Welcome to Issue 28 of Foot and Ankle Research Review.

The manuscripts I have selected for this issue are all topics directly related to discussions I have had in the past few months. I would particularly draw your attention to the very good review on foot melanoma. I was very interested to read the Framingham study relating to region-specific foot pain and plantar pressure, in light of the recent increase in foot orthoses that are manufactured based on plantar foot pressures. Management of Achilles tendon and exertional compartment problems are a challenge, so I have included two systematic reviews to enhance knowledge surrounding surgical management. I am very interested in what your thoughts are of the recommendations for interventions for diabetic foot ulcers provided by the IWGDF. What is clear is that more quality research is required in this area. I have again highlight paediatrics, in particular, management of clubfoot. It is pleasing to see the knowledge base ever increasing in paediatric conditions related to the foot and ankle.

Research Review is ten!!! The first ever issues of Research Review were delivered to inboxes in February 2006. Fast forward ten years and we now publish 48 regular reviews to which there are over 160,000 subscriptions. We’re grateful to each and every one of you for your support and are looking forward to even bigger and better things over the coming years.

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

Kind regards,

Dr Matthew Carroll
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Surgical treatment for midportion Achilles tendinopathy: a systematic review

Authors: Baltes TP et al.

Summary: This systematic review evaluated literature from MEDLINE, EMBASE and the Cochrane database on the surgical treatment for midportion Achilles tendinopathy. Among 23 reviews meeting the study inclusion criteria, the results of 1285 procedures in 1177 cases were reported. Surgical techniques were separated into five categories: open surgical debridement (11 studies); minimally invasive procedures (seven); endoscopic procedures (three); open gastrocnemius lengthening (one); open autologous tendon transfer (one). Patient satisfaction and complication rates varied widely across the studies (69-100% and 0-85.7%, respectively). Lower complication rates were seen with minimally invasive and endoscopic procedures than with open procedures.

Comment: This review investigated patient satisfaction and complication rates relating to five Achilles tendon surgical procedures; open surgical debridement, minimally-invasive procedures, endoscopic procedures, gastrocnemius lengthening and autologous tendon transfer. The results of this review should be interpreted with caution due to inconsistencies in the reporting of the primary and secondary outcome measures and the large number of heterogeneous outcome measures used to measure functional outcome and pain.

Clinical Perspective: Despite providing a low level of evidence, the review does provide the clinician awareness of surgical techniques available. Additionally, the review demonstrated the variation in the techniques with regard to patient satisfaction and complication rates.


Abbreviations used in this issue
CECS = chronic exertional compartment syndrome
ESWT = extracorporeal shock wave therapy
IWGDF = International Working Group on the Diabetic Foot

to read previous issues of Foot and Ankle Research Review
**Orthosis-shaped sandals are as efficacious as in-shoe orthoses and better than flat sandals for plantar heel pain: A randomized control trial**

**Authors:** Vicenzino B et al.

**Summary:** The efficacy of a contoured sandal being marketed for plantar heel pain was investigated in this Australian study, using a flat flip-flop and contoured in-shoe insert/orthoses as a comparison. A total of 150 volunteers (mean aged 50 years) with plantar heel pain of greater than 4-weeks duration were recruited and randomised to receive either the commercially available contoured sandals (n = 49), flat flip-flops (n = 50) or the counter, pre-fabricated full-length foot orthotics (n = 51). At 12 weeks, wearers of the contoured sandal were 68% more likely to report improvement on the 15-point Global Rating of Change scale (GROC) and 61% more likely to report improvement on the 20-item Lower Extremity Function Scale (LEFS) compared to wearers of the flat flip-flop. No differences were observed between the contoured sandal and the shoe insert.

**Comment:** Contoured sandals have had an ever increasing market presence in the past 5 years. Over a 12-week period in this cohort with plantar heel pain, levels of self-reported improvement were assessed through comparison of contoured sandals compared to flat sandals and contoured insoles. The non-measurement of first step heel pain over the 12-week period and lack of blinding to the treatment were limitations of the study.

**Clinical Perspective:** The study adds positively and is supportive of existing literature surrounding the use of prefabricated foot devices in the short-term management (3 months) of plantar heel pain. The authors suggest that contoured sandals produce effects beyond that of placebo. Anecdotally, is this observed by those in clinical practice?

**Reference:** PloS One 2015;10(12):e142789

**Abstract**

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**The effect of step rate manipulation on foot strike pattern of long distance runners**

**Authors:** Allen DJ et al.

**Summary:** The effect of step rate manipulation to change foot strike pattern in runners from a heel strike pattern to a non heel strike pattern was evaluated in this study. A total of 40 shod recreational runners who run with a heel strike pattern and covered over 10 miles weekly were recruited. A metronome was used to increase step rate above the runner’s referred step rate by 5%, 10% and 15%, and 2D video motion analysis used to determine foot strike pattern and foot inclination angle at initial contact for each step rate condition. At both 10% and 15% step rates above preferred rate, statistically significant changes in foot strike pattern from a heel strike pattern to a midfoot or forefoot strike pattern were observed; seven (17.5%) participants at 10% step rate increase and 12 (30%) at 15%. A statistically significant reduction in mean foot inclination angle at initial contact was seen as step rate increased.

**Comment:** This study of 40 recreational runners presented data indicating that manipulation of step rate may be an effective method of changing foot strike patterns. Data indicated that manipulation of step rate can effect change to heel strike patterns and foot inclination angles.

**Clinical Perspective:** Changing foot strike pattern from a heel strike pattern to a midfoot or forefoot strike pattern through running gait retraining may be one way to accomplish a reduction of impact forces and reduce running-related injuries.


**Abstract**

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**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.
A longitudinal review of gait following treatment for idiopathic clubfoot: Gait analysis at 2 and 5 years of age

Authors: Jeans KA et al.

Summary: This study examined the long-term effects of growth and surgical intervention on gait following non-operative and surgical interventions for clubfoot in 181 children (276 clubfeet) at 2 and 5 years of age. Initially all feet were treated with either the Ponseti casting technique (n = 132) or French physical therapy method (n = 144) but by 5 years, 30 Ponseti and 61 physical therapy treated feet required surgery. Gait analysis indicated limitations primarily in the surgically treated feet. Following surgical intervention, normal ankle motion was observed in 17% of Ponseti treated feet and 21% of physical therapy treated feet at age 5. Surgically treated physical therapy feet showed persistent in-toeing at both 2 and 5 years of age. Among surgically managed feet, those initially receiving physical therapy had a clinically significant reduction in ankle power versus Ponseti treated feet. Feet receiving a full posterior release had significantly less ankle power than those receiving limited release or tendon transfer surgery, or those who were still non-operative at 5 years of age.

Comment: This longitudinal study was designed to monitor changes seen in gait patterns of children treated surgically and non-operatively (physical therapy & Ponseti) for clubfoot as they grew (ages 2 & 5 years) and to see whether early gait differences persist or normalise over time. Data supports that clubfeet treated non-operatively have more normal gait than those that have undergone surgical management.

Clinical Perspective: Of significance was the finding surrounding ankle power in the surgical group. When the participants were reviewed at 5 years of age the authors conclude that surgical release of the clubfoot, regardless of the form of initial treatment, compromises push-off and creates gastrocsoleus weakness. Of note for the clinician in these patients is a reduction in ankle plantar flexion and increasing angles of in-toeing. It will be interesting to see the next installment of data from this group as the cohort is followed in the future.

Reference: J Pediatr Orthop. 2015;May 12 [Epub ahead of print]
Abstract

Research Review is an endorsed provider for CPD recertification credits by Podiatry NZ.

FOR MORE INFORMATION PLEASE CLICK HERE
Epidemiology of shoe wearing patterns over time in older women: Associations with foot pain and hallux valgus

Authors: Menz HB et al.

Summary: In a survey of 2627 women aged 50-89 years, women’s shoe wearing patterns and associations between footwear characteristics and foot pain and hallux valgus were evaluated. The survey indicated that the use of shoes with a high heel and very narrow toe box was common when participants were aged 20 and 29 years, but their use decreased to <10% by the age of 40 years. When compared to those who wore a very-wide toe box shoe, the likelihood of hallux valgus was greater in those wearing a wide (OR 1.96; 95% CI 1.03-3.71), narrow (OR 2.39; 95% CI 1.29-4.42) or very narrow (OR 2.70; 95% CI 1.46-5.00) toe box from age 20-29 years or a very narrow toe box (OR 1.93; 95% CI 1.10-3.39) from 30-39 years.

Comment: Features of women’s footwear such as an elevated heel and a constrictive toe box may contribute to the development of foot pain and deformity. Studies have revealed that heel elevation increases the pressures under the metatarsal heads, limits motion of the first metatarsophalangeal joint, and increases the stiffness of the Achilles tendon.

Clinical Perspective: This large population-based study evaluating associations between footwear characteristics, foot pain and hallux valgus provides great guidance for the clinician. The 20-39 age group appears to be a key demographic where poor choice may be detrimental. Avoiding constrictive footwear between the ages of 20-29 may help prevent the development of hallux valgus. Interestingly, the authors also reported no association between hallux valgus and heel height of footwear worn between the ages of 20-29 years or 30-39 years, or between the hallux valgus and total number of decades of exposure to high heels.


Laser therapies for onychomycosis - critical evaluation of methods and effectiveness

Authors: Francuzik W et al.

Summary: This review assessed the use of laser therapies for onychomycosis based on 22 reports (926 initial search hits) from peer-reviewed journals or published as white papers. Most studies (81.82%) used an Nd:YAG laser. 47.4% used a 1064 device and reported that all treated patients responded positively. The use of, and investment in this modality. Specifically, limitations are: the uncertainty many clinicians face when considering the move towards the use of, and investment in this modality. Specifically, limitations are: the inconsistencies in reported outcomes of studies, the majority of studies are small, uncontrolled and non-randomised, numerous laser settings are reported, treatment procedures are inconsistent, varied reporting of adverse effects and inconsistent guidance surrounding follow up time. Whilst there is low level evidence of effectiveness and instances where laser treatment is preferable in patients with contraindications for oral antifungal pharmacotherapy, high-quality clinical trials are required. There are no long-term study results exceeding 18-months post therapy that have been reported to date.

Comment: The use and availability of laser light sources in the treatment of onychomycosis has rapidly evolved in the last 5 years.

Clinical Perspective: I have waited for some time now for a systematic review to bring the evidence together on this topic. The review emphasises the uncertainty many clinicians face when considering the move towards the use of, and investment in this modality. Specifically, limitations are: the inconsistencies in reported outcomes of studies, the majority of studies are small, uncontrolled and non-randomised, numerous laser settings are reported, treatment procedures are inconsistent, varied reporting of adverse effects and inconsistent guidance surrounding follow up time. Whilst there is low level evidence of effectiveness and instances where laser treatment is preferable in patients with contraindications for oral antifungal pharmacotherapy, high-quality clinical trials are required. There are no long-term study results exceeding 18-months post therapy that have been reported to date.


Melanoma of the foot

Authors: Bristow I and Bower C

Summary: This review examines the clinical features of melanoma arising on the foot, which has several unique characteristics compared with cutaneous melanoma arising elsewhere in presentation and prognosis. It is frequently delayed in presentation and diagnosis, in part due to a highly variable plantar surface and nail unit appearance. The CUBED (Coloured, Uncertain diagnosis, Bleeding, Enlargement, Delay) acronym can aid foot melanoma diagnosis and use of a dermatoscope can improve assessment of suspicious lesions. New drug therapies that target known melanoma mutations, such as BRAF mutations targeted by vemurafenib, dabrafenib and trametinib, and the KIT mutation targeted by imatinib, may extend survival times for patients with the disease.

Comment: Foot melanoma has its own unique peculiarities and clinically may present a greater diagnostic challenge because lesions often are presented and diagnosed late, adversely affecting outcomes.

Clinical Perspective: This is a must read for all clinicians involved in the management of the foot and ankle. The review article provides a comprehensive overview of the types of melanoma, the clinical presentation of melanomas to the foot and the nail unit. Of particular note to melanomas to the nail unit is the use of the CUBED acronym, if you have not encountered this before, it is well worth your time to read this article. The manuscript also provides guidance surrounding the use of dermoscopy, a hand held device that will aid your diagnosis of skin lesions and is well worth the investment.


Abstract
USING RESEARCH REVIEW ABSTRACTS FOR CNE POINTS

Time spent reading this publication has been approved for Continuing Nursing Education (CNE) by The College of Nurses Aotearoa (NZ) for RNs and NPs. All you have to do is to have a record of the activity and a few sentences about what you learnt and how this impacts your practice as a RN & NP on the CNE Template. Available by clicking HERE.

We have used some of the recent Diabetes & Obesity Research Review abstracts as examples to show how you can easily record such activity if you would like this to contribute to your requirement for CNE. This example template can be used as a guide for completing the reflection form across all Research Reviews.

See the College of Nurses website for more information on Continuing Nursing Education (CNE) http://www.nurse.org.nz/continuing-nursing-education-cne-template.html

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Name: 
Practice area: 

Details of the research review chosen for this activity:

Diabetes & Obesity Research Review Issue 104

Key points from the review:

• Need to encourage all adolescents to exercise regularly due to long-term risk of obesity and lack of fitness & CV risk later in life.
• Reducing weight gain (even modest weight loss) in high-risk individuals (including rural women) does reduce rates of type 2 diabetes.
• Structured self-management education programmes are an important part of a quality diabetes service and help to reduce emergency diabetes-related incidences.

Application to my practice:

Making time to work with people towards manageable, realistic and incremental lifestyle adjustments has considerable benefits in terms of managing diabetes and reducing CV risk.

Length of time given to each review: 30 minutes

For CNE purposes allow 30 minutes per Research Review publication for reflective reading and follow-up.