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Abbreviations used in this issue

BMI = Body Mass Index
MRI = magnetic resonance imaging
OR = odds ratio

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Foot and Ankle Research Review

Welcome to Issue 29 of Foot and Ankle Research Review.

Thank you for your feedback on the previous issue of the review. It is pleasing to hear how research continues to be integrated into clinical practice. In this issue I have reviewed three articles related to different aspects of heel pain. The study by Cotchett et al. surrounding anxiety & stress and plantar heel pain is particularly relevant. There are also two manuscripts reviewed that provide you with some clinical tools to aid your assessment surrounding footwear and paediatric lower limb assessment. I have included a new section in the review titled 'Clinical Corner' where I provide details of reviews of clinical conditions. In this issue this includes plantar hyperhidrosis and the diagnosis and management of plantar warts.

I hope you enjoy the selection of studies in this review and I look forward to your feedback.

Kind regards,

Dr Matthew Carroll

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Depression, anxiety, and stress in people with and without plantar heel pain

Authors: Cotchett M et al.

Summary: This observational study examined associations between depression, anxiety and stress in 45 patients with plantar heel pain and 45 age- and sex-matched control patients. Univariate analysis suggested that those with plantar heel pain had greater levels of depression (mean difference 4.4; 95% CI 2.3-6.5), anxiety (mean difference 2.6; 95% CI 0.9-4.3), and stress (mean difference 4.8; 95% CI 1.9-7.8). Adjustment for age, sex, BMI and years of education, indicated that plantar heel pain was associated with increases in symptoms of depression (OR 1.3; 95% CI 1.1-1.6), anxiety (OR 1.3; 95% CI 1.1-1.5) and stress (OR 1.2; 95% CI 1.1-1.3).

Comment: The management of plantar heel pain is infrequently straight forward, with numerous modalities often used within a management plan. This very interesting manuscript highlights the need for clinicians to think beyond the simple biological manifestations of plantar heel pain.

Reference: *Foot Ankle Int.* 2016; May 2 [Epub ahead of print]

[Abstract](#)

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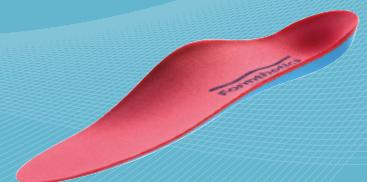
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Foot Science
International

Impaired foot plantar flexor muscle performance in individuals with plantar heel pain and association with foot orthosis use

Authors: McClinton S et al.

Summary: In this controlled laboratory study, 27 participants with heel pain and 27 control participants undertook a rocker board plantar flexion test (RBPFT) and a modified paper grip test for the great toe (mPGTGT) and lesser toes (mPGTLT) to compare ankle plantarflexor and toe flexor muscle performance and to assess the relationship between muscle performance and duration of foot orthosis use. Results indicated that muscle performance was lower in participants with plantar heel pain (RBPFT $p = 0.001$; mPGTGT $p = 0.037$; mPGTLT; $p = 0.022$). Data also indicated that longer duration of foot orthosis use was also moderately correlated to lower performance on foot muscle performance tests (RBPFT $r = -0.52$, $p = 0.02$; mPGTGT; $r = -0.54$, $p = 0.01$; mPGTLT, $r = -0.43$, $p = 0.03$).

Comment: The results of this study need to be viewed with extreme caution. It should not be interpreted from the results that foot orthosis use causes a decrease in foot plantarflexor muscle performance, as the data analysis did not allow for determination of causality. The use of the word muscle performance is also crucial. This raises an interesting issue for all clinicians who assess muscle performance in the foot and ankle as part of their routine assessment, that is, what aspect of muscle performance are the tests you conduct measuring?

Reference: *J Orthop Sports Phys Ther.* 2016;July 3 [Epub ahead of print]

[Abstract](#)

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Disclaimer: This publication is not intended as a replacement for regular medical education but to assist in the process. The reviews are a summarised interpretation of the published study and reflect the opinion of the writer rather than those of the research group or scientific journal. It is suggested readers review the full trial data before forming a final conclusion on its merits.

Research Review publications are intended for New Zealand health professionals.

Relationship and classification of plantar heel spurs in patients with plantar fasciitis

Authors: Ahmad J et al.

Summary: This retrospective review of radiographs characterised the size and shape of plantar heel spurs in 109 participants (78 female) with plantar heel spurs and plantar fasciitis (confirmed by ultrasound or MRI). Calcaneal spur characteristics, pain and function measures were reevaluated after a minimum 6-week period of immobilisation in a weight-bearing controlled ankle motion (CAM) boot. The plantar heel spurs could be classified based on shape and size in participants with plantar fasciitis. Plantar heel spur shape was classified as 0 (absent) in 26 patients, 1 (horizontal) in 66 patients, 2 (vertical) in four patients and 3 (hooked) in 13 patients. Plantar heel spur size was <5 mm in 75 patients, 5-10 mm in 28 patients and >10 mm in six patients. Before treatment, neither the spur shape nor size was significantly correlated with different levels of patient function and pain. After treatment, those with a horizontal or hooked spur showed the greatest improvement in function and pain. When compared to spurs <5 mm, those with spurs >5 mm showed greater improvement in function and pain ($p < 0.05$).

Comment: The role of the calcaneal spur and effect on pain and function is controversial. Although this study has limitations, it does highlight that the assessment of the calcaneal spur still merits consideration. However, the calcaneal spur cannot be considered in isolation for its role in symptomology, considerations must be given to spur fractures, fascial thickness, fat pad and calcaneal bone abnormalities. This study further highlights the clinical utility of ultrasound and MRI in the diagnosis of the multiple pathologies that can coexist in people with plantar heel pain.

Reference: *Foot Ankle Int.* 2016;May 13 [Epub ahead of print]

[Abstract](#)

Twelve-month outcomes following surgical repair of the Achilles tendon

Authors: Fox G et al.

Summary: This prospective cohort study ($n = 204$) analysed data from the Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) to assess the frequency of surgical repairs of Achilles tendon rupture over a five-year period (July 2009 to June 2014), and examined return to work status, health status and functional outcomes 12-months post-surgery. In total, 92% of participants completed followup; of these, 95% of those working prior to injury had returned to work and 42% of patients reported a full recovery. The prevalence of problems as measured by the 3-level European Quality of Life-5 Dimensions (EQ-5D-3L) was 0.5% for self-care, 11% for anxiety, 13% for mobility, 16% for activity and 22% for pain; 16% reported problems in >1 domain.

Comment: These findings highlight the significant impact of Achilles tendon rupture on global function in an otherwise healthy group of participants. In summary, almost one-quarter of participants reported problems with pain and discomfort 12 months after surgery, and a similar proportion of patients reported moderate functional disability, indicating problems in the areas of work, study, relationships and/or social and leisure activities. The authors also raise some very pertinent points in their discussion. First, the need for an increased focus on management within the first year post-operatively, second, the wide variations in post-operative rehabilitative regimes may be linked to favourable outcomes. Of interest the authors allude to the idea that the decreased incidence of tendon repair over the study period (68% decrease) may reflect a change in practice, whereby surgery may be becoming a less common management approach for Achilles tendon repair.

Reference: *Injury* 2016;Jul 9 [Epub ahead of print]

[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 Podiatry and Senior Lecturer at Auckland University of Technology, Director/Treasurer of the Australia New Zealand Podiatry Accreditation Council and a Board member of the Podiatrists Registration Board of New Zealand. He has a special interest in inflammatory arthritis and is active in research in rheumatoid arthritis, gout and lupus.



In-shoe plantar pressure measurements for the evaluation and adaptation of foot orthoses in patients with rheumatoid arthritis: A proof of concept study

Authors: Tenten-Diepenmaat M et al.

Summary: This observational proof-of concept study investigated the use of plantar pressure measurement to guide adaptations to foot orthoses in 45 participants with rheumatoid arthritis and foot problems. Specific regions of interest related to the forefoot and digits were selected as target areas for pressure reduction. According to an adapted protocol, custom-made foot orthoses were evaluated using in-shoe plantar pressure measurements and if necessary, adapted. Adaptations to foot orthoses included the addition of functional corrections (i.e. varus/ valgus corrections, metatarsal bars and metatarsal domes) and shock absorbing padding; orthoses were adapted for 70% of patients. Usual care foot orthoses resulted in a mean 9% reduction in pressure-time integral at forefoot region of interest compared to no-foot orthoses ($p = 0.01$). Foot orthosis adaptation led to an additional mean 3% reduction in pressure-time integral ($p = 0.05$). The authors concluded that using in-shoe plantar pressure measurements to guide foot orthosis adaptations in participants with rheumatoid arthritis leads to a small additional plantar pressure reduction in the forefoot.

Comment: This study highlights the growing utility of plantar pressure measurements in the clinical environment. For those clinicians who use plantar pressure assessment the results also emphasise the need to move beyond simple barefoot pressure measurements, and consider the use of in-shoe pressure systems. This study has demonstrated that by targeting specific areas of the foot with orthotic additions, quantifiable differences to plantar pressure redistribution in the forefoot can be achieved.

Reference: *Gait Posture* 2016;45:45-50

[Abstract](#)

If the shoe fits: development of an on-line tool to aid practitioner/patient discussions about 'healthy footwear'

Authors: Farndon L et al.

Summary: The purpose of this study was to use qualitative methods (via interviews and a focus group) to design a practical on-line toolkit to empower foot health practitioners to encourage healthier shoe choices in the people they treat. Six podiatrists/shoe-fitters undertook semi-structured interviews with 13 participants with foot pathologies, some of whom also completed shoe diaries. Follow-up interviews and photographs of participants' own shoes were taken to allow in-depth discussions. Overall, four areas related to 'fit' were identified, all of which need to be considered when discussing changes in footwear; practicalities, personal, purpose and pressures. The toolkit, which provides a support for podiatrists in partnership with patients to identify and address possible barriers to changing footwear towards a more suitable shoe, is available to download on the study website (<http://www.sheffield.ac.uk/podiatrytoolkit>).

Comment: The results of this study should cause you to rethink a few concepts with regard to footwear recommendations, particularly around the concept of fit. When defining what is considered a 'healthy shoe' clinicians must move beyond the simplicity of a shoe that is perceived to fit well physically and consider concepts such as practicalities (physical fit), personal (mental fit), purpose (lifestyle fit) and pressures (social fit).

Reference: *J Foot Ankle Res.* 2016;9:17

[Abstract](#)

Non-surgical treatment of hallux valgus: a current practice survey of Australian podiatrists

Authors: Hurn SE et al.

Summary: In order to determine whether a consensus exists among Australian podiatrists regarding non-surgical treatment of hallux valgus and to explore physical examination findings and common presenting concerns associated with this condition, an online survey was distributed to Australian podiatrists in 2013 via the professional association in each state (approximately 1900 members). Survey data from 210 respondents demonstrated that a consensus exists among Australian podiatrists regarding non-surgical management of hallux valgus, although typically management recommendations differ between adults, older adults and juveniles with hallux valgus. The most common recommendation for all patient types was advice regarding different footwear, recommended by 92% of podiatrists for adults, 91% for older adults, and 77% for juvenile hallux valgus. Despite the lack of empirical evidence for the efficacy of orthoses for hallux valgus, custom and prefabricated devices were commonly prescribed by podiatrists for hallux valgus management. A diverse range of presenting problems and physical examination findings were reported and these factors have implications for treatment decisions. The study authors concluded that because management strategies differ across patient age groups, any updated clinical guidelines should differentiate between adult and juvenile hallux valgus.

Comment: Although there was a degree of consensus amongst respondents surrounding management strategies for hallux valgus, there is a clear need for development of up-to-date guidelines surrounding non-surgical management of hallux valgus. In particular, differentiation between treatment strategies for juvenile versus adult management. The manuscript also cautions against a blanket approach in the management of all patients with hallux valgus.

Reference: *J Foot Ankle Res.* 2016;9:16

[Abstract](#)



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Gait and Lower Limb Observation of Paediatrics (GALLOP): development of a consensus based paediatric podiatry and physiotherapy standardised recording proforma

Authors: Cranage S et al.

Summary: This study was undertaken in order to develop a gait and lower limb standardised recording proforma guided by the literature and consensus, for the assessment of the paediatric foot and lower limb in children up to 18 years of age. Expert Australian podiatrists and physiotherapists were invited to participate in a three round Delphi survey panel using the online Qualtrics® survey platform; 17 of the 21 (81 %) participants completed three rounds of the survey. Round one consisted of open-ended questions on paediatric gait and lower limb assessment developed from a literature search of standardised lower limb assessment methods and existing templates, while rounds two and three consisted of statements developed from the first round responses. When 70 % or more of the participants indicated consensus or agreement with the assessment method and when there was support within the literature for paediatric age-specific normative data with acceptable reliability of outcome measures, the questions and statements were included in the final Gait and Lower Limb Observation of Paediatrics (GALLOP) proforma. Overall there was agreement on 95 statements relating to birth history, developmental history, rotation of the lower limb, hip measurement, ankle range of motion, foot posture, gait and balance.

Comment: Although the proforma was developed through expert opinion (low level of evidence) the GALLOP proforma is the first step towards clinicians collecting paediatric data pertaining to the lower limb in a uniform manner. I would be interested in hearing your feedback on the proforma in terms of its ease of use in the clinical environment. The proforma is available for free download. Just search this manuscript on the Journal of Foot and Ankle Research website. The proforma is included as additional file 4.

Reference: *J Foot Ankle Res.* 2016;9:8

[Abstract](#)

CLINICAL CORNER

The human papillomavirus and its role in plantar warts: A comprehensive review of diagnosis and management

Authors: Vlahovic TC and Khan MT

Summary: This review article discusses the role of the human papilloma virus in the development of plantar warts. The review discusses the human papilloma virus subtypes responsible and explains that an epidermal abrasion and a transiently impaired immune system is required for the inoculation of keratinocytes.

Comment: This review of diagnosis and management of plantar warts will provide you with in depth information surrounding the Human Papilloma virus, an overview of patient evaluation and details of pharmacological and non-pharmacological treatment options.

Reference: *Clin Podiatr Med Surg.* 2016;33(3):337-53

[Abstract](#)

Plantar hyperhidrosis: An overview

Author: Vlahovic TC

Summary/Comment: Plantar hyperhidrosis or excessive sweat production on the soles of the feet affects approximately 3% of the population. The onset of plantar hyperhidrosis tends to be between the ages of 0 and 19 years. This review provides the clinician a great overview of the pharmacological and non-pharmacological treatment options for plantar hyperhidrosis. Included is an adapted hyperhidrosis disease severity scale and a step-by-step evaluation checklist to aid diagnosis, both useful in the clinical environment.

Reference: *Clin Podiatr Med Surg.* 2016;33(3):441-51

[Abstract](#)

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