

Foot & Ankle Research Review™

Making Education Easy

Issue 32 – 2017

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Abbreviations used in this issue

MTSS = medial tibial stress syndrome

NLC = nocturnal leg cramps

SEBT = star excursion balance test



Welcome to issue 32 of Foot and Ankle Research Review.

This issue has a focus on musculoskeletal conditions that affect the lower limb, with both a mixture of experimental research and literature reviews. This includes patellofemoral pain, MTSS (medial tibial stress syndrome), Achilles tendon rupture, inversion ankle injuries and the iliotibial tract. A few other highlights include recent research from Australia that presents normative data for strength and flexibility, and a review of new horizons in the management of the diabetic foot.

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

Kind regards,

Dr Matthew Carroll

matthewcarroll@researchreview.co.nz

‘Managing My Patellofemoral Pain’: the creation of an education leaflet for patients

Authors: Barton CJ & Rathleff MS

Summary: This paper reported on the development of a brief but comprehensive evidence-based education leaflet, ‘Managing My Patellofemoral Pain’, for use as an adjunct in the management of patellofemoral pain. The process involved the development of a preliminary leaflet based on best practice and published educational information, which was reviewed by 21 clinical academics who provided a number of modifications. Additional feedback from 20 patients with patellofemoral pain was sought regarding the clarity and adequacy of information and to determine additional educational resource needs. The main topics of the final leaflet cover causes of knee pain and treatment options (exercise and additional treatments).

Comment: The ‘Managing My Patellofemoral Pain’ is an education leaflet developed through consultation with international experts and is a freely available educational resource for patients with patellofemoral pain. The leaflet provides a valuable resource for patients and clinicians to assist the provision of education and to help translate the current evidence base into clinical practice. A freely available version of the education leaflet can be [downloaded](#) (pdf, 1.2MB).

Reference: *BMJ Open Sport Exerc Med* 2016;2(1):e000086

[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.



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Medial tibial stress syndrome can be diagnosed reliably using history and physical examination

Authors: Winters M et al.

Summary: The purpose of this research was to assess if MTSS could be reliably diagnosed using patient history and physical examination, and if clinicians were able to reliably identify concurrent lower-leg injuries. Two clinicians independently evaluated a total of 46 athletes with nontraumatic lower leg pain. MTSS was diagnosed in 34 athletes (prevalence 74%), with agreement of 96% and respective observed percentage of positive and negative agreement values of 97% and 92%. Inter-rater reliability was very high with a κ value of 0.89 ($p < 0.000001$). Concurrent lower-leg injuries were identified in 11 of the athletes with MTSS, with good inter-rater reliability ($\kappa = 0.73$ [$p < 0.0001$]).

Comment: This study proposes a need for a paradigm shift in the diagnosis of MTSS towards the use of clinical diagnosis over imaging-based diagnosis. Data demonstrated that MTSS can be diagnosed with a high degree of reliability through physical examination. A six-step history taking and physical examination tool provides you with a guide to confirm the presence of MTSS and when other lower-limb pathologies may be considered.

Reference: *Br J Sports Med*; Published online Feb 8, 2017

[Abstract](#)

Normative reference values for strength and flexibility of 1,000 children and adults

Authors: McKay MJ et al., for the 1000 Norms Project Consortium

Summary: Reference values for isometric strength of 12 muscle groups (using hand-held and fixed dynamometry) and flexibility of 13 joint movements (using goniometry) were determined in 1000 individuals aged 3–101 years, and the influence of demographic and anthropometric factors was assessed. Strong linear correlations were identified between age and strength for the first two decades of life, whereas muscle strength significantly decreased with age in older individuals. The most significant predictor of strength in children was increasing height, in adolescents it was greater body mass, and in older adults it was male gender. Gradual decreases in joint flexibility were seen with age, with little difference between the sexes. Waist circumference significantly predicted variability in joint flexibility in adolescents and adults of all ages.

Comment: If you routinely assess muscle strength and joint flexibility without the use of a hand-held dynamometer, then it may be time to consider a move to use of the device. This study established a comprehensive reference dataset of isometric muscle strength and joint flexibility in healthy people. Normative data were presented for four age groups: 3–9, 10–19, 20–59 and ≥ 60 years of age. Strength and flexibility data were consistent with previous studies and demonstrated a muscle-specific response to aging during adulthood and that generalised weakness does not occur until older adulthood. Interestingly, the study is the first to report an association between waist circumference and strength and flexibility. Waist circumference was identified as a significant predictor of flexibility in adolescents, adults and older adults and of strength in children.

Reference: *Neurology* 2017;88(1):36–43

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The identification of risk factors for ankle sprains sustained during netball participation

Authors: Attenborough AS et al.

Summary: This research identified risk factors for ankle sprain in 94 netball players, 11 of whom experienced an ankle sprain during a single netball season (incidence rate 1.74 per 1000 hours of netball exposure). A reach distance in the posterior-medial direction of the SEBT (star excursion balance test) of $\leq 77.5\%$ of leg length significantly increased the likelihood of an ankle sprain (odds ratio 4.04 [95% CI 1.00, 16.35]).

Comment: With research indicating ankle injuries account for 40% of netball injuries, knowledge of modifiable risk factors is essential for those who routinely manage netball players. Following 94 netballers over one season revealed one risk factor for lateral ankle sprain – a shorter posterior medial reach distance (assessed using the SEBT). The posterior-medial reach direction of the SEBT is one of only three directions of the test that is able to identify dynamic balance deficits in limbs with chronic ankle instability. The SEBT has recently come under criticism as a screening tool; however, the results of this study further advocate the use of the tool. If you are not familiar with the SEBT, it is well worth the time to upskill yourself.

Reference: *Phys Ther Sport* 2017;23:31–6

[Abstract](#)

The effect of ankle taping on functional performance in participants with functional ankle instability

Authors: Halim-Kertanegara S et al.

Summary: Twenty-five individuals with functional ankle instability (Cumberland Ankle Instability Score < 25) performed the following five functional tests with and without their ankles taped rigidly: figure-8 hopping test, hopping obstacle course, SEBT, single-leg stance and stair descent test. Stair descent time was significantly decreased by 4% when the ankles were taped, but there was no impact on performance in the other tests. There was a significant increase in self-efficacy. Ankle taping was also associated with significant increases in perceived stability, confidence and reassurance during the stair and two hopping tasks, but not during the SEBT or single-leg stance test.

Comment: The effect of taping on functional performance in participants after ankle sprain has received little attention. Questions also remain surrounding the effect on performance and use of rigid taping; specifically that taping impairs performance of lower extremity tasks. The data indicated that rigid ankle taping did not affect performance in any of the functional tests conducted, with the exception of the stair descent test. The data also supports the long-held belief that rigid taping increases perceptions of confidence. Interestingly, the data also indicated that perceptions of stability and confidence increased with use of taping; this is something I have frequently noted from an anecdotal perspective in my practice. Of note is that while the data showed that rigid ankle taping did not impair performance of dynamic activities, there was no evidence to indicate rigid ankle taping improved performance. A limitation of this study relates to the dynamic tests chosen to assess the effect of taping; the tests were not specific to tasks encountered in various sports.

Reference: *Phys Ther Sport* 2017;23:162–7

[Abstract](#)



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Acute Achilles tendon ruptures: an update on treatment

Authors: Kadakia AR et al.

Summary: This was a review on surgical and nonsurgical management of acute Achilles tendon ruptures. The authors recommend that functional rehabilitation be the cornerstone of nonsurgical management, as it provides similar outcomes to surgical management options without the risk of postoperative complications. When surgery is preferred, the newer, less invasive techniques should be considered, as they are associated with fewer complications without increasing rerupture rates. Surgical management also offers the advantages of earlier return to work and slightly stronger plantar flexion strength, and should be considered for athletes. The authors also note that biological adjuncts have no proven role in the surgical management of Achilles tendon ruptures.

Comment: Recent research around Achilles tendon repair is always interesting to read, as there are strong advocates for both surgical repair and conservative management approaches. This review manuscript provides a great overview of both conservative and surgical approaches. The review includes nicely summarised sections outlining the outcomes of research to evidence both management approaches. I particularly liked the sample functional rehabilitation protocol for use after surgical or nonsurgical management of acute Achilles tendon ruptures provided by the authors. This article is well worth your time if you are looking for a general update surrounding Achilles tendon rupture management.

Reference: *J Am Acad Orthop Surg* 2017; 25(1):23–31

[Abstract](#)

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New horizons in the understanding of the causes and management of diabetic foot disease

Authors: Clokie M et al.

Summary: This report from the 2017 Diabetes UK Annual Professional Conference Symposium addresses some of the outstanding questions on aspects of diabetes-related foot disease care. Particular emphasis was placed on the impact of newer technologies for identifying organisms present in a wound, the use of novel approaches to treat infections, and new remote sensing technology for identifying patients at risk of developing foot ulceration. The authors also addressed the often-overlooked psychological impact of foot disease, they highlighted the difficulty of comparing results from diabetic foot studies due to high heterogeneity, and they discussed a recently published [paper](#) on standardising the way that foot disease trials are reported.

Comment: The review highlights recent advances in management of the diabetic foot. Section 1 details new horizons in understanding the microbiology of foot disease. The discussion in this section on nonculture-based molecular microbiological techniques (16s coding) to characterise foot infection microbiota that may guide antimicrobial selection is particularly interesting. There is also very pertinent information on the use of bacteriophages over the use of antibiotics. Section 2 details remote sensing in the assessment of the diabetic foot. The use of dermal thermography is advocated, discussion also focuses on hyperspectral imaging, skin perfusion pressure and how these techniques may allow for earlier detection of peripheral arterial disease. Wearable technologies are also discussed for their potential in diagnosis and monitoring of the diabetic foot. Section 3 details the psychological and behavioural aspects of foot disease and articulates the message that psychological and behavioural factors influence ulcer outcomes.

Reference: *Diabet Med* 2017;34(3):305–15

[Abstract](#)

Association between ankle equinus and plantar pressures in people with diabetes

Authors: Searle A et al.

Summary: This was a systematic review of 15 studies reporting data on the relationship between ankle equinus and plantar pressures in patients with diabetes, with three of these studies reporting data suitable for a meta-analysis. The results of the meta-analysis indicated that ankle equinus had a significant, but small, effect on increased plantar pressures (effect size 0.26 [95% CI 0.11, 0.41]). Eight of the remaining studies reported evidence of an association between limited ankle dorsiflexion and increased plantar pressures, whereas no such relationship was evident in the other four studies.

Comment: Foot ulcer development has been associated both prospectively and retrospectively with elevated plantar pressures in people with diabetes. The aim of this review was to systematically evaluate the current literature to determine if, for people with diabetes, there is an association between equinus and high plantar pressures. The review demonstrated that reduced range of ankle dorsiflexion in people with diabetes can potentially elevate plantar pressures, additional to increases associated with neuropathy. The review advocates that screening for restricted ankle joint dorsiflexion may therefore be a useful early clinical indicator of increased risk of foot ulcer in people with diabetes, especially those with neuropathy. Clinically, this article again emphasises the routine use of plantar pressure assessments for clinicians who manage lower-limb and foot pathologies.

Reference: *Clin Biomech* 2017;43:8–14

[Abstract](#)

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Criteria in diagnosing nocturnal leg cramps

Authors: Hallegraef J et al.

Summary: This was a systematic review of eight randomised controlled trials and ten observational studies on NLC (nocturnal leg cramps) and cramps of legs and other muscles at rest, which were extracted and analysed by two independent researchers. They identified the following seven diagnostic characteristics of NLC: intense pain, period of duration from seconds to maximum 10 minutes, location in calf or foot, location seldom in thigh or hamstrings, persistent subsequent pain, sleep disruption and distress.

Comment: This is well worth a read if you manage patients with NLC. The authors provide a good overview of a complex set of conditions and discuss NLC, restless leg syndrome and idiopathic periodic limb movement disorder. Following a systematic review of literature and Delphi exercise, the authors propose a 7-criteria framework to differentiate NLC from restless leg syndrome or periodic limb movement disorder. Whilst the seven criteria (intense pain, period of duration from seconds to maximum 10 minutes, location in calf or foot, location seldom in thigh or hamstrings, persistent subsequent pain, sleep disruption and distress) do provide guidance and may enhance the recognition of restless leg syndrome, limitations must be taken into account. Namely, that the studies reviewed had patients with multiple comorbidities that could influence NLC and the lack of primary studies with the focus on diagnosing NLC in older adults.

Reference: *BMC Fam Pract* 2017;18(1):29

[Abstract](#)

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The iliotibial tract: imaging, anatomy, injuries, and other pathology

Authors: Flato R et al.

Summary: These authors sought to provide information for radiologists, orthopaedists and other clinicians regarding proximal iliotibial band syndrome, Morel-Lavallée lesions, external snapping hip syndrome, iliotibial band syndrome and bursitis, traumatic tears, iliotibial insertional tendinosis and peritendonitis, avulsion fractures at Gerdy's tubercle and Segond fractures. The review covered clinical presentation, pathophysiology, imaging findings of associated pathologies and a brief discussion on their clinical management.

Comment: This review presents the most comprehensive overview of all aspects of the iliotibial tract I have seen in recent times. There is detail in the review of the anatomy and function; the quality of the anatomy images is also a highlight. The review of the specific pathologies is well formatted, detailed and easy to read. If you want to upskill yourself on the iliotibial tract and associated pathologies, then this manuscript will provide a great foundation for your knowledge.

Reference: *Skeletal Radiol* 2017;46(5):605-22

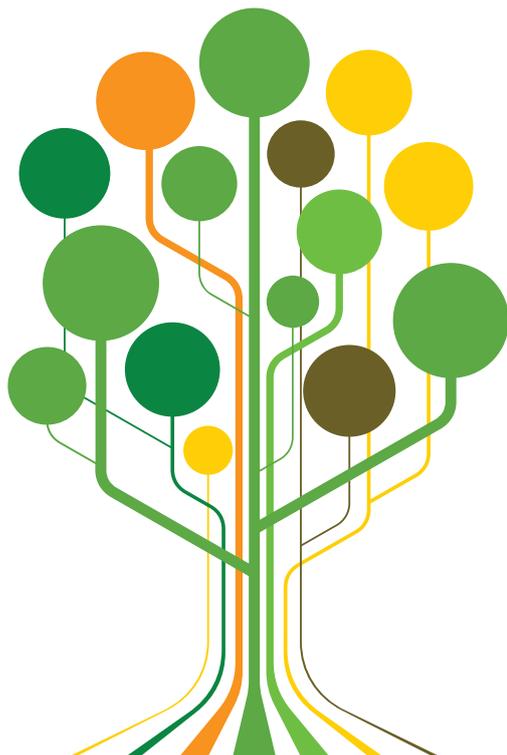
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