Foot & Ankle RESEARCH REVIEW™

Making Education Easy

Issue 65 – 2025

In this issue:

Abbreviations used in this issue
BMI = body mass index
GP = general practitioner
MRI = magnetic resonance imaging
MTP = metatarsophalangeal joint

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Welcome to Issue 65 of Foot and Ankle Research Review.

I am pleased to bring you the latest insights and research in foot and ankle health. This issue features a diverse range of studies from patient perspectives on diabetes-related foot disease and footwear interventions, as well as clinical findings on Charcot foot, osteoarthritis, and trip-related fall risks. I hope these articles spark meaningful discussion and inform your practice.

I hope you enjoy the issue.

Noho ora mai

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Exploring patient and podiatrist perspectives of the 'in-remission' status in diabetes-related foot disease

Authors: Donaldson G et al.

Summary: This study used semi-structured focus groups or interviews to explore patient (n = 9) and clinician (n = 12) perceptions of the term "in-remission" in the context of diabetes foot disease management. Three themes were identified including the perception of "in-remission", which was highly variable, with podiatrists avoiding using the term with patients and instead focusing on patient education. Furthermore, podiatrists had mixed views of the impact of the term " in-remission" on patients. Individuals with diabetes were generally unaware of their "in-remission" status and had differing opinions on what "in-remission" means and how it impacts foot care.

Comment: This study explored how the term "in-remission" is perceived and used in the context of diabetes-related foot disease. Both patients and clinicians showed varied understanding and use of the term, with many patients unaware of their risk status and clinicians hesitant to use it due to concerns about causing confusion or anxiety. The term "remission" is often misunderstood, especially among individuals with lower health literacy, which is common in populations affected by diabetic foot ulcers. Patients associated "in-remission" with cancer, leading to fear of recurrence and feelings of helplessness. Clinicians noted that while the label can help prioritise care and access to services, its psychological impact and lack of clarity may outweigh its benefits. Most prefer focusing on education rather than using the term directly. Written materials were often ineffective, as patients did not recall receiving relevant leaflets. Clinicians emphasised the importance of tailored education, involving caregivers, and using clinical judgment in risk classification. An alternative term, "ulcer-free," was proposed to reflect foot health status better and offer a more hopeful message. This label could serve as a motivational goal for patients and potentially improve engagement with self-care. Further research is needed to refine terminology and communication strategies in diabetes foot care.

Reference: J Foot Ankle Res. 2025;18(2):e70045
Abstract

Follow-up magnetic resonance imaging in monitoring Charcot foot and its association with total contact cast treatment duration and long-term outcomes: A retrospective cohort study

Authors: Schoug J et al.

Summary: This Swedish retrospective study assessed the use of follow-up MRI during Charcot foot treatment, total contact cast (TCC) offloading duration and risk of future surgery in 122 patients. Overall, 53% of Charcot foot events were monitored through 141 follow-up MRIs with MRI monitored patients having longer TCC and total Charcot foot treatment durations ($p < 0.001$). Only use of follow-up MRI ($p < 0.001$) predicted longer TCC and total Charcot foot treatment duration.

Comment: This retrospective cohort study examined the impact of follow-up MRI on treatment duration in patients with Charcot foot. Those who underwent follow-up MRI spent more time in TCC and took longer to regain full mobility, despite having similar clinical profiles and surgical outcomes as those who did not receive MRI follow-up. Regression analysis revealed that both follow-up MRI and Charcot foot stage 1 were independently associated with longer treatment times. Although international guidelines recommend MRI to assess Charcot foot remission, its effectiveness remains uncertain due to limited research and the absence of standardised criteria. Prior studies revealed that MRI findings often lag behind clinical improvements, with bone marrow oedema signals persisting even after symptoms resolve. Delays in MRI scheduling, cautious clinical decisions, and inconsistencies between imaging and clinical signs may explain the extended offloading in the MRI group. Notably, surgical intervention rates were low and similar across groups. The findings suggest that routine serial MRI may unnecessarily prolong treatment and should be reserved for cases with suspected relapse or infection.

Reference: J Foot Ankle Res. 2025;18(2):e70058
Abstract

Outcomes of diabetic toe amputation with versus without metatarsal head resection for single ray wet gangrene: A preliminary study

Authors: Yammine K et al.

Summary: This retrospective comparative study examined the outcomes of single toe/ray diabetic wet gangrene treated with toe amputation through the metatarsophalangeal joint (TA-MTPJ; n = 12) and toe amputation with resection of the metatarsal head (TA-MHR; n = 19). Outcomes did not differ between treatment groups including healing frequency (66.7% vs 58%), infection recurrence (50% vs 52.6%), osteomyelitis (41.6% vs 42.1%), and re-amputation (33.3% vs 47.3%).

Comment: This preliminary study examined outcomes of two surgical approaches in patients with diabetic foot wet gangrene. Despite prompt treatment within 24 hours, complication rates remained high. Healing rates were below 70% and infection recurred in about half of the cases, often as osteomyelitis in the same or adjacent toe/ray. Re-amputation was required in roughly one-third of TA-MTPJ cases and nearly half of TA-MHR cases. A comparative analysis showed no difference in healing or recurrence of infection between the two techniques, although TA-MHR tended to have slightly worse outcomes. MRI was used systematically to guide surgical decisions, but it did not reduce re-amputation rates, likely due to overestimation of osteomyelitis from bone marrow oedema signals. The study suggests that current surgical criteria, such as preserving 1 cm of healthy tissue, may be insufficient to prevent infection recurrence. Better outcomes were observed when more proximal resections were performed, especially when the metatarsal head was removed in cases with suspected bone infection.

Reference: J Foot Ankle Res. 2025;18(2):e70052
Abstract

Knowledge-behavior relationships and technology adoption among patients with diabetes: A mixed-methods analysis of smart foot care technology

Authors: Yeh T-T et al.

Summary: This mixed-methods study sought to integrate quantitative (Foot Care Knowledge questionnaire, Diabetic Foot Self-management Behaviour scale, Unified Theory of Acceptance and Use of Technology questionnaire; n = 80) and qualitative (semi-structured interviews exploring adoption factors; n = 20) data on the use of a smart diabetic foot screening system (FootHow). Despite high levels of knowledge around foot care (86.2% correct response rate), in practice, self-management behaviours were suboptimal, with only a moderate correlation ($r = 0.31$; $p < 0.01$) between knowledge and behaviour. Regression analysis suggested that attitude and facilitating conditions explained 57% of the variance in smart system adoption intention. Qualitative analysis identified three themes: perceptions of technology acceptance; systems to support implementation; and patterns of self-management.

Comment: This mixed-methods study investigated the adoption of smart technology in diabetic foot care, focusing on the FootHow system. Despite participants demonstrating high foot care knowledge (with an average score of 86.2%), only 36.3% performed daily foot checks, highlighting a clear gap between knowledge and actual behaviour. This suggests that knowledge alone is insufficient to drive consistent self-care practices. The study identified attitude and environmental support (facilitating conditions) as the strongest predictors of intention to adopt the technology, accounting for 57% of the variance. Qualitative insights reinforced these findings, indicating that perceived benefits and access to support systems had a greater influence on adoption than factors such as performance expectations or self-efficacy. Many participants viewed foot self-examinations as unnecessary or inconvenient, often due to a low perceived risk of developing foot ulcers. These attitudes reflect broader trends in diabetes self-management, where foot care is often deprioritised. Compared to similar studies, this research highlights the crucial role of environmental support in adopting more advanced technologies, such as FootHow, which incorporates imaging capabilities. The findings highlight the need for healthcare policies that go beyond education, emphasising infrastructure, technical support, reimbursement, and clinician training to create enabling environments and address psychological barriers to adoption.

Reference: J Foot Ankle Res. 2025;18(2):e70051
Abstract

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Exploring the lived experiences of individuals living with Charcot neuro-osteoarthropathy in Australia: A qualitative research study

Authors: Chapman NM and Tehan PE

Summary: This Australian qualitative study used semi-structured interviews to examine the lived experience of 14 individuals (7 males; age 36-74 years) affected by active Charcot neuro-osteoarthropathy (CNO) and CNO in remission. Reflexive thematic analysis identified four themes: feeling a burden to family and caregivers and feelings of isolation; lack of certainty relating to outcomes causing anxiety; CNO diagnosis triggering adaptive health behaviour changes; and limited access to healthcare information and support.

Comment: This qualitative study examined the experiences of individuals living with CNO and identified four key themes that highlight the challenges they face. Many participants felt isolated and burdensome to their families due to reduced mobility and loss of independence, which negatively impacted their mental and physical well-being. Uncertainty about treatment outcomes led to increased anxiety, with some individuals reporting worsened mental health and a lack of control over their condition. Participants also described changes in their health behaviours following diagnosis; while some adopted positive habits, others struggled with treatment adherence, particularly with offloading protocols, often due to stigma and emotional distress. Additionally, limited access to reliable healthcare information and support was a common issue. Many patients experienced delays in diagnosis and found that healthcare professionals lacked awareness of CNO. Peer support was identified as a potentially valuable resource, and the study emphasised the need for more holistic, multidisciplinary care, including psychological and social services, to improve treatment adherence and overall outcomes. These findings underscore the importance of person-centred care and tailored support systems for individuals with CNO.

Reference: J Foot Ankle Res. 2025;18(2):e70037
Abstract

How much running is too much? Identifying high-risk running sessions in a 5200-person cohort study

Authors: Frandsen JSB et al.

Summary: This 18-month cohort study in 5205 runners (mean age 45.8 years, 22% female), examined whether a sudden increase (spike) in running distance during a single session or over 1 week was associated with increased risk of running-related overuse injury. In total 1820 (35%) participants sustained a running-related injury across 588,071 running sessions. Increased injury rates were identified after small (10-30% increase; adjusted hazard rate ratio [aHRR] 1.64; 95% CI 1.31-2.05, $p = 0.01$), moderate (30-100% increase; aHRR 1.52; 95% CI 1.16-2.00, $p < 0.01$) and large (>100%; aHRR 2.28; 95% CI 1.50-3.48, $p < 0.01$) spikes in single-session running distance. There was a negative dose-response relationship for an acute:chronic workload ratio (1-week period relative to the preceding 3 weeks). There was no relationship for the week-to-week ratio.

Comment: This study investigated the impact of sudden increases in running distance on injury risk among runners, utilising data from over 5200 participants. It found that sharp spikes in distance during a single session increased the likelihood of injury. Small spikes (10-30%) raised risk by 64%, moderate spikes (30-100%) by 52%, and large spikes (over 100%) by 128%. These findings suggest that most running injuries result from abrupt increases in training load rather than gradual progression. Week-to-week changes in distance showed no significant effect on injury rates. The authors recommend that runners avoid exceeding 10% of their longest run in the past 30 days during any single session. Even small increases (1-10%) may carry some risk, especially if repeated within a short timeframe without adequate recovery.

Reference: Br J Sports Med. 2025;Jul 7 [Epub ahead of print]
Abstract

Lower limb kinematics of people with midfoot osteoarthritis during level walking and stair climbing

Authors: Lithgow MJ et al.

Summary: This cross-sectional study assessed foot and lower limb kinematics in 24 people with and 24 people without symptomatic radiographic midfoot osteoarthritis (OA) during level walking and stair climbing. People with midfoot OA walked slower and had less hip extension, knee flexion, and ankle dorsiflexion during stance, but had greater subtalar pronation and tarsometatarsal supination during stance during level walking. There were few differences during stair climbing.

Comment: This study compared foot and lower limb movements in individuals with and without symptomatic radiographic midfoot OA during level walking and stair navigation. During level walking, individuals with midfoot OA walked more slowly, had longer ground contact times, and showed altered joint positions, specifically less hip extension, reduced knee flexion, and decreased ankle dorsiflexion. These changes likely reflect a cautious gait adopted to reduce pain and protect the affected foot. A key finding was increased subtalar pronation in late stance among those with midfoot OA, suggesting a dynamic shift in foot posture that may contribute to joint stress. Additionally, greater tarsometatarsal supination was observed in early stance, possibly as a compensatory adjustment to maintain foot contact. These patterns support theories linking pronated foot posture to midfoot OA, although the study's cross-sectional design limits conclusions about causality. Stair climbing revealed fewer differences between groups, likely due to a smaller sample size and potential selection bias, as only participants with sufficient balance and strength were able to complete the task. Overall, the study highlights how midfoot OA affects gait mechanics and suggests that pain, walking speed, and foot posture play important roles in movement adaptations.

Reference: J Foot Ankle Res. 2025;18(2):e70054
Abstract

Patients' perspectives on participation in an effectiveness study on footwear modification for the first metatarsophalangeal joint osteoarthritis: A qualitative study

Authors: Braam C et al.

Summary: This qualitative research study embedded in a feasibility pilot study assessed experiences, expectations, beliefs, and opinions of 10 patients with first MTP joint OA. All participants experienced limitations in activity and participation due to pain symptoms. Approaches and treatment outcomes in primary and secondary healthcare varied, creating both positive and negative perspectives. The cosmetic appearance of modified footwear was highlighted by most participants. Participants were willing to participate in a clinical trial, with a preference for an intervention group with a modified footwear alongside usual GP care versus GP care alone.

Comment: This qualitative study explored the experiences of patients with first MTP joint OA, focusing on pain, mobility limitations, and perspectives on footwear interventions. Participants reported that pain impacted walking and daily activities, often prompting delayed consultations with GPs. Many GPs adopted a "watch and wait" approach, likely due to the absence of clear guidelines for managing first MTP joint OA. Treatment options vary widely, but evidence supporting their effectiveness remains limited. Participants emphasised the importance of the cosmetic appearance of custom-made footwear, which strongly influenced adherence. While most were open to participating in a randomised controlled trial, many preferred being assigned to an intervention group rather than receiving usual GP care alone. Offering deferred access to the footwear intervention after follow-up may improve recruitment and adherence. Effective communication, including clear explanations and accessible materials, was identified as essential for successful trial participation. The study also highlighted the need for better identification of meaningful outcome measures, as pain and walking limitations were consistently reported but not clearly prioritised.

Reference: J Foot Ankle Res. 2025;18(2):e70050
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.**

Examining foot shape variations in individuals with and without diabetes

Authors: Hemler SL et al.

Summary: This study examined differences in external foot shapes of 69 people (136 feet) with and without diabetes and peripheral neuropathy. Principal component analysis suggested the feet of people with diabetes and with neuropathy are not clustered into particular foot shapes but have more pronounced features in specific foot variations (ankle width, arch height, hallux abduction, and oedema) than people without diabetes and neuropathy. Mean pairwise principal component distance for individuals with diabetes and neuropathy was 43% greater than those without diabetes and neuropathy and 24% greater than for those with neuropathy but not diabetes.

Comment: This study examined foot shape differences in older adults with and without diabetes mellitus and neuropathy. The results revealed greater variability in foot shape among people with diabetes mellitus and neuropathy compared to those without these conditions. Key foot shape differences included variations in ankle width, arch and instep height, forefoot width, hallux size and orientation, toe splay, and overall foot proportions. These differences were consistent with previous studies, suggesting that foot shape changes remain relatively stable across age and pathology. The presence of diabetes was more strongly associated with foot shape features than with age, BMI, or years since diagnosis. People with diabetes mellitus tended to have foot shapes that deviated more from the average, indicating a need for multiple shoe lasts to accommodate diverse deformities. Neuropathy also influenced foot shape, even in people without diabetes, although its effects were more complex and less pronounced.

Reference: J Foot Ankle Res. 2025;18(3):e70060
Abstract

Does ankle support of safety shoes increase trip-related risk of falling? – A randomized crossover study

Authors: Munk-Hansen M et al.

Summary: This randomised cross-over study examined whether ankle support in occupational footwear increased the trip related-fall risk in 20 asymptomatic individuals. During treadmill walking with unexpected trips induced by obstacles (heights 31 mm and 75 mm) safety shoes with ankle support, increased reliance on external support suggesting a higher fall risk, particularly over the lower obstacle.

Comment: This randomised crossover study investigated the effect of safety shoes with and without ankle support on trip-related fall risk and ankle movement. The study found that participants wearing safety shoes with ankle support were more likely to rely on external support (rails or harnesses) when tripping over low obstacles, indicating a higher fall risk. Surprisingly, ankle plantarflexion was not significantly affected by the presence of ankle support, although measurement reliability was limited due to variability in foot positioning. Toe clearance did not differ considerably between shoe types, but safety shoes generally showed higher toe clearance than everyday shoes, suggesting reduced gait stability. Recovery strategies were also influenced by the design of footwear. Shoes with ankle support led to more frequent use of the delayed recovery strategy, which involves postponing foot placement and increasing instability.

Reference: Gait Posture 2025:122:183-189
Abstract