

# Foot & Ankle Research Review™

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Issue 36 – 2018

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### Abbreviations used in this issue:

**OR** = odds ratio  
**RA** = rheumatoid arthritis  
**RCT** = randomised controlled trial  
**RICE** = rest, ice, compression, elevation  
**NSAIDs** = non-steroidal anti-inflammatory drugs

## Welcome to Issue 36 of Foot and Ankle Research Review.

In this issue I review a broad mix of recent publications. It is good to see some articles that are challenging the norm, particularly the review by Rasenberg et al., who question the use of custom foot orthoses. The clinical review of diabetic foot osteomyelitis is well worth a download as it contains some great clinical guidance. The study by Mailuhu et al., on lateral ankle sprains also highlights the need for continual care for people who suffer lateral ankle sprains due to the degree of persistent complaints that develop as a long-term complication of the injury.

I hope you enjoy this issue and please keep the feedback coming in.

Kind regards,

**Dr Matthew Carroll**

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## If it doesn't work, why do we still do it? The continuing use of subtalar joint neutral theory in the face of overpowering critical research

**Authors:** Harradine P et al.

**Summary:** The theories of Dr Merton L. Root are the basis for a common approach to musculoskeletal foot assessment and the design of foot orthoses known as the subtalar joint neutral (STJN) theory also known as "the subtalar joint neutral theory", "the foot morphology theory", the "Rootian theory" or the "Root model." Yet the value of this theory has been challenged on the basis of poor reliability and limited external validity. This review examines the STJN theory, and possible reasons for its ongoing use.

**Comment:** If you prescribe custom foot orthoses or prefabricated insoles or analyse gait and use the STJN position as your reference then you need to review this article. This viewpoint manuscript critically reviews the STJN theory, a theory that still underpins many clinicians' decision-making processes. The viewpoint discusses the historical inaccuracies, reliability and validity issues associated with the theory. Whilst this article could be viewed as controversial, I feel the evidence demonstrates that the STJN theory is likely incorrect. I wonder how long this theory will remain a cornerstone of foot orthotic theory.

**Reference:** *J Orthop Sports Phys Ther.* 2018;48(3):130-32

[Abstract](#)

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## Comparisons of plantar fasciitis injected with platelet-rich plasma vs corticosteroids

**Authors:** Jain SK et al.

**Summary:** This prospective randomised active control study examined the effect of local corticosteroid injection (n = 20) versus platelet-rich plasma (PRP; n = 20) injection in patients with plantar fasciitis. From baseline, 1, 3 and 6 months post-injection mean visual analog score (VAS), distribution of modified Roles and Maudsley scores, Foot and Ankle Outcome Instrument (FAI) core scale scores, American Orthopaedic Foot & Ankle Society (AOFAS) ankle-hindfoot scores, and plantar fascia thicknesses decreased in both groups, but there were no significant between-group differences.

**Comment:** In spite of the data indicating equal effectiveness in reduction of pain and fascial thickness with steroid or PRP injection, consideration must be given to the limitations of the study. Apart from the small sample size and lack of control group there are some significant limitations surrounding the exclusion criteria. Participants were excluded if they had any foot deformity of the ankle, including pes planus or pes cavus, no rationale is provided to explain this, nor is there any detail of how these foot deformities were defined. Ultrasound imaging was used to measure fascial thickness; however, there is no further definition provided surrounding the ultrasound characteristics of the participants. Namely, was there any vascularisation, hypochoigenicity, or oedema present prior to commencement of injection therapy? This is an area where we will no doubt see continual growth in research due to growing use in the clinical environment; however, large population-based studies are required.

**Reference:** *Foot Ankle Int.* 2018;Mar 1 [Epub ahead of print]

[Abstract](#)

## Age-related differences in foot mobility in individuals with patellofemoral pain

**Authors:** Tan JM et al.

**Summary:** This cross-sectional analysis examined whether older people with patellofemoral pain (PFP) had less foot mobility than younger adults with PFP in a cohort of 194 participants (58% women, mean age 32 years, mean BMI 25 kg/m<sup>2</sup>) with PFP of ≥ 6 weeks duration. K-means cluster analysis identified three age groups; 18-29 years (n=70), 30-39 years (n=101), and 40-50 years (n=23). A main effect for age was identified for midfoot height mobility (p<0.001) and foot mobility magnitude (p=0.006). Post-hoc analyses suggested midfoot height mobility differed across all age groups (moderate to large effect sizes), and foot mobility magnitude was reduced in those aged 40-50 years versus 18-25 years (moderate effect size).

**Comment:** Data from the study adds further evidence that foot mobility reduces in older age groups. The findings do raise some interesting questions surrounding the management of PFP in those with reduced midfoot mobility. Specifically, with regard to foot orthoses which have been found beneficial for older people with PFP and reduced midfoot width mobility. As motion control is not the only mechanism by which orthoses are effective, the study raises questions surrounding how the orthoses may be of benefit. In those with less foot mobility, are foot orthoses effective due to their ability to redistribute plantar pressures and/or attenuate loads during weight bearing? Footwear is also a consideration. If midfoot mobility is reduced should the shoe be more controlling through the midfoot or more flexible?

**Reference:** *J Foot Ankle Res.* 2018;11:5

[Abstract](#)

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## National profile of foot orthotic provision in the United Kingdom, part 2: podiatrist, orthotist and physiotherapy practices

**Authors:** Nester CJ et al.

**Summary:** This online survey examined the foot orthoses practice of 357 podiatrists, 93 orthotists and 49 physiotherapists in the UK. Differences between professional groups in employment and clinical arrangements, clinical populations, and the nature and volume of foot orthoses caseload were identified. The professions deliver prevention and treatment to important clinical populations, but their working context, scope of practice and clinical caseload mix differs.

**Comment:** Although based on UK data, the study highlights that foot orthoses fall in the scope of practice of many disciplines (podiatrists, orthotists and physiotherapists) as paralleled in New Zealand. The authors take a pragmatic view of orthotic prescription noting that quality of provision and development of knowledge will only improve with more professions providing input. Despite this pragmatic approach the data highlights numerous significant differences between the professions regarding their approaches in consultation processes, professional practices and patient outcomes surrounding foot orthoses. This data combined with the findings from part 1 of the study (Nester CJ et al. 2017) do pave the way to bridge the gap in defining and discussing the different approaches the professions have to the prescription of foot orthotics.

**Reference:** *J Foot Ankle Res.* 2018;Mar 20 [Epub ahead of print]

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## Efficacy of foot orthoses for the treatment of plantar heel pain: a systematic review and meta-analysis

**Authors:** Rasenberg N et al.

**Summary:** This meta-analysis examined the use of different foot orthoses on pain, function and self-reported recovery in patients with plantar heel pain versus conservative interventions in 20 RCTs using eight different types of foot orthoses. Using pooled data from six of the studies, no difference between prefabricated and sham orthoses was identified for short-term pain (mean difference 0.26; 95% CI -0.09 to 0.60), no difference was identified between sham and custom (mean difference 0.22; 95% CI -0.05 to 0.50), nor between prefabricated and custom orthoses (mean difference 0.03; 95% CI -0.15 to 0.22).

**Comment:** This is a further systematic review to add to the growing evidence demonstrating no difference between short-term pain reduction between prefabricated and sham devices or between custom orthoses and prefabricated orthoses in participants with plantar heel pain. Whilst the methodology of this review is sound, consideration must be given to the ability to standardise foot orthoses and how the diagnosis of plantar heel pain was made in the included studies. Whilst the review does provide the latest update, I feel there is still not enough evidence to support the conclusions the authors reach. It may be easy to think that this is yet another telling blow for the use of foot orthoses in the management of heel pain or may be reflective of the need to consider that foot orthoses may have their effect by mechanisms yet to be studied. Does the shape and contour of a foot orthotic really matter? Or is it the material properties of an orthotic and the ability to attenuate forces that creates an effect?

**Reference:** *Br J Sports Med.* 2018;Mar 19 [Epub ahead of print]

[Abstract](#)

## Diagnosis, treatment and prevention of ankle sprains: update of an evidence-based clinical guideline

**Authors:** Vuurberg G et al.

**Summary:** Updating existing guidelines for ankle sprain diagnosis, prevention and therapeutic interventions, this publication also sought to examine the cost-effectiveness of diagnostic procedures, therapeutic interventions and prevention strategies and instigate interactions with clinicians to help reduce health impairments and patient burden. The guideline indicates that ligament damage severity is best assessed by delayed (4-5 days post trauma) physical examination. A short period of immobilisation may relieve pain and swelling, but acute lateral ankle ligament rupture is best treated with tape or a brace in combination with an exercise programme. Certain sports have an increased risk of a lateral ankle sprain. NSAIDs use after an ankle sprain should be cautious, they may reduce pain and swelling, but have complications and may suppress the natural healing process. Supervised exercise-based recovery programmes are preferred over passive modalities because of stimulation of recovery of functional joint stability. Surgery is reserved for failure of thorough and comprehensive exercise-based treatment. For recurrent lateral ankle sprains, ankle braces should be considered.

**Comment:** This is a nice evidence-based update surrounding lateral ankle sprains, one of the most common lower limb musculoskeletal injuries. The article provides an evidence summary of the effect of treatment strategies (RICE vs control, immobilisation vs functional support, mobilisation vs control, exercise therapy and surgery vs conservative therapy). A good overview of predisposing factors and prognostic factors and diagnostics are provided by the authors. Perhaps not surprising to the clinician, the type of sport played was the main modifiable extrinsic factor related to lateral ankle sprain. The most common being basketball, indoor volleyball and climbing. The authors also identify following acute lateral ankle sprain the patient's current level of pain, their workload and level of sports participation, all have the potential to negatively affect recovery if not adequately addressed. Other recommendations included: the anterior drawer test is optimised if delayed until 4-5 day post injury; there is no role for RICE alone in the treatment of acute lateral ankle sprain; care should be taken in NSAID usage; if immobilisation is applied to treat pain or oedema, it should be for a maximum of 10 days; and a combination with other treatment modalities, such as exercise therapy, enhances the efficacy of manual joint mobilisation and is therefore advised. This article is well worth a read to keep abreast of the latest evidence-based recommendations.

**Reference:** *Br J Sports Med.* 2018;Mar 7 [Epub ahead of print]

[Abstract](#)

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## What's new in the management of foot deformities in children with cerebral palsy

**Authors:** Heydemann JA et al.

**Summary:** This literature review examined 46 articles and abstracts (English-language publications) on foot deformities in children with cerebral palsy. An evaluation of foot deformity is essential when evaluating children with cerebral palsy. Significant advances in gait assessment, conservative management and surgical correction have been reported and promising results have been reported in the achievement of higher levels of orthopaedic care and functional potential optimisation.

**Comment:** The review highlights the importance of assessing the foot and ankle in patients with cerebral palsy and provides an easy-to-follow update on foot deformities in cerebral palsy. The review provides a summary of visual and instrumented gait assessment and discusses orthotic management and surgical correction. There are some good points to note for those who assess and manage patients with cerebral palsy. Particularly, the reinforcement of the use of the Edinburgh Visual Gait Score for visual assessment of gait. If you are not familiar with the tool, the explanatory notes can be accessed [here](#). There is also a thought-provoking section on the negative effect of orthotic use. Definitely an area that requires more research.

**Reference:** *J Pediatr Orthop.* 2018;38(1):e20-24

[Abstract](#)

### Independent commentary by Dr Matthew Carroll



Matthew graduated in podiatry at the CIT in Wellington. He

undertook his postgraduate work at Otago University, Dunedin, New Zealand, Curtin University, Western Australia and Auckland University of Technology, Auckland, New Zealand. He is Head of Postgraduate Programmes within the School of Clinical Sciences and Senior Lecturer at Auckland University of Technology. Matthew is Associate Editor for BMC Musculoskeletal Disorders and an Editorial Board Member for the Journal of Foot and Ankle Research. He is active in research with a special interest in musculoskeletal conditions affecting the lower limb.

## Region-specific foot pain and plantar pressure in people with rheumatoid arthritis: A cross-sectional study

**Authors:** Stewart S et al.

**Summary:** This small study in 21 rheumatoid arthritis (RA) patients and 19 age- and sex-matched controls examined the association between region-specific foot pain and plantar pressure. RA patients experienced greater foot pain than controls at the toes (OR 10.4;  $p = 0.001$ ), forefoot (OR 6.3;  $p = 0.006$ ) and rearfoot (OR 10.1;  $p = 0.011$ ). RA patients also exhibited greater rearfoot peak pressure ( $p = 0.003$ ) and greater pressure-time integrals at the forefoot ( $p = 0.005$ ), midfoot ( $p = 0.016$ ) and rearfoot ( $p < 0.001$ ). After body mass and participant group adjustment, higher peak pressure at the toes was associated with midfoot and/or rearfoot pain.

**Comment:** The study assessed if pain is associated with increased plantar pressures in the foot in people with RA. Data reinforced that people with established RA experience region-wide foot pain, primarily affecting the toes and forefoot, but also the midfoot and rearfoot, with more than half of the study participants experiencing pain in multiple regions. This may reflect the high prevalence of toe deformities and synovial inflammation of the metatarsophalangeal joints, as well as rearfoot valgus and pes planus in this population. Data also showed higher peak pressures and pressure-time integrals at the rearfoot, which may be suggestive of a forefoot offloading mechanism. The results did not observe a direct relationship between plantar pressure and foot pain within the same regions of the foot, but did observe that pain in the rearfoot and forefoot is associated with increases in plantar pressure at the toes.

**Reference:** *Clin Biomech.* 2018;55:14-17

[Abstract](#)

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## Clinical and radiological predictors for persistent complaints five years after a lateral ankle sprain: A long-term follow-up study in primary care

**Authors:** Mailuhu AKE et al.

**Summary:** This observational study over 5 years in 206 patients followed on from a cross-sectional study of patients with an acute lateral ankle sprain. The 5-year follow-up in 132 (64.1%) patients revealed that 18.2% experienced persistent complaints and 30.3% experienced a re-sprain. Predictors of persistent complaints 5 years after an acute ankle sprain were baseline complaints 6-12 months after injury (OR 6.38; CI 95% 1.54-26.44), dominant leg injury (OR 4.89; CI 95% 1.16-20.62) and a recurrent ankle sprain (OR 9.81; CI 95% 2.17-44.47).

**Comment:** This research highlights the persistent complaints that exist 5 years following lateral ankle sprain. Approximately 20% of the study population reported a persistent complication. Interestingly the percentage of complaints post injury were lower in this study compared to previous research. This may be attributable to the methodology; in this study the participants completed a questionnaire with no physical exam or imaging conducted. Therefore, the study may under-report the degree of injury post lateral ankle sprain. It was also interesting to read of the percentage of participants who re-sprain their ankle during the 5-year follow-up (30%) and the amount of participants who have five or more re-sprains. The data also reported that of all re-sprains approximately 68% occurred within the first year of follow-up. The article highlights significant predictors for persistent complaints at 5-year follow-up, those being, persistent complaints 6 to 12 months after initial injury, dominant leg injury and recurrent ankle sprain. This study emphasises the need for continual review of people who have suffered a lateral ankle sprain, with the growing body of evidence indicating there will be persistent ongoing problems.

**Reference:** *J Sci Med Sport* 2018;21(3):250-56

[Abstract](#)

## Modern management of diabetic foot osteomyelitis. The when, how and why of conservative approaches

**Authors:** Aragón-Sánchez J and Lipsky BA et al.

**Summary:** Diabetic foot osteomyelitis is a complex infection associated with a high rate of relapse and limb loss that is diagnosed by clinical evaluation, serum inflammatory markers and plain X-ray. When these results are negative or contradictory, advanced imaging tests or bone biopsy may be required. The infection is often polymicrobial, but *Staphylococcus aureus* is the most frequent microorganism isolated from bone specimens. Antibiotic therapy for  $\leq 6$  weeks is as safe and effective as surgery in uncomplicated forefoot diabetic foot osteomyelitis. Surgery (limb-sparing when possible) is required when accompanied by necrotising fasciitis, deep abscess, gangrene or when the osteomyelitis is not responsive to appropriate antibiotic treatment.

**Comment:** Diabetic foot osteomyelitis appears to complicate about 20% of diabetic foot infections seen in outpatient clinics, but can be present in more than 70% of patients hospitalised for the infection. The manuscript provides a detailed and easy to understand review surrounding the pathophysiology, diagnosis, microbiology, conservative and surgical management of diabetic foot osteomyelitis. The review of pathophysiology in this article is a highlight for me and contains a good flow chart that can be used in the diagnosis of osteomyelitis. The authors provide good commentary on how to clinically evaluate the patient with a suspected diabetic foot osteomyelitis, detail on the use of the probe to bone test, the value of X-rays, inflammatory markers and the need for advanced imaging to aid diagnosis. This article is well worth a read for those who want a knowledge refresh in this area.

**Reference:** *Expert Rev Anti Infect Ther.* 2018;16(1):35-50

[Abstract](#)

