinematic synergistic analysis

**Authors:** Liu Y et al.

**Summary:** This study examined changes in neuromuscular control and falls risk in elderly hallux valgus patients, young controls and elderly controls, using muscle and kinematic synergies analysis during walking. Elderly controls had additional calf muscle activation and decreased ankle motion and increased hip abduction. Compared with elderly controls, elderly hallux valgus patients had greater thigh flexor muscle activation to compensate for lack of function of ankle movements during walking and decreased hip abduction, but increased knee flexion. During walking, centre of plantar pressure was significantly ( $p < 0.05$ ) larger in elderly hallux valgus patients than in young and elderly control groups.

**Comment:** The study investigates the neuromuscular control and fall risk in older adults with hallux valgus. The study included three groups: young controls, older adult controls, and older adults with hallux valgus. Using non-negative matrix factorisation for electromyography and joint motion analysis, data indicated that older individuals with hallux valgus exhibited under-activated calf muscles and increased reliance on thigh flexor muscles to compensate for impaired ankle function during gait. This group also showed decreased hip abduction and increased knee flexion, leading to poor balance and a higher risk of falls. The centre of plantar pressure measurements indicated that the hallux valgus group had larger displacements, reflecting poorer balance compared to the other groups. The study highlights the need for personalised treatment strategies to improve neuromuscular control and reduce fall risk in elderly individuals with hallux valgus.

**Reference:** *Gait & Posture* 2025;118:33-38

[Abstract](#)

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## Determining health professional students' self-perceived cultural capability following participation in clinical placement with Aboriginal and Torres Strait Islander Peoples: A systematic review

**Authors:** Paisley K et al.

**Summary:** This systematic review assessed health professional students' self-perceived cultural capability after clinical placement with First Nations Peoples based on 14 studies including 307 participants (undergraduate podiatry, medicine, nursing, pharmacy, and mixed health profession students). Clinical placements with Aboriginal and Torres Strait Islander Peoples that involve co-design elements are effective in increasing self-perceived cultural capability and this was consistent across studies regardless of the urban or rural location of clinical placements, health setting or community clinical placement, or length of placement.

**Comment:** This systematic review evaluates the impact of clinical placements on health professional students' self-perceived cultural capability. The review includes 14 studies with 307 participants from various health disciplines. The findings suggest that clinical placements in health services or settings for Aboriginal and Torres Strait Islander Peoples, particularly those involving co-design elements, effectively enhance students' self-perceived cultural capability. Students reported increased awareness and understanding of the interrelationship between culture, family and community, and improved confidence in providing culturally safe care. However, the review highlights the need for further research to assess the cultural safety of these placements from First Nations Peoples' perspective and determine the long-term impact on students' cultural capability and health service provision.

**Reference:** *J Foot Ankle Res.* 2024;17(4):e70017

[Abstract](#)

## Comparing perioperative outcomes after transmetatarsal amputation in patients with or without peripheral vascular disease

**Authors:** Plantz MA et al.

**Summary:** This US study compared the incidence and risk factors for reoperation and perioperative complications in 3392 patients after transmetatarsal amputation (TMA) for infectious or diabetic wounds compared with peripheral vascular disease. Overall, the 30-day mortality rate was 2.9%, with a 22.2% surgical complication rate, a 16.8% readmission rate, a 15.8% medical complication, and a 13.8% reoperation rate. Vascular surgery had higher mortality, reoperation, hospital readmission, non-home discharge, and medical complication rates ( $p < 0.05$ ). Infectious/diabetic wounds had higher deep surgical site infection and systemic sepsis rates ( $p < 0.05$ ). Vascular surgery was associated with reoperation and overall medical complications ( $p < 0.05$ ). Poor outcomes were associated with age, BMI, medical comorbidities, and preoperative sepsis.

**Comment:** This study from the US investigates the incidence and risk factors for reoperation and perioperative complications following TMA. The study included 3392 patients who underwent TMA over a 5-year period. Patients with peripheral vascular disease had higher rates of mortality, reoperation, hospital readmission, non-home discharge, and various medical complications compared to those with infectious/diabetic wounds. Independent risk factors for poor outcomes included advanced age, BMI, medical comorbidities, and the presence of preoperative sepsis. Peripheral vascular disease was independently associated with reoperation and overall medical complications. This study highlights the need for all clinicians involved in the assessment and management of the high-risk foot to have a good understanding of early indicators of peripheral vascular disease, as early detection is crucial for preventing serious complications.

**Reference:** *J Foot Ankle Res.* 2025;18(1):e70026

[Abstract](#)

## Enhancing teamwork in higher education: Experiences of podiatry students using SPARK<sup>PLUS</sup> for self- and peer-assessment in group work

**Authors:** Kaminski MR et al.

**Summary:** This study evaluated the experiences of 102 undergraduate podiatry students in a 4<sup>th</sup>-year project-based subject who used the Self and Peer Assessment Resource Kit (SPARKPLUS) for self-evaluation and peer review to increase transparency, address inequities and provide learning-oriented feedback during group work. Inductive thematic analysis of responses from 11 (10.8%) students who participated in semi-structured focus groups revealed four themes and 11 subthemes: Performance (subthemes of equity and accountability); Peer interrelationships (subthemes of social dynamics and fear of consequences); Feedback and reflection (subthemes of self-reflection, receiving and responding to feedback, supervisor action, and avoiding confrontation); and Utility (subthemes of enablers, barriers and integration throughout course).

**Comment:** The study evaluates the experiences of podiatry students using the SPARKPLUS tool for self- and peer-assessment in group work. The results revealed four main themes: Performance, peer interrelationships; Feedback and reflection; and Utility. Students reported that SPARKPLUS promoted equity and accountability in group work, allowing for fairer mark allocations based on individual contributions. However, there were concerns about the negative impact of poor feedback on group dynamics and relationships, with students expressing feelings of guilt and fear of confrontation when providing negative feedback. The tool was found to be useful for self-reflection and providing a confidential platform for feedback, but some barriers included unfamiliarity with the system and confusion about its automation features. Students suggested that integrating SPARKPLUS earlier in the course could improve its effectiveness and help address bad habits in group work. Overall, SPARKPLUS was positively viewed for promoting equitable assessment and encouraging accountability, but further refinement and education on its use are needed.

**Reference:** *J Foot Ankle Res.* 2024;17(4):e70010

[Abstract](#)

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