

# Foot & Ankle RESEARCH REVIEW™

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Issue 57 – 2023

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### Abbreviations used in this issue

**AUC** = area under the receiver operating characteristic curve  
**CI** = confidence interval  
**HR** = hazard ratio  
**RICE** = rest, ice, compression, elevation  
**RR** = risk ratio

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## Welcome to Issue 57 of Foot and Ankle Research Review.

In this issue I highlight some recent New Zealand publications surrounding the measurement of toe pressures during haemodialysis, the assessment and management of sesamoiditis by New Zealand podiatrists, and the treatment of plantar warts. There are two Australian studies that investigated information available to the public surrounding calcaneal apophysitis and school footwear, both have some interesting findings very relevant to clinical practice.

I hope you enjoy this issue.

Noho ora mai

**Associate 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.

## Variability of toe pressures during haemodialysis: Comparison of people with and without diabetes; a pilot study

**Authors:** Carle R et al.

**Summary:** This study assessed the variability of toe systolic blood pressure (TSBP) and Toe-Brachial Pressure Index (TBPI) during haemodialysis in people with end-stage renal disease (ESRD), and whether observed variability differed with (n = 17) and without (n = 13) diabetes. There was an overall reduction in TSBP across all participants (p < 0.001). There was a reduction in TSBP from before dialysis and one hour into dialysis (p < 0.001) and in the last 15 min of dialysis (p < 0.001), but no overall change in TBPI over time. There was no overall difference in TSBP with diabetes versus without diabetes (mean difference -9.28; 95% CI -40.20 to 21.64). There was no overall difference in TBPI with versus without diabetes (mean difference -0.01; 95% CI -0.17 to 03.16).

**Comment:** This study investigated the changes in TSBP and TBPI during dialysis in people with ESRD. The results showed that TSBP decreased from baseline to the second and third measurements in both participants with and without diabetes. TBPI remained stable throughout dialysis, but was lower in participants with loss of protective sensation (LOPS). The study also found that the prevalence of LOPS in the study cohort was lower than previously reported. The study findings suggest that TSBP and TBPI should be measured during dialysis in people with ESRD, especially those with LOPS. This would help to identify patients at risk of developing peripheral arterial disease and other complications.

**Reference:** *J Foot Ankle Res.* 2023;16(1):42

[Abstract](#)

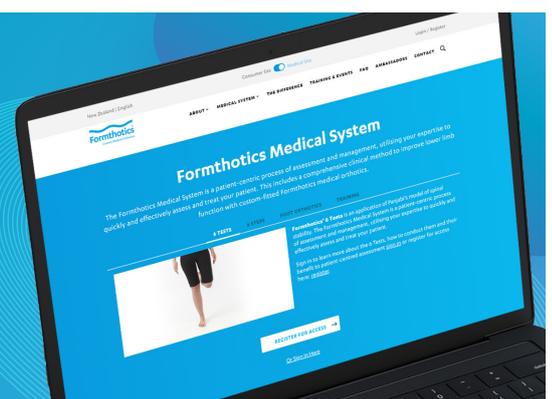
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## International differences and inaccuracies in the public advertising about calcaneal apophysitis: An audit of websites originating in Australia, UK and USA

**Authors:** Liu S et al.

**Summary:** This audit of 150 publicly accessible websites assessed the credibility (e.g., publisher), readability (e.g., literacy score) and accuracy (e.g., alignment with evidence) of websites discussing calcaneal apophysitis in Australia, the UK and the USA. The websites were mostly hosted by private health services (79%), and had a mean Statistical Measure of Gobbledygook (SMOG; readability) score of 9.3. Most websites (93%) provided  $\geq 1$  treatment recommendation, and less than 10% of advertised treatments were fully aligned with evidence. Treatment modalities without evidence, and with high risk for children, included surgery, extracorporeal shock wave therapy and laser.

**Comment:** This study was conducted to assess the accuracy and quality of online health information about calcaneal apophysitis, a common childhood condition. Study data showed that many websites provided inaccurate or misleading information about the condition, including the use of outdated terminology and the promotion of treatments that are not supported by evidence. Results also showed that the information was often written at a high literacy level, making it difficult for parents and children to understand. The authors recommend that clinicians make simple changes to the way they provide information about calcaneal apophysitis online. This includes using easy-to-read language, reviewing the evidence for effective treatments, and aligning public-facing advertising with contemporary evidence. It was also recommended that clinicians consider advertising simple treatment advice that parents can implement at home before seeking care. The study's findings highlight the importance of providing accurate and reliable information about common childhood conditions online. This information can help parents and children make informed decisions about their health care and avoid unnecessary treatments.

**Reference:** *J Foot Ankle Res.* 2023;16(1):39

[Abstract](#)



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### Independent commentary by Associate Professor Matthew Carroll



Matthew is an Associate Professor of Podiatry at Auckland University of Technology. His research focus is on chronic long-term conditions that affect the foot. He is a current Editorial Board member for the Journal of Foot & Ankle Research, Academic Editor for PLOS ONE, and past Associate Editor for BMC Musculoskeletal Disorders.

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## Microwave therapy for the treatment of plantar warts

**Authors:** Hagon W et al.

**Summary:** This retrospective analysis examined the effectiveness of microwave therapy for 150 plantar warts from 45 patients and assessed clinical factors associated with plantar wart resolution. Overall, 125 (83.3%) warts resolved and 25 (17%) warts did not with a mean of 2.8 total treatment sessions for resolved lesions. The only characteristic associated with resolution was younger age ( $p = 0.046$ ).

**Comment:** A retrospective study of 45 participants with plantar warts has shown that microwave therapy is an effective treatment for this condition. The complete resolution rate of 83.3% is higher than the resolution rates for other commonly used therapies, such as cryotherapy and salicylic acid. Microwave therapy was also associated with a shorter post-treatment recovery period and less pain than other therapies. This is an exciting clinical finding as effective treatments for plantar warts are currently limited.

**Reference:** *J Foot Ankle Res.* 2023;16(1):37

[Abstract](#)

## A systematic review and meta-analysis of randomised controlled trials on surgical treatments for ingrown toenails part I: Recurrence and relief of symptoms

**Authors:** Exley V et al.

**Summary:** This systematic review and meta-analysis assessed the use of surgical methods for treating ingrown toenails based on 36 randomised controlled trials including 3756 participants (62.7% male). Very low-quality evidence suggested that using phenol with nail avulsion versus without phenol reduces risk of recurrence (RR 0.13; 95% CI 0.06-0.27;  $p < 0.001$ ). There was no difference between chemical or surgical versus conservative management, nor was there a difference between chemical or surgical (e.g., CO<sub>2</sub> laser, electrocautery) versus other management, nor for other combinations of treatment. Central toenail resection was the only procedure that relieved symptoms ( $p = 0.001$ ).

**Comment:** A systematic review of surgical treatments for ingrown toenails was conducted. The review included 36 studies with 3756 participants. The results of the review showed that phenolisation was the only treatment that reduced the risk of recurrence. However, there was no difference in risk of recurrence for most other comparisons. The review also found that symptom relief was only reported in five of the 36 studies. In addition, most of the studies were of low quality. The authors concluded that more high-quality clinical trials are needed to inform clinical decision making in nail surgery.

**Reference:** *J Foot Ankle Res.* 2023;16(1):35

[Abstract](#)

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**Research Review publications are intended for New Zealand health professionals.**

## Relationship between the morphology of osteophytes and cartilage lesions in anterior ankle impingement in athletes: A cross-sectional study

**Authors:** Yabiku H et al.

**Summary:** This retrospective study assessed the frequency and severity of tram-track lesions (distinctive cartilage lesions associated with tibial osteophytes) in anterior ankle impingement in 34 athletes undergoing arthroscopic osteophyte resection, and the relationship between osteophyte morphology and severity. Tram-track lesions were found in 26 (76.5%) athletes. Distribution of International Cartilage Repair Society (ICRS) grades of tram-track lesions were: grade 0 (n = 8), grade 1 (n = 7), grade 2 (n = 10), grade 3 (n = 9), and grade 4 (n = 0). Athletes with anterior ankle impingement syndrome may have more severe cartilage lesions than non-athletes. ICRS grade was correlated with osteophyte size ( $r = 0.393$ ;  $p = 0.021$ ). Osteophyte protrusion into the joint space occurred in 14 athletes (41.2%), all of whom had tram-track lesions; seven (50%) had ICRS grade 3 lesions. Protrusion-type lesions had a higher ICRS grade than non-protrusion lesions ( $p = 0.008$ ). Osteophyte sizes did not differ between groups.

**Comment:** A study of athletes with anterior ankle impingement syndrome found that they had a high frequency of tram-track lesions, and more than half had ICRS grades 2 and 3 cartilage injuries. The most critical finding was that the osteophyte size and protrusion into the joint space were related to the severity of tram-track lesions. The study found that the frequency of tram-track lesions in athletes was higher than that reported in previous studies. This may be due to the fact that athletes have higher levels of activity, which can lead to more wear and tear on the ankle joint. The study also found that the severity of tram-track lesions was related to the protrusion of the osteophyte into the joint space. This suggests that athletes with protrusion-type osteophytes may be more likely to experience pain and other symptoms of anterior ankle impingement syndrome. The authors recommend that future studies with larger sample sizes be conducted to confirm the findings and to further explore the relationship between osteophyte morphology and the severity of tram-track lesions in athletes.

**Reference:** *J Foot Ankle Res.* 2023;16(1):31

[Abstract](#)

## The assessment and management of sesamoiditis: A focus group study of podiatrists in Aotearoa New Zealand

**Authors:** Kaur P et al.

**Summary:** This qualitative study assessed the views of 12 New Zealand podiatrists on their approaches to assessment and management of sesamoiditis affecting the sesamoid bones at the plantar aspect of the first metatarsophalangeal joint. Reflexive thematic analysis identified four themes related to assessment of sesamoiditis: (1) patient history; (2) recreating symptoms; (3) identifying biomechanical factors; and (4) differential diagnosis, and seven themes related to management of sesamoiditis: (1) patient factors; (2) patient education; (3) sesamoid cushioning for more comfortable first metatarsophalangeal joint weightbearing; (4) pressure redistribution and offloading; (5) immobilisation of first metatarsophalangeal joint and sesamoids; (6) facilitating sagittal plane motion during gait; and (7) referral to other health professionals to manage patient symptoms.

**Comment:** This study explored the assessment and management practices used by podiatrists in New Zealand for patients with sesamoiditis. The study found that podiatrists use a range of assessments, including subjective questioning and objective examination, to diagnose sesamoiditis and identify biomechanical factors that may contribute to the condition. They also use a range of management strategies, including patient education, RICE therapy, pharmacological management, foot orthoses, and footwear, to manage sesamoiditis. Findings indicated that podiatrists in New Zealand are limited in their ability to provide timely and effective care for patients with sesamoiditis because they cannot directly refer for advanced imaging or pharmacological management. Data also found that there is a lack of evidence-based guidelines and clinical practice recommendations for the management of sesamoiditis. The authors concluded that further research is needed to evaluate the effectiveness of different podiatric interventions for sesamoiditis and to develop evidence-based guidelines and clinical practice recommendations.

**Reference:** *J Foot Ankle Res.* 2023;16(1):29

[Abstract](#)

## Offloading effects of a removable cast walker with and without modification for diabetes-related foot ulceration: A plantar pressure study

**Authors:** Withers RV et al.

**Summary:** This repeated measures study quantified walking plantar pressures with a removable cast walker (RCW) with and without modification for diabetes-related foot ulcers (DFUs) in 16 plantar neuropathic DFU patients in four conditions: post-operative boot (control), RCW alone, with 20 mm of felt on an orthosis, and with 20 mm of felt adhered to the foot. Compared with control, the highest peak plantar pressure reduction was observed with the RCW with felt adhered to the foot (-83.1%;  $p < 0.001$ ), compared with RCW alone (-51.3%;  $p = 0.021$ ) and RCW with felt adhered to the orthosis (-31.4%;  $p = 0.009$ ).

**Comment:** This study investigated the effectiveness of RCWs with and without modification in reducing plantar pressure at DFU sites. The results showed that all three RCW conditions resulted in reductions in plantar pressure compared to the control condition. The RCW with felt adhered to the foot condition led to the greatest reduction in plantar pressure, followed by the RCW alone and the RCW with felt adhered to an orthosis. The ease of application and degree of customisation offered with the felt adhered to foot modification may make it a useful option for DFU management. However, more research is needed to confirm the effectiveness and safety of RCWs with modification in healing DFUs.

**Reference:** *J Foot Ankle Res.* 2023;16(1):27

[Abstract](#)



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## Australian secondary school principals', parents', and students' attitudes to prescribed school footwear guidelines

**Authors:** Mazzella N et al.

**Summary:** This online survey study sought to describe the following: (1) current school footwear guidelines in Australian secondary schools; (2) factors that influence footwear choice by students and parents; and (3) principals' (n = 80), parents' (n = 153), and students' (n = 120) beliefs about factors that contribute to school footwear guidelines. Overall, 96% of principals reported set guidelines for school footwear and 88% considered comfort to be important when developing guidelines. Parents and students were 3.4- and 4.9-fold more likely than principals to rate comfort as being important when schools develop footwear guidelines. Over 40% of students reported musculoskeletal pain, and 70% of these students reported that pain was exacerbated in school shoes. Less than one-third of participants considered healthcare recommendations important in developing footwear guidelines.

**Comment:** The study found that most schools have guidelines on footwear, but these guidelines are often focused on uniformity and tradition rather than foot health. Students and parents value comfort and appearance when selecting school shoes, and they are not always aware of the factors that principals consider when developing footwear guidelines. Study data also showed that lower limb pain is common in adolescents, and it may be influenced by the shoes they wear to school. There is no prospective evidence to demonstrate the effect that footwear has on pain and/or injury risk in adolescents, but further research is needed to investigate this. The study's findings suggest that there is a need for more research into the effects of school footwear on musculoskeletal health and lower limb biomechanics. Additionally, schools should consider reviewing their footwear guidelines to ensure that they are focused on foot health and comfort, rather than uniformity and tradition.

**Reference:** *J Foot Ankle Res.* 2023;16(1):26

[Abstract](#)

## Predicting the outcome of plantar heel pain in adults: A systematic review of prognostic factors

**Authors:** Gulle H et al.

**Summary:** This systematic review examined prognostic factors associated with favourable or unfavourable plantar heel pain outcomes based on five studies evaluating 98 variables in 811 participants. Overall, study quality was rated as low. In one cohort study three factors were associated with a poor outcome including sex (HR 0.49; 95% CI 0.30-0.80) and bilateral symptoms (HR 0.33; 95% CI 0.15-0.72). The other four studies reported 20 factors associated with a favourable outcome after shockwave therapy, anti-pronation taping and orthoses. The strongest factors predicting medium-term improvement were heel spur (AUC 0.88; 95% CI 0.82-0.93), ankle plantar-flexor strength (likelihood ratio [LR] 2.17; 95% CI 1.20-3.95) and response to taping (LR 2.17; 95% CI 1.19-3.90). There was an absence of research examining psychosocial factors.

**Comment:** This review explored patient characteristics associated with outcomes in 811 individuals with plantar heel pain. The findings indicate that female patients with bilateral heel pain are at a higher risk of a poor outcomes. Prognostic indicators of recovery included the immediate effects of taping, symptom duration, the number of painful sites, and various ankle and hip kinematics, specifically increased ankle plantar flexion and hip rotation range. Regarding specific interventions, clinical prediction rules suggest that a shorter symptom duration and a lower frequency of pain are predictive of favourable outcomes with extracorporeal shockwave therapy. For anti-pronation taping and orthoses, various physical factors such as ankle and hip strength and flexibility were associated with positive outcomes, indicating the importance of biomechanical support to reduce stress on the plantar fascia.

**Reference:** *J Foot Ankle Res.* 2023;16(1):28

[Abstract](#)

## Foot health status in pregnant women

**Authors:** Letompa S et al.

**Summary:** This descriptive cross-sectional study used a quantitative approach to determine the overall foot health status in pregnant women and compared overall foot health status in different trimesters. All pregnant women had poor foot health status in vigour, especially in the third trimester, where women's physical activity was diminished and had greater difficulties with footwear. However, despite having minimal foot pain, pregnant women maintained good foot function and social capacity. The least foot pain was experienced in the second trimester.

**Comment:** This study found that foot health status declines as pregnancy progresses. This is due to a number of factors, including changes in foot morphology, biomechanical, and gait modifications, weight gain, oedema, and hormonal imbalances. Data showed that physical activity and social capacity decline as pregnancy progresses, and that energy and strength levels are decreased throughout all trimesters. Specifically, the study found that foot function, shoe scores, general foot health, physical activity, social capacity, energy, and strength all declined as pregnancy progressed. The greatest amount of foot pain occurred in the third trimester, and this was attributed to an increased contact time and pressure on the forefoot during standing. The shoe scores were lowest in the third trimester, indicating an increased difficulty in finding adequately fitting footwear in the third trimester. The study's findings suggest that pregnant women should be aware of the potential changes in foot health that can occur during pregnancy, and that they should take steps to manage these changes. This may include wearing supportive footwear, exercising regularly, and maintaining a healthy weight.

**Reference:** *Foot (Edinb).* 2023;55:101938

[Abstract](#)

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