

Foot & Ankle Research Review

Making Education Easy

Issue 7 – 2011

In this issue:

- *Microbiological contamination of cubicle curtains*
- *Measuring dynamic first metatarsal elevation*
- *Does a longer limb predict plantar fasciitis?*
- *Tools for treating in-toed gait in children*
- *Removing residual protein on podiatry instruments*
- *Foot posture in medial compartment knee OA*
- *Ankle taping protects knee joints*
- *Foot orthoses and gait*
- *Importance of ankle ultrasound in JIA*
- *Reliable measures of footwear comfort*
- *Morton's neuroma – outcome of surgical excision*

A warm Welcome to all our readers and a Happy New Year.

In this edition, I have included two articles relating to sterilising of instrumentation that would be of interest to clinicians (Smith et al., J Foot Ankle Res 2011;4(1):21:2) and microbiological contamination of cubicle curtains (Woodland et al., J Foot Ankle Res 2010; 3:26).

The Review provides website links to the abstract or fully published papers where possible so you can make your own judgements. If you have discovered or been involved in what you think is significant global research, let us know and we will consider it for inclusion next time. If you have colleagues or friends within New Zealand who would like to receive our publication, please send us their contact email and we will include them in the next issue. The creation of this publication would not have been possible without support from our sponsors, and to them we give our thanks.

I hope you find this edition of Foot & Ankle Research Review stimulating reading, and we welcome your feedback.

Kind regards,

Professor Keith Rome

keithrome@researchreview.co.nz

Microbiological contamination of cubicle curtains in an out-patient podiatry clinic

Authors: Woodland R et al

Summary: This UK-based study sought to identify any micro-organisms present on cubicle curtains in a podiatry clinic and assess the effectiveness of cleaning strategies on the magnitude of colony counts. Baseline microbiological swabs were taken from 20 cubicles within clinics at an outpatient podiatry clinic prior to the curtains being sent to the hospital laundry. Curtains were swabbed again immediately after, one and three weeks post laundering. Total colony counts increased very slightly (3%) from 1358 at baseline to 1399 immediately after laundry, which was not statistically significant, then declined significantly by 56% (to 610) at 1 week post laundry. At 3 weeks, post-laundry colony counts had increased by 16.4% (to 710); this was not statistically significant. The two most frequent micro-organisms present throughout were coagulase-negative *Staphylococcus* and *Micrococcus* species. In both species, colony counts were not significantly affected by the laundry process.

Comment: One of the major concerns that many clinicians constantly face is microbiological contamination. There is clear evidence relating specifically to instrumentation but not to cubicle curtains. The article highlights that one week after laundry there is a 56% decline in total colony counts. A concern that is highlighted in the article is a 16% increase at three weeks post-laundry. In a busy clinic, curtains may act as a major source for micro-organisms, creating potential for cross-infection. The disinfection of equipment is an important aspect of clinical practice and risk management to ensure a clean and safe environment. Cross-infection needs to be contained, especially when dealing with high-risk groups, such as those with diabetes. The need to ensure an environment that requires minimal contamination must be strictly adhered to. Cleaning and disinfection procedures require constant review, audit and reinforcement.

Reference: J Foot Ankle Res. 2010;3(1):26.

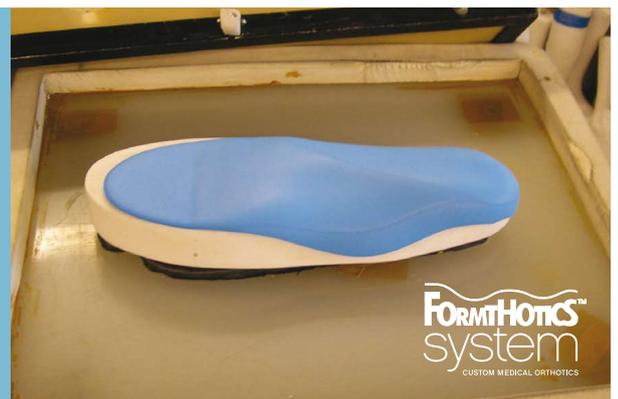
<http://www.jfootankleres.com/content/3/1/26/abstract>

Formthotics™
are custom
foot orthoses.

Formthotics thermoform to a positive cast of the foot or to the foot itself – at temperatures and pressures that can be applied right in the office.

Podiatry experts can cut, grind or build-up Formthotics as they would modify a traditional hard-plastic custom orthotic, to suit the patient's foot, problem, footwear and activity.

Visit <http://medical.formthotics.co.nz/podiatry> to learn more.



Formthotics™
system
CUSTOM MEDICAL ORTHOTICS

First ray mobility increase in patients with metatarsalgia

Authors: Greisberg J et al

Summary: These researchers assessed the reliability of a simple device for measuring dynamic first metatarsal elevation at different time points with different examiners, in a cohort of 352 patients: 64 with transfer metatarsalgia and 288 without symptoms. Patients with metatarsalgia symptoms had significantly greater first ray mobility (9 mm vs 7 mm; $p < 0.0002$) and metatarsal elevation (5 mm vs 3 mm; $p < 0.0002$) than patients without symptoms.

Comment: The first ray consists of the first metatarsal and first cuneiform and serves important purposes during the gait cycle: providing shock absorption during the loading response and stability during the terminal stance and push-off phases of the gait cycle. Abnormal first ray position (plantar flexion or dorsiflexion) or abnormal mobility (hypermobility or hypomobility) decreases the structure's ability to function normally during gait. First ray abnormalities have been suggested as a causative factor for the development of metatarsalgia. The current study is not the first to evaluate the reliability of the first ray position. However, the prospective study did use a well-described reproducible technique that many clinicians could use in their clinical practice. The results found patients with metatarsalgia symptoms had significantly greater first ray mobility and elevation than all other patients.

Reference: *Foot Ankle Int.* 2010;31(11):954-8.

<http://tinyurl.com/48afd7>



*Independent commentary by
Professor Keith Rome, School of
Podiatry, AUT University, Auckland.*

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

Looking for
healthcare jobs?

trade me
JOBS

www.trademe.co.nz/jobs

Limb-length discrepancy as a cause of plantar fasciitis

Authors: Mahmood S et al

Summary: These researchers investigated whether limb-length discrepancy contributes to the frequency and severity of plantar fasciitis. Limb-length discrepancy was determined in 26 patients with measurements from the anterior superior iliac spine to the medial malleolus and from the umbilicus to the medial malleolus, and with a block test. Body mass index was recorded in all patients. There was a strong correlation between the pain location and the longer limb ($p < 0.0001$). There was insufficient evidence in support of any association between body mass index and pain location.

Comment: Plantar fasciitis is a common musculoskeletal foot condition and the cause is multifactorial, with obesity, age, excessive foot pronation and calcaneal spurs as examples reported in the literature. The article highlights that pain is associated with the longer limb. The authors hypothesised that in the presence of a limb-length discrepancy; there will be a higher frequency and greater severity of plantar fasciitis. The authors did not use just one method to calculate limb-length discrepancy and several observers took the measurements. Furthermore, only 26 patients were enrolled into the study and no other risk factors were included. Based upon the results, there is no indication whether a longer limb is a predictor of plantar fasciitis and I would caution that there is a strong causal effect based upon the findings of this study.

Reference: *J Am Podiatr Med Assoc.* 2010;100(6):452-5.

<http://www.japmaonline.org/cgi/content/abstract/100/6/452>

Orthotic devices with out-toeing wedge as treatment for in-toed gait in children

Authors: Munuera PV et al

Summary: This paper reports the effect of an orthotic device with an out-toeing wedge combined with correctly fitting shoes as treatment for in-toed gait in children. Angle of gait was measured in 48 children (3–14 years of age) with in-toed gait. Angle of gait was compared in children unshod versus children shod without treatment, in children shod without treatment versus children shod plus orthoses, and in children unshod versus children shod plus orthoses. Correctly fitting shoes increased the angle of gait; the increase was significant between children who were unshod versus children under treatment. The corrective effect of the orthotic device was greater in the right foot.

Comment: The management of in-toeing gait in children is controversial. The effect of in-toed gait may lead in adulthood to hip arthritis, patella-femoral problems and be associated with foot problems such as flat feet. In this Spanish case series of 48 children aged between 3–14 years old, each child was issued with and without a foot orthoses. The authors evaluated angle of gait using porous paper. Although the authors find significant differences between children with and without foot orthoses, there was no control group for comparison. Furthermore, the long-term impact of using foot orthoses still requires further investigation. There is a need for randomised controlled trials to illustrate the impact of foot orthoses in children of different age groups.

Reference: *J Am Podiatr Med Assoc.* 2010;100(6): 472-8.

<http://www.japmaonline.org/cgi/content/abstract/100/6/472>

Quantitative analysis of residual protein contamination of podiatry instruments reprocessed through local and central decontamination units

Authors: Smith GW et al

Summary: These researchers measured residual protein contamination of 189 podiatry instruments reprocessed centrally and 189 instruments reprocessed locally. A fluorescent assay based on the reaction of proteins with o-phthalaldehyde/sodium 2-mercaptoethanesulfonate detected residual protein on 72% ($n=136$) of instruments reprocessed centrally and 90% ($n=170$) of instruments reprocessed locally. Significantly less protein ($p < 0.001$) was recovered from instruments reprocessed centrally (median 20.62 μg) than local reprocessing (median 111.9 μg).

Comment: This UK article relating to the cleaning of podiatry instruments by local and central decontamination and cleaning will be of interest to all clinicians. The paper is well presented, demonstrating that centralised cleaning is more effective than local units at removing residual protein. The paper also demonstrates that similar levels of protein contamination are found on podiatry instruments, as have been reported on other surgical instruments. For a busy clinician, the short- and long-term costs need to be considered in regard to using a central decontamination unit, since no single standard exists as yet for 'acceptable' protein levels on instruments.

Reference: *J Foot Ankle Res.* 2011;4(1):2.

<http://www.jfootankleres.com/content/4/1/2>

Foot posture in people with medial compartment knee osteoarthritis

Authors: Levinger P et al

Summary: Foot posture of 32 patients with clinically- and radiographically-confirmed osteoarthritis (OA) predominantly in the medial compartment of the knee was compared with that of 28 asymptomatic age-matched healthy controls. The clinical foot measures used included the foot posture index (FPI), vertical navicular height and drop and the arch index. Significant differences were found between the control and the knee OA groups in relation to the FPI (1.35 vs 2.46, $p=0.02$; $d = 0.61$, medium effect size), navicular drop (0.02 vs 0.03, $p=0.01$; $d = 1.02$, large effect size) and the arch index (0.22 vs 0.26, $p=0.04$; $d = 1.02$, large effect size). Vertical navicular height did not differ significantly between the groups (0.24 vs 0.23, $p=0.54$; $d = 0.04$, negligible effect size).

Comment: This very good Australian study reports that people with medial compartment knee OA exhibit a more pronated foot type (flat foot) compared to controls, as indicated by the FPI, navicular drop and arch index. Although this was a cross-sectional study, the results may be of interest to both clinicians and researchers that prescribe foot orthoses and footwear modifications. Although highly controversial on the type of foot orthoses to be used for medial compartment knee OA, this is the first study to indicate a tentative link between foot posture and knee OA. The authors conclude that using the arch index is a more valid tool to measure foot posture than other foot posture measures.

Reference: *J Foot Ankle Res.* 2010;3(1):29.

<http://www.jfootankleres.com/content/3/1/29>

Effect of ankle taping on knee and ankle joint biomechanics in sporting tasks

Authors: Stoffel KK et al

Summary: In order to explore the association between ankle taping and knee joint loading during dynamic athletic activities, these researchers used a kinematic and inverse dynamics model to determine ankle and knee joint motion and loading in 22 healthy male participants undertaking running and sidestepping tasks. Ankle taping significantly reduced peak internal rotation moments and peak varus moments at the knee during all running and sidestepping trials (planned and unplanned). Similarly, the use of ankle tape significantly reduced internal rotation impulse for sidestepping tasks as well as varus impulse during unplanned sidestepping manoeuvres. However, there was a trend toward increased valgus moments and impulse for planned sidestepping trials undertaken with ankle tape. Taping reduced the range of motion at the ankle in all three planes. Peak inversion was reduced for running trials only. Average eversion and peak dorsiflexion moments were significantly reduced in sidestepping tasks by taping.

Comment: This Australian study on 22 healthy participants reflects on the importance of 'distal' control to knee joint mechanics. Prophylactic taping is a popular external stabilising technique used by clinicians to prevent ankle injuries during sports activities. Taping limits excessive range of motion at the tibiotalar and subtalar joints and may also increase local proprioceptive output. The results suggest that non-rigid ankle taping provides some protective benefits to the knee during running and cutting through a reduction in internal rotation and varus moments and varus impulse. Although some positive benefits for knee joint loading through use of ankle taping were evident from this study, it would be premature to conclude that ankle taping provides a totally protective effect to the knee. Furthermore, further work is needed on those patients with previous knee pathologies such as those with ACL injuries, since the effect of ankle taping on risk of knee injury is complex and is dependent on multiple factors including injury history, physical conditioning and dynamic movement strategies of the athlete, type of footwear, and environmental conditions.

Reference: *Med Sci Sports Exerc.* 2010;42(11):2089-97.

http://journals.lww.com/acsm-mssse/Abstract/2010/11000/Effect_of_Ankle_Taping_on_Knee_and_Ankle_Joint.16.aspx

Foot orthoses and gait: a systematic review and meta-analysis of literature pertaining to potential mechanisms

Authors: Mills K et al

Summary: These researchers systematically reviewed the evidence regarding the physiological basis for orthoses under the kinematic, shock attenuation and neuromotor control paradigms. A total of 22 papers were included in the review. For each paradigm, the researchers analysed the role of orthoses with different design features including combinations of posting, moulding and density. The main findings in the kinematic paradigm were that posted non-moulded orthoses systematically reduced peak rearfoot eversion (2.12°) and tibial internal rotation (1.33°) in non-injured cohorts. In the shock attenuation paradigm, non-posted moulded and posted moulded orthoses produced large reductions in loading rate and vertical impact force when compared with a control and to a posted non-moulded orthosis. The researchers note that the evidence was the least conclusive for the neuromotor control paradigm.

Comment: Health care professionals frequently prescribe foot orthoses to treat and prevent overuse running injuries, as well as enhance comfort, cushioning, realignment, redistribution of forces and stability for chronic conditions such as diabetes and rheumatoid arthritis. However, the exact biomechanical mechanism of the action of orthoses remains unknown. Researchers have attempted to understand the biomechanical and anatomical factors associated with the prescription of foot orthoses and only recently there has been an interest in neurophysiological factors. The evidence relating to the research on neurophysiological factors in the current paper is somewhat limited and disappointing, as previous studies looking at foot orthoses give a different perspective. There is no mention of balance control in this review, which limits the current clinical evidence.

Reference: *Br J Sports Med.* 2010;44(14):1035-46.

<http://bjsm.bmj.com/content/44/14/1035.abstract>

OUT NOW...

Bone Health Research Review

* [Click here to subscribe](#)

We'll take
your business'
pulse, before
we prescribe.



bnzpartners

Prospective evaluation of clinical and ultrasound findings in ankle disease in juvenile idiopathic arthritis: importance of ankle ultrasound

Authors: Pascoli L et al

Summary: These researchers clinically and ultrasonographically assessed a total of 61 swollen/painful ankles in 42 children (mean age 11.3 years) with juvenile idiopathic arthritis (JIA). The clinical examination of the ankle joint focused particularly on 3 regions; the tibiotalar joint and medial and lateral tendons. Clinical and ultrasound findings were both scored 0–3 (normal to severe). Ultrasound demonstrated no signs of tibiotalar joint effusion in 14 out of 43 ankles considered clinically involved. Ultrasound revealed tenosynovitis in medial tendons of 13 ankles out of 31 thought to be clinically normal; of the 19 lateral tendons deemed to be clinically involved, fewer than 50% had involvement on ultrasound imaging. Very poor agreement was observed comparing the clinical and ultrasound scores for the 3 regions: tibiotalar joint, kappa = 0.3; medial tendons, kappa = 0.24; lateral tendons, kappa = 0.25. Among other ankle structures, only 39% of the subtalar (talocalcaneal) joints considered clinically involved were deemed abnormal by ultrasound investigation. Of the 10 ankles with talonavicular ultrasound effusion, only 2 were considered clinically involved.

Comment: The results from this UK study of 42 children with JIA are interesting to clinicians who deal with this patient population. The researchers concluded that clinical evaluation of the ankle in children with JIA was inadequate in identifying the structures involved, and ultrasound examination prior to glucocorticoid injection should be considered, to improve the outcome. The ankle joint is frequently involved in JIA and previous studies have reported a high incidence of ankle problems with JIA. In conclusion, this study, similarly to other robust studies that have used ultrasound to diagnose specific foot and ankle problems, illustrates that clinical examination is poor in identifying anatomical structures and that diagnostic tools are required to ensure an adequate management programme for the patient.

Reference: *J Rheumatol.* 2010;37(11):2409-14.

<http://jrheum.org/content/37/11/2409.abstract>

Privacy Policy: Research Review will record your email details on a secure database and will not release them to anyone without your prior approval. Research Review and you have the right to inspect, update or delete your details at any time.

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.

Identifying clinically meaningful tools for measuring comfort perception of footwear

Authors: Mills K et al

Summary: These researchers sought to determine reliable measures of footwear comfort. Their study enrolled 20 subjects who were allocated to 2 experiments consisting of 5 sessions of repeated measures. Each experiment applied measures of footwear comfort to each subject's usual jogging shoe; the first experiment examined the reliability of the visual analogue scale (VAS) and Likert scales over 6 dimensions of the foot, including overall comfort. The second experiment examined the reliability of the ranking scale by assessing the ranked position of the shoe. Comfort measures were obtained in both walking and jogging. The ranking scale was the most stable scale. Mixed linear modelling revealed the VAS to be more stable than the Likert scale. The VAS required two sessions to become reliable for all measures except for those obtained from the heel, which required more. On the 100-mm VAS, a clinically important change in comfort was scored as 9.59 mm by a data-derived approach and as 10.2 mm by an anchor-based approach. Subjects identified overall comfort and the arch as the most important considerations.

Comment: From a commercial perspective, footwear, foot orthoses and shoe inserts are commonly used to promote comfort, yet the evidence to support their efficacy is not well established. Of notable difficulty is what defines comfort. Words such as *pleasurable, sense of ease, enjoyment, well-being* are often associated with the concept. The current work evaluated three common tools to evaluate comfort. The results will be of interest to those who wish to identify the most clinically relevant change in comfort. Shoe designers and clinicians would also be interested to note that overall comfort and arch comfort were important components. A cautionary note is that the current study used 20 healthy subjects and that differing changes of comfort may occur in patients with long-term chronic foot conditions such as rheumatoid arthritis or those with osteoarthritis.

Reference: *Med Sci Sports Exerc.* 2010;42(10):1966-71.

http://journals.lww.com/acsm-msse/Abstract/2010/10000/Identifying_Clinically_Meaningful_Tools_for.21.aspx

Morton's neuroma – outcome of surgical excision

Authors: Anwar F

Summary: Outcomes are reported for 47 adult patients who underwent surgical excision of Morton's neuroma between January 2002 to January 2005. Data were obtained from the clinical notes and clinical letters, as well as a short telephonic interview. The surgical procedure involved excision of the neuroma and ligament release through either planter or dorsal incision. Patients were followed-up for an average 15.1 months. Mean hospital stay was 1.4 days. The most common site of involvement was the third inter-metatarsal space, followed by the second inter-metatarsal space. Three (6.4%) superficial and 2 (4.3%) deep wound infections were treated conservatively. Three (6.4%) patients experienced a recurrence, 4 (8.5%) had stump neuroma and 7 (14.8%) had either persistent pain or swelling of the foot. Persistent pain on weight bearing occurred in 7 patients (14.8%) and 5 (10.6%) had some sensory loss over the involved foot.

Comment: This UK article is a retrospective study of patients who underwent surgical excision of Morton's neuroma over a three-year period. The data was collected from the clinical case notes, clinical letters and a telephonic interview, which can lead to measurement bias. Postoperative VAS scores were reduced to zero in 72% of patients. However, the VAS score remained high at 6 in 2 patients (4.3%) and 7 in 5 patients (10.6%) (all had planter approach for excision of the neuroma). Postoperative numbness of the foot in the distribution of the involved digital nerve was encountered in 11% of patients, with difficulty in wearing shoes. It is interesting to note that 19% of patients reported poor outcomes following surgical removal of the neuroma. The discussion section of the article is a review of previous work, rather than an exploration of the current results.

Reference: *J.Orthopaedics.* 2010;7(3)e8.

<http://www.jortho.org/2010/7/3/e8/index.htm>

COMING SOON...

Smoking Cessation Research Review

Click here to subscribe

Subscribing to Foot and Ankle Research Review

To subscribe or download previous editions of Research Review publications go to www.researchreview.co.nz

To unsubscribe reply to this email with unsubscribe in the subject line.