

SPORT

HEALTH

VOLUME 33 ISSUE 3 2015

FOOT ISSUE

Running shoe
selection

Diagnosing heel pain

Analysing the foot
during running

Obesity and foot pain



- Ankle taping
- Impacting running economy
- Rising through the ranks
- Sport and exercise medicine in Japan
- Working in Olympic sports medicine



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Publisher

Sports Medicine Australia
PO Box 78 Mitchell ACT 2911
sma.org.au

ISSN No. 1032-5662
PP No. 226480/0028

Editor

Chris Bishop

Managing Editor/Advertising Manager

Declan Boffa

Design/Typesetting

Perry Watson Design

Cover photograph

www.thinkstockphotos.com.au

Content photographs

Author supplied; www.thinkstockphotos.com.au



FROM THE CHAIRMAN

INFORMATION OVERLOAD



Peter Nathan
peter.nathan@sma.org.au

SMA CHAIRMAN, PETER NATHAN DISCUSSES THE CHALLENGES OF SIFTING THROUGH THE MASS OF RESEARCH CURRENTLY AVAILABLE IN SPORTS MEDICINE.

The foot and ankle are the most common regions of the body to be injured during sporting activity, so it is appropriate that this edition is dedicated to the management of foot and ankle problems. One of the great challenges in managing or preventing injuries is keeping abreast of the current body of relevant research and evidence that will drive decision making. It is not so much the lack of information which is the problem, but rather the information overload.

We receive so much information that it is often irrelevant so it can be difficult to make sense of it all. Information has to be filtered out so much that in the end we have to ignore most of the information directed at us completely. This is a common problem not only in our industry but in all industries.

If we consider a product like “milk” as an example, the supermarket shelves carry over 45-plain milk products at any one time, meaning the next time you ask someone to buy some milk from the supermarket you are going to need to be a whole lot more specific than,

“we need milk”. The broad range of milk products available does nothing to assist the consumer and in fact hinders them as they now have to filter through groups, subgroups and subsets of products, even if subconsciously, to choose one of life’s basic essentials.

If “life is like a box of chocolates” then “Sports Medicine Information is like a supermarket shelf”, there are copious amounts of information available but filtering out the irrelevant information and identifying the material that will guide your decision making processes can be overwhelmingly difficult and time consuming.

This has always been a key strength of a publication like *Sport Health* which condenses research and evidence into interesting, relevant and practical articles that offer gems of wisdom which the reader can take and apply immediately.

This edition is no exception with a focus on foot and ankle issues which many of us would deal with on a regular basis. No filtering required.



We receive so much information that it is often irrelevant so it can be difficult to make sense of it all.

BUILDING A SOLID FOUNDATION

FROM THE
CEO

NEW SMA CEO, ANTHONY MERRILEES RECITES
A STORY OF HOW IMPACTFUL THE FOOT CAN BE
ON THE REST OF THE BODY.

Coming from a business consulting background one of my most used homilies for my clients over the years is that every good business is built upon solid foundations. As a parent, like most others, I want the best for my children and like most typical parents this consists of providing them with a good education, opportunity and keeping them healthy and happy.

Perhaps the furthest thought from my mind while changing their nappies, or helping them with their homework, was that one of the most important things that might have a future impact on their health and happiness was the state of their feet. A chance trip to my local podiatrist with my teenage son changed my view forever.

Growing up and participating in many sports, I was armed with a basic understanding of the importance of biomechanics and was certainly aware that core strength, fitness and flexibility were key aspects for achieving optimal performance. However, the connection between feet and posture is not something that I ever recall receiving much attention at all.

Initially, the trip to the podiatrist was largely about my sons "clawed and misaligned toes" which was no doubt

the result of some poor footwear choices over time by mum and dad. The toe problem was of course easy to spot visually. However, it was the factors that I couldn't readily visualise which were having the most effect. Specifically, how the poor architecture and gait of his feet were the actual cause of other issues affecting my son such as bad posture, sore knees and sore hamstrings.

It wasn't until the podiatrist put him through a series of tests on a treadmill that were filmed and then subsequently analysed that I became aware that his bad posture, sore knees and sore hamstrings were actually the result of some fairly significant deficits in his feet, which in turn caused him to walk with a poor gait.

Untreated, his prognosis was for ongoing problems due largely to what was little more than poor foundations. Happily, treatment via specially designed orthotics was available and with the right amount of cajoling and reminding, he stuck to the regime of treatment prescribed by his podiatrist.

The end result for him was that his poor posture had resolved, as did the pain in his knees and hamstrings, and he now enjoys few if any of the symptoms he once had because of his bad feet.



Anthony Merrilees

anthony.merrilees@sma.org.au



It wasn't until the podiatrist put him through a series of tests on a treadmill that were filmed and then subsequently analysed that I became aware that his bad posture, sore knees and sore hamstrings were actually the result of some fairly significant deficits in his feet.

5 MINUTES WITH KENT SWEETING

PODIATRIST AND AUSTRALASIAN
ACADEMY OF PODIATRIC SPORTS
MEDICINE (AAPSM) PRESIDENT



Tell me a little about your sports medicine background.

I've always been involved in sport, as one of four boys there were plenty of passionate games of cricket and soccer (and the odd boxing match) in the backyard growing up. I always wanted to get into a profession which combined my love of sport with the ability to help people. I always thought I'd study physiotherapy but after spending some time with my podiatrist who I'd seen through my high school years I changed my mind. I won the sports medicine award in my final year of university and got a job working at a running injury clinic. Like anyone straight out of university, you learn a lot. For me, I learnt a lot about runners, particularly the mindset of a runner and athletes in general. It was during this time that I also started working on a randomised clinical trial on Achilles tendinopathy with Professor Michael Yelland in the Medical School at Griffith University. I presented our findings at the National SMA Conference in 2008 and was lucky enough to win the Best New Investigator Award and travel to Seattle in 2009 to present at the American College of Sports Medicine (ACSM) conference. During this time I was also lecturing in sports medicine to podiatry students at Queensland University of Technology. Clinically I've been lucky enough to treat elite and amateur athletes in a range of sports but I get just as much satisfaction out of treating a patient with a challenging pathology.

What does a typical day for you consist of?

I'm in my clinic (Performance Podiatry & Physiotherapy) three days a week. We have a fairly small clinic consisting of three podiatrists, a sports physiotherapist, sports dietitian and Pilates instructor. My brother Ben and I set up the clinic about eight years ago. I'll typically see a number of runners and triathletes of varying abilities as well as people of varying ages just walking or running to keep fit and healthy. I also consult to the Queensland Ballet so I'll either go to the studio or they'll come and see me in the clinic. The other two days, I'm at Queensland Orthotic Laboratory, which Ben and I also own and is one of the country's biggest orthotic laboratories. We really act as the link between the podiatrist and our production staff to ensure a high quality product. I get a lot of satisfaction out of helping other podiatrists to effectively treat their patients and I also enjoy the variety it brings me in the working week.

What is your favourite aspect of your job?

Meeting so many different people each day, hearing their stories and helping them to stay active. It's nice treating people who are motivated to get better and want to get back to full training and achieve their goals.

What has been the highlight of your career?

It's hard to single out one but I'd have to say that winning the prize at the SMA Conference in 2008, getting published in the British Journal of Sports Medicine and making a very small contribution to Brukner & Khan's Clinical Sports Medicine textbook are all hard to beat.

How did you become involved with SMA?

My first employer told me that I need to join up to SMA and AAPSM which I did straight away. I needed to learn from the best across a range of sports medicine disciplines and SMA was the best way to do that. I've been a member ever since.

What do you think the benefit of being a SMA member provides especially within the podiatry field?

It's really about being in a multidisciplinary team and learning from people outside of podiatry. It's great going to conferences and learning from physios, exercise physiologists, biomechanists, psychologists, dietitians and sports doctors. Where else would you get that?

Describe your role with AAPSM, how did you come to be in this role?

I started off as the Queensland board member for AAPSM in 2012 and then was voted in as the National president in 2013. AAPSM is our national sports podiatry body and also a discipline group of SMA. Our role is primarily education of podiatrists in sports podiatry. We hold regular professional development (PD) events across the country and provide speakers and content for the Australasian Podiatry Council (APodC) & SMA Conferences. My role is to oversee the organization as a whole and work with our key stakeholders – SMA, APodC and ASICS to deliver high quality education for our members. When I came into the role as president, I really wanted to achieve a couple of things – to improve member services for podiatrists in regional areas and also to develop a career pathway in sports podiatry. I'm pleased to say that this year we are starting to record some of our PD sessions so members all over the country can view them. Our board is also working on developing a career pathway in sports podiatry in conjunction with the APodC to deliver a structured pathway for podiatrists who want to develop their skills and be recognised by their colleagues and the community as being expert clinicians in sports podiatry.

Besides from sports medicine, what are you passionate about?

My family. My kids are at a really nice age where they want to kick the footy with me and play together. I love my Aussie rules and cricket. I'm a Geelong supporter in the AFL so I'll try to watch them play as much as I can and my kids both love sitting down with me and watching some footy together.

What's the best piece of advice anyone has ever given to you?

Don't stress about things that you can't control. My grandfather also always told me never to go to bed without resolving an argument.

Name four people, living or not, you would invite for a dinner party and why?

Kerry O'Keefe – to tell a few good cricket stories.
Leigh Mathews – to talk footy.
Ricky Gervais – for a few laughs.
My wife – to share it all with.

FAVOURITES**Travel destination:**

Stradbroke Island.

Sport to play/watch:

Play – soccer, watch – AFL.

Cuisine: Japanese.**Movie:** Old School.**TV program:** Game of Thrones or Curb Your Enthusiasm.**Song:** Everlong by the Foo Fighters.**Book:** The latest edition of BJSM.**Gadget:** My corkscrew.



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IT'S A BIG WORLD. GO RUN IT



ANALYSIS OF THE FOOT AND ANKLE DURING RUNNING

SIMPLIFYING THE
COMPLICATED TO
MAKE INFORMED
CLINICAL DECISIONS

PODIATRIST CHRIS BISHOP
DISCUSSES THE MOST
RELIABLE WAYS TO STUDY
A PERSON'S GAIT AND THE
BENEFITS ASSOCIATED WITH
THOROUGH ANALYSIS.

ANALYSIS OF THE FOOT AND ANKLE DURING RUNNING

The movement of the foot and ankle underpins everything our patients do. We put all of our body mass through it every step we take – one foot in front of the other. When we walk and run, up to three times our body weight is applied through our ankle to the ground, with the same force applied directly back on the body¹. This puts potentially damaging forces through our bones, ligaments and tendons, and it is our job to be able to analyse someone's movement profile to determine if this is likely to be a problem.

Research using gold standard motion capture techniques has directly informed our understanding of foot and ankle motion during gait. The kinematics (i.e. motion) of the foot during barefoot tasks have been studied in detail, giving insights into the motion at the level of the foot during walking and running²⁻³. Previous efforts have stemmed right from simple rigid segment models to describe idealized foot motion, through to bone pin work describing the movement of the individual bones of the foot²⁻⁵. This research has identified that motion occurs at multiple areas of the foot and that it is inappropriate to consider the foot as one segment. The current trend in the literature is to model the foot as at least three (if not four) individual segments to represent the hindfoot, midfoot, forefoot (metatarsals) and the toes. The research is conclusive that most motion at the level of the foot and ankle occurs in the sagittal plane, yet with large variability between subjects²⁻³. Research efforts have also given us new appreciation for the amount of motion occurring at the level of the midfoot (talonavicular and medial cuneiform-navicular joints). Overall the data in the literature demonstrates the complexity of the foot and ankle, and specifically the importance of the joints distal to the rearfoot in its overall dynamic function.

Despite the detail of these studies, it is highly infrequent, in a Western society, that activities of daily living would be undertaken barefoot. Despite the barefoot debate, and the noted differences between running barefoot and shod, in reality, most people run with shoes on (of some form)⁶. This presents a unique set of challenges in terms of not only understanding the motion of the foot inside the shoe, but the effect that footwear design and in-shoe inserts (i.e. orthotics) have on the foot at the level of the foot-shoe interface. In contrast to what many footwear companies will have you believe, our understanding of in-shoe foot interaction and footwear biomechanics is extremely limited⁷. Understanding the true mechanisms of the effect of footwear technologies has largely been restricted by both the inability of human eyes to see through the shoe upper, as well as a lack of accurate methods to analyse foot motion inside the shoe during gait. Based on current evidence demonstrating small effect, the concepts that manipulating midsole geometry (e.g. dual density) or inserting a rigid heel counter to stop the foot pronating is unsubstantiated⁸. Likewise, the concepts relating to increased cushioning as a result of shock attenuating systems of responsive foams to reduce loading rates of force remains questionable, especially given that there is minimal evidence to suggest high loading rates are a predictor of a lower limb injury⁹. This has led to the proposal of new theories, all of which focus on individual responses¹⁰⁻¹¹. The take home message from the literature is that any changes as a result of shoe design

features are small, and non-systematic. Further, any changes to the foot inside the shoe as a result of footwear and/or orthotics certainly cannot be seen with the naked eye as research shows that analyzing the motion of the shoe upper is not the same as the foot inside the shoe⁷. There is large variability between individual's response to footwear, and if anything, this supports the range of footwear present in most retail stores. The commercial reality is that all shoes, no matter their design, work for someone. This has direct implications for transforming the way we analyse gait – with less emphasis on quantifying motion control and more emphasis on how 'comfortable' interventions can begin to work with the foot to restore optimal function.

So the question remains though – how best to replicate such detailed analytical methods in a clinical environment where we don't have access to half a million dollars' worth of motion capture equipment. Do we need to? These questions are all answered with a true understanding of the role of gait analysis in a clinical context – to provide information about movement profiles of individuals back into the clinical decision making matrix. I have spent a great deal of time advocating to other therapists the need to be able to effectively analyse gait patterns in a clinical environment. This is specifically important for running – I just don't understand the concept of treating running injuries without an ability to analyse running biomechanics. We walk differently to how we run¹⁻¹². How people run is arguably more variable to how



people walk and this requires thorough analysis. To ensure our analysis is as accurate as possible, we must optimise setup, as well as the analytical processes we use. In terms of logistics, the most cost effective method to do this in a clinical environment is with the use of treadmills.

Before we argue whether treadmills can replicate overground running, let's first understand what a treadmill does. The motor accelerates your centre of mass (COM) instead of you having to do this over-ground. Also, when running indoors on a treadmill, we also don't have the same effects of climate (i.e. heat, wind etc.) that can influence the physiological expenditure of the run. In terms of biomechanics, research has suggested small differences exist when running overground vs. on a treadmill (even though it is argued that results are generalizable¹³⁻¹⁵). I acknowledge this may be the case, yet the larger issue is the physical effort running on a treadmill vs. over-ground outdoors is likely to be less. In saying this, it can be controlled for with a number of setup considerations that if we get right, improve the representativeness of the gait pattern seen. Firstly, the treadmill needs to be as stiff as the ground to ensure we don't introduce compliance into the system. Think those bouncy treadmills we have all ran on – these will increase the displacement of the COM and have consequent effects on increasing joint motion¹⁶. Secondly, the treadmill motor needs to be more powerful (ideally > 2.5 HP) than the force the runner applies to it when they land to prevent belt slippage

and increased braking forces. Thirdly, and most importantly, is matching physiological cost and lower limb biomechanics. Research has suggested that raising the incline of the treadmill to 1% mimics the economic cost of over-ground running, yet this will change biomechanics¹⁷. It is plausible to think that if we set someone's analytical running speed based on their perceived level of exertion (i.e. BORG's scale RPE) rather than speed (yes this has them run faster on a treadmill), we may get a more representative gait pattern that minimises the differences in biomechanics (and

changes in biomechanics are likely to be within measurement error of 3D motion systems). Further, appropriate acclimatisation of the treadmill for up to six minutes has been shown to reduce the variability in stride-to-stride fluctuations¹⁸. And if we want to really go to the next level, we can place a large fan in front of the treadmill to create wind resistance. By taking a moment to think about the logistics of our analytical environment, we come out the other end with an incredibly controlled environment that has large benefits in terms of being able



In contrast to what many footwear companies will have you believe, our understanding of in-shoe foot interaction and footwear biomechanics is extremely limited.

ANALYSIS OF THE FOOT AND ANKLE DURING RUNNING



Will it:

- Alter the treatment that the patient is given?
- Improve the outcome for the patient?
- Simply provide a marketing avenue for the business?

If it's the latter, you are wasting your time and going about it the wrong way. Although it may look good, it takes time and considerable expertise and the appropriate utilization of gait analysis must always have the intention of improvement in technique or treatment prescription. It has to directly benefit the patient. We have to be able to report meaningful clinical outcomes, whether they be simply the visualization of applied interventions (think different shoes, taping techniques, orthotics etc.) or the success of suggested retraining protocols. It is not designed as a quantitative process in a clinical context – drawing lines to infer calcaneal eversion is incredibly inaccurate and offers little to the overall clinical management in terms that A) abnormal pronation cannot be quantified, B) pronation is not a risk factor for injury and C) interventions have a small and negligible effect on changing biomechanics. If anything, it's a sign of being preoccupied with previous paradigms of motion control, and perhaps we need to shift our thinking towards more of a qualitative point of view in terms of quality of movement occurring¹. What is most important, and where the benefit of 2D analysis lies is in the quick description of gross movement changes, especially in the sagittal plane. This is

to describe multiple foot falls, have our patients run at any speed (training vs. tempo vs. race pace), and for as long as they want (induce fatigue). With the setup now right, we lend our attention to the analytical component of gait analysis. For years, clinicians and scientists have been fascinated by the way humans move and the analysis of gait has formed a large part of clinical practice for many practitioners. With the development of technology, we are constantly being inundated with different options to conduct this rather complex task. But do we need it? Can we analyse gait without technology? What can we see with our own two eyes and what does the addition of video feedback provide? Firstly, we need to appreciate what we can't see with our own two eyes. Think forces, muscle activity, in-shoe foot movement when wearing shoes. We need to accept that without gold standard techniques, we can't infer this level of detail. In saying this, it is likely that subjective feedback (i.e. self-perceived comfort, stability etc.) from our patients is going to provide a level of information

that gives inferences to underlying mechanics at play. What I do see the need for though is the addition of video gait analysis (or a method to slow down and replay movements).

I constantly get questioned as to what it adds to my practice and it's a research only tool. Although I believe this is wrong, the argument that video analysis does not identify anything that a trained eye cannot is complete rubbish, and is often a sign of a practitioner who does not know when and how to utilise this technology. The human eye simply cannot see all the complex interactions of the foot and ankle during gait. It can't break down the movement of the hindfoot, midfoot, forefoot and toes in real time, which research has indicated is required information². It cannot play side by side movement profiles of barefoot and shod motion, or multiple shoes effect on the foot and ankle. Yet, before you even get the patient in the clinic, you must be comfortable within your own assessment protocol as to what is the purpose of gait analysis.



Comparing a patient's running gait profile to a theoretical or population norm has one large issue – that there is such a thing that is normal. Each person has their own unique DNA sequence, their own biological passport and therefore their own risk factors for injury.

So with this discussion, where should we be heading? How should we be using gait analysis to analyse foot and ankle function in a clinical environment? Can we simplify our approach? To answer this, we are likely to benefit from reviewing our understanding of biomechanical theory, foot and ankle function during gait, the role of gait analysis in our assessment, and where gait analysis fits into the diagnostic matrix. To effectively analyse foot and ankle motion during running, we need to have:

1. An understanding of all the foot and ankle biomechanical theories so that we can apply the most relevant theory to the clinical presentation at hand.
2. An understanding of what clinical tests can be conducted to provide value as an input to the dynamic gait evaluation. Although static tests do not dictate dynamic function, they certainly can provide valuable insight into restrictions in range of motion that are likely to cause compensatory patterns when analysing gait.
3. An understanding of the differences between walking and running gait, and the appropriate facilities to describe both gait patterns.
4. An understanding that the human eye cannot observe, process and interpret all of the complex movements of the human body. We need high speed video to assist us in seeing the intricate movements of the foot and ankle that may be contributing towards someone's pathology.
5. An appreciation that each individual is unique and requires personalised attention. Comparing a patient's running gait profile to a theoretical or population norm has one large issue – that there is such a thing that is normal. Each person has their own unique DNA sequence, their own biological passport and therefore their own risk factors for injury. Therefore what is normal for one person is not

necessarily normal for someone else. There is large variability in how individual patients move and respond to different conditions, leading to the need for a more individualized approach to the assessment of human movement of our patients.

6. An appreciation that the foot moves inside the shoe and we can't infer in-shoe foot motion when analysing shod gait. Inferences can be made from the analysis of barefoot gait, assuming that temporal-spatial parameters do not change.
7. An understanding that the foot-shoe complex in a clinical context is a black box (a template), whereby we can add elements of design and/or technology to influence the way the foot functions and/or to modulate the load applied at the foot-shoe interface.
8. Force dictates motion. When we run, a force is applied to our body that causes us to move in a particular manner. In a perfect world, our muscles are strong enough to counteract this force and provide a stabilizing effect, but often this isn't the case and we get an imbalance between the external forces acting on our body and the internal forces trying to stabilise the body. This is when we likely experience pain and injury.

assisted with one of the many pieces of software available on the market (be careful – not all are both MAC and PC compatible). Forward trunk lean, anterior pelvic tilt, knee flexion, ankle plantarflexion, arch deformation and hallux dorsiflexion can all clearly be seen, with the later outcomes giving good insight in terms of the natural mechanism of shock attenuation as well as quantification of foot strike patterns. Of course this implies that the camera is sampling at an appropriate rate (ideally > 100Hz / 100 frames per second) to be able to visualise/capture an appreciation of the movement of each joint through each phase of gait (initial contact, loading response, midstance, propulsion, swing). The addition of a second camera in the coronal plane has benefits for visualising foot progression angle and hindfoot motion, yet caution needs to be taken when inferring the magnitude of eversion (i.e. pronation) occurring as the visual appearance could be masking some influence of transverse plane foot motion (i.e. over- or under-estimating the amount of eversion really occurring). Regardless the setup, it is important that the outcomes get fed back into the clinical decision making matrix. Gait analysis is not prospective in this environment – it does not infer why the problem is present. What it does provide in a clinical environment is a visualisation strategy to assist in making decisions on how best to reduce the load on pathological structures of the foot and ankle to restore asymptomatic function.



ANALYSIS OF THE FOOT AND ANKLE DURING RUNNING

9. An appreciation that biomechanical effects can be applied without a change in visual appearance to the foot. Therefore, just because the appearance of foot motion (i.e. the kinematics of the foot) does not change with orthotics (i.e. the foot is still everted), does not mean that the orthotic is not or cannot be applying a force that is sufficient to alter the

internal forces of the intrinsic muscles that are required to effectively offload the tissue.

The technology of gait analysis is moving rapidly, and as a sports medicine profession, we must embrace this to assist us in the diagnostic and/or assessment process. The way humans move is extremely complex. The foot and ankle, through simply being the weight-bearing joint of interest, underpins everything we do. Add to this the unique demands of individual sports, different surface terrains, variability in footwear designs and the increased in orthotic and/or bracing use, and we have a situation which requires careful thought and consideration. Clinical examination and experience are no longer sufficient to analyse the complexities of the foot and ankle during gait – we need to embrace technology to better describe complex anatomical function. Yet we don't necessarily need expensive motion analysis setups to analyse most runners.

We now have broad applications of technology at the grasps of our finger tips, many of them free of charge and accessible right in the palms of our hands. We are slowly running out of excuses. The key to effective clinical management of lower limb pathology likely lies in taking the time to understand your patient's biomechanical profile and the intricate interactions not just at the level of the foot, but how the foot can influence proximal mechanics. This is simply not possible without being able to analyse your patient run.

ABOUT THE AUTHOR

Chris Bishop is a clinical podiatrist and Biomechanics Research Fellow at the University of South Australia focusing on footwear biomechanics and human movement.



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RUNNING SHOE SELECTION

MORE ART, LESS SCIENCE?

PODIATRIST JOHN ARNOLD PROPOSES THAT WHEN CHOOSING A RUNNING SHOE, ATHLETES SHOULD FAVOUR COMFORT AND FEEL OVER ANY SUGGESTED SCIENTIFIC BENEFITS.

It only takes a short visit into any sports store to become perplexed by the range of running shoes lining the shelves. Not only do we have to contend with the growing number of brands, but also the cornucopia of gels, foams and rubbers adorning the walls from floor to ceiling. This makes finding the 'right' pair of running shoes a seemingly insurmountable task. Our conundrum is further complicated by our fear that choosing the wrong shoe will fast track

us to an injury rather than the finish line. With such anxiety created by having to choose from the plethora of potential running shoes comes one critical question: what's important for determining which running shoe is right for us, and our patients?

Current running shoe selection habits are centred on the practice of matching foot type and footwear. The classification of footwear is based on the features it

RUNNING SHOE SELECTION

MORE ART, LESS SCIENCE?

possesses that presumably match up the foot 'type' of the wearer, ranging from 'stability' shoes (for pronated feet) to 'neutral' shoes (for supinated feet). It is logical that the structural features of the foot and footwear are compatible to prevent fitting issues, such as rubbing and slipping. The dynamic function of the foot is also frequently taken into account, evidenced by the growing number of gait analysis style services offered in the retail environment.

Despite enhanced efforts to personalise the fitting of running footwear, the evidence to support this practice is surprisingly weak. A randomised trial that allocated 81 female runners of varying foot types (pronated, neutral and supinated) to shoes with different levels of stability found no difference in injury rates during a 13-week training program¹. So how can we interpret these findings in the current state of uncertainty we face when trying to select the right running shoes?

Firstly, these findings suggest running shoe selection based on foot type may not confer an advantage to prevent running related injuries. Secondly, we must question the underlying premise of considering foot type in running shoe selection, given that multiple systematic literature reviews have found only weak evidence that foot type or function are risk factors for developing running related injuries²⁻⁴. Practices that aim to improve the biomechanical profile of the runner, such as matching foot type to footwear, may not provide benefit for injury prevention. This raises the important possibility that other approaches to running shoe selection may be more superior than matching foot type to footwear for preventing running related injuries.

WALKING ON AIR?

Over the past four decades we have witnessed the evolution of running shoes, from the humble beginnings of the original waffle-soled Nike 'Moon Shoe' of the early 1970s to the expensive feature-packed models of today (and ironically, back again). In the search for improved performance, comfort (and sales), the consumer was introduced in the late





Comfort has long been known to be an important factor in selling running shoes, however, only more recently are we beginning to understand that shoe comfort may also be a key factor for improving performance and reducing running related injuries.

1970s to the concept of ‘cushioning’, pioneered by the introduction of air-bag systems in the heel of Nike running shoes. Indeed, since then the pursuit of improved cushioning to prevent running related injuries has sat at the epicentre of the development of footwear technology. The premise underpinning this approach is that high impact forces cause injury and must be dampened.

Unfortunately, this approach seems flawed as the evidence linking high impact forces to the development of running related injuries is ambiguous⁵. We have a lack of well-designed prospective studies in this area, and without these the picture won’t get any clearer. There is also limited evidence from randomised trials, although one recent study which allocated 247-runners to wear either hard or soft soled running shoes found no difference in injury rates between the two groups over a five-month period⁶. So neither foot type nor midsole hardness appear like strong candidates for guiding our selection of running shoes. This leaves us wondering what factors should inform our decision making. Interestingly, the most important factor could lie not in the information gleaned from our observations – but that of our patients.

COMFORT

At first thought having the power taken out of our hands during the running shoe selection process is a daunting prospect. It is certainly counterintuitive to trust the intuition of our patients over our own clinical experience. Comfort has long been known to be an important factor in selling running shoes, however, only more recently are we beginning to understand that shoe comfort may also be a key factor for improving performance and reducing running related injuries. So when it comes to running shoes, what exactly is ‘comfort’ and why does it matter?

WHAT IS COMFORT?

Comfort is an inherently difficult concept to define. It is highly subjective and person-specific⁷. Descriptors of comfort often relate to perceptions of ‘well-being’ and ‘satisfaction’, highlighting to the contribution of physical, psychosocial and contextual factors⁸. Discomfort is more easily defined as it is more strongly influenced by physical factors, with common descriptors including reference to ‘cushioning’, ‘cramping’ or ‘numbness’. After all, when trying to determine which shoe we prefer, it is often easier to put our finger on what we don’t like, compared to what we do like.

RUNNING SHOE SELECTION

MORE ART, LESS SCIENCE?



Despite comfort being an imprecise concept, it is obvious that improving footwear comfort can only be a good thing, but why?

WHY DOES IT MATTER?

There is no doubt that comfort is high on our priority list when searching for a new pair of running shoes. What is less known is that improved footwear comfort is also associated with improved markers of running performance and a reduced frequency of running related injuries. More comfortable footwear reduces oxygen cost during running⁹, and while this is not of importance to all runners, it suggests the effects of comfortable shoes may reach further than just feelings of well-being and satisfaction. Ratings of comfort are also explained by differences in biomechanical parameters during running, such as muscle activity, joint kinetics and kinematics¹⁰. Unsurprisingly, biomechanical variables during running only contribute a modest amount to comfort, with the rest explained by a range of psychological, aesthetic and contextual factors. Of more importance is evidence linking more comfortable footwear conditions to a lower frequency of injuries (up to 13%) than when footwear is standardised, without any optimisation of comfort¹¹. These studies suggest that comfort can be an influential factor in modifying injury risk and performance.

Whilst it could be seen as disheartening that our patients' intuition might rival our own when selecting running shoes, we should be capitalising on the opportunity to empower our patients in this process. It might take some time to accept that the selection of running shoes may be more about 'art' and less about 'science', but if this can translate into less injuries and improved performance for our patients, I don't think we can complain.

ABOUT THE AUTHORS

John Arnold is a Lecturer in Exercise Science in the School of Health Sciences at the University of South Australia. His research focus is in the area of musculoskeletal biomechanics with applications in the fields of rheumatology, orthopaedics and sports medicine.

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RUNNING ECONOMY CAN RUNNING SHOES AFFECT PERFORMANCE?

PHYSIOTHERAPIST JOEL FULLER LOOKS AT SOME IMPORTANT FACTORS TO CONSIDER WHEN CHOOSING A RUNNING SHOE AND HOW THEY CAN AFFECT PERFORMANCE AND RUNNING ECONOMY.

Running shoes are often purchased based on foot type as a means for preventing injury. What is the next most important reason for purchasing a new pair of running shoes? Improved race performance. However, does your selection of running shoe really influence how well you will perform in a race?

To answer this question, we are limited to research that has compared running economy between shoes, because of a lack of studies that have assessed race times in different shoes. Running economy refers to the amount of energy required to support running at a given speed. Running economy, along with lactate threshold, is a good predictor of running performance in a long distance race. Lower energy cost (improved

RUNNING ECONOMY CAN RUNNING SHOES AFFECT PERFORMANCE?

running economy) means that a faster race pace can be achieved without exceeding the lactate threshold and this should lead to improved performance over longer race distances.

In 2015, my colleagues and I published a meta-analysis that reviewed 19 studies of running economy that included over 30 different pairs of running shoes.¹ We were interested to know what features of running shoes were important for optimising running economy. Among the shoe features we considered were shoe mass, cushioning, comfort, bending stiffness and motion control.

The effect of shoe mass on running economy is the most commonly studied shoe feature. Across studies we found that reducing shoe mass by only 100 grams improved running economy by approximately 2%. Over the course of a marathon this improvement in running economy is estimated to save a runner approximately six minutes! So does this mean that running barefoot with zero shoe mass is the most economical way to run?

Yes... if shoe mass was the only shoe feature that influenced running economy. However, we found no difference in running economy between running barefoot and running in shoes weighing 220 grams. This lack of difference was observed even though theoretically the 220-gram shoe should have impaired running economy by 4%. Based on this finding, we can conclude that shoe features other than shoe mass are also important for optimal running economy.

Shoe cushioning is one shoe feature that has often been suggested as important for running economy. The human foot is a remarkable structure



capable of cushioning the impacts of running using the ligaments and muscles that traverse the large number of joints that comprise the foot-ankle complex. However, there is a metabolic cost associated with using the foot to absorb impacts and appropriately cushioned shoes can be used to minimise this cost. The appropriate amount of cushioning varies for each individual and for experienced runners is approximately 10 mm of foam cushioning. This level of cushioning improves running economy by approximately 2%.

In addition to functioning as an absorber of energy, the foot also has the potential to contribute energy for forward propulsion. The longitudinal and transverse arches of the foot have been shown to store and recover mechanical energy in ex vivo studies and it has been hypothesised that these ligaments can perform the same function during running gait. In order to improve this elastic potential of the foot, studies have investigated whether increasing the longitudinal bending stiffness of running shoes improves running economy. Interestingly, doubling longitudinal bending stiffness improves running economy by approximately 1% but tripling longitudinal bending stiffness has no effect on running economy. Similar to shoe cushioning the optimal amount of longitudinal bending stiffness varies for each individual.



Over the course of a marathon this improvement in running economy is estimated to save a runner approximately six minutes!

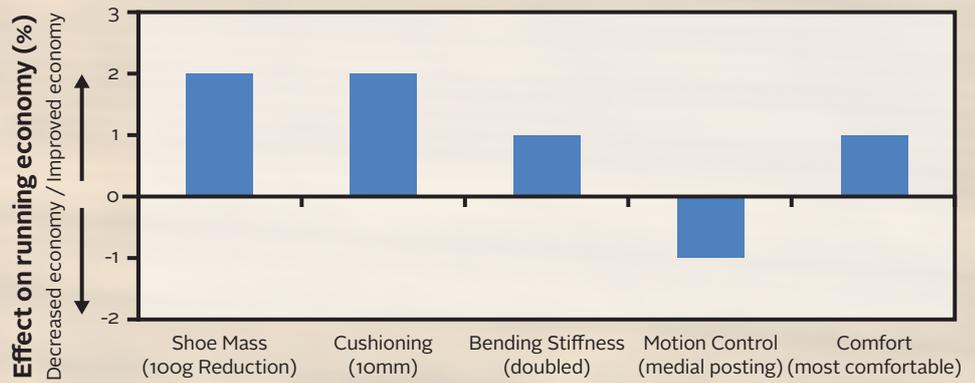


Figure 1: The effect of different shoe features on running economy.

With cushioning and longitudinal bending stiffness having variable effects on running economy for each runner, it is potentially difficult to determine which running shoe will be optimal for improving the running performance of an individual runner. However, importantly running shoe comfort appears to provide a strong indication of which shoe will suit which runner the best. When choosing between shoes with differing amounts of cushioning, bending stiffness and motion control (but with the same shoe mass), runners will improve running economy by approximately 1% if they select whichever shoe is most comfortable. As a result, runners can rely on their subjective assessment of shoe comfort to help them identify the shoe that will help improve their race times the most.

Much less research has considered the effect of motion control shoes on running economy. It has been hypothesised that, by preventing excessive foot pronation and compensatory motion at the knee, motion control shoes may help to improve running economy. However, early work in this area suggests that motion control features in shoes (e.g. external heel counter and additional medial posting) have no effect or a possible negative effect (approximately 1%) on running economy even when controlling for the additional mass these features add to shoes.

Although it is possible to influence running economy using different footwear features (Fig. 1), these features should never be altered at the expense of safety. Forced time off from training due to injury has a much greater effect on race performance than any effects derived from different running shoe designs. A typical running injury will interrupt training for an average of six weeks and running performance will regress considerably during this time. However, if running shoes can be altered to improve running economy without an increase in injury risk then the available evidence suggests that this will facilitate improved race performance.

ABOUT THE AUTHOR

Joel Fuller is a respected physiotherapist who works at the University of South Australia in the Alliance for Research in Exercise, Nutrition and Activity (ARENA). He has an extensive knowledge in the field of sports science, including the topics of running performance and injury.

SMA MEMBER NEWS



SMA BOARD CHANGES

Sport Medicine Australia has made three changes to its National Board structure as three National Director positions were vacated for new candidates at the recent AGM during the 2015 ASICS SMA Conference. Andrew Jowett and Caroline Finch became two new additions to the National Board, while Peter Nathan was re-elected. SMA would like to thank Kerri Lee Sinclair, Fabio Egitto and Wendy Brown for their contributions to SMA.

SMA RESEARCH FOUNDATION GRANTS

The SMA Research Foundation has been established to provide support to young postgraduate researchers engaged in sports medicine and disease prevention research.

The SMA Research Grants are designed to support research conducted by postgraduate students and postgraduate practitioners for the purpose of advancing research in sports medicine and its relationship with disease prevention.

Congratulations to the following five applications that were recently awarded SMA Research Grants of \$2,000 each for 2015.

- Joshua Denham, University of New England
- Luke Heales, University of Queensland
- Natalie Lander, Deakin University
- Margaret Perrott, La Trobe University
- Rhiannon Snipe, Monash University

Further congratulations goes to Margaret Perrott who was also recently awarded the 2015 Brian Sando Clinical Sports Medicine Research Award.



CONCUSSION POSITION STATEMENT

Sports Medicine Australia has released its official position statement on concussion for 2015. The purpose of the position statement is to provide an evidence-based, best practice summary to assist SMA members, coaches, parents, officials and administrators to recognise and manage sport-related concussion.



SMA ONLINE STORE

Remember to visit the SMA online store. It has everything you need for first aid, including the full range of Victor sports taping equipment. **Click here to start shopping!**



ASISCS SMA CONFERENCE PROGRAM AND BOOK OF ABSTRACTS

For anyone who missed out on the 2015 ASISCS SMA Conference on the Gold Coast, the program and book of abstracts detailing the full list of presenters can be downloaded from the SMA website. The booklets feature the complete list of speakers and researchers with their chosen field of research. [Click here for all the details.](#)

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2015 ASICS SPORTS MEDICINE AUSTRALIA CONFERENCE



CONFERENCE MANAGER ERIN WALSH GIVES YOU ALL THE HIGHLIGHTS FROM THIS YEAR'S ASICS SMA CONFERENCE.

The Intercontinental Sanctuary Cove provided the perfect location for the 2015 ASICS Sports Medicine Australia Conference from October 21st-24th, with everyone embracing this biannual conference and the casual atmosphere it is becoming renowned for!

With just on 500-delegates in attendance, the support for the conference well and truly exceeded our expectations and they were all treated to an amazing array of high calibre presentations and presenters.

The conference was officially opened with the Refshauge Lecture by Dr Peter Brukner, providing everyone with an insight of the lessons he has learnt over the past 30-years in sports medicine. His engaging presentation kept the delegates glued to their seats even after the presentation went 30-minutes over the scheduled allotted time!

Dr Brukner was joined by other high calibre and insightful keynotes and invited speakers including Professor Jens Bangsbo, Professor Joseph Hamill, Professor Ylva Hellsten, Mr Alex Kountouris and Ms Susan Mayes.

While being blessed with such high quality presentations, it made it very hard on our judges when it came time to award time! Congratulations to Ryan Timmins from the Australian Catholic University, who took out the ASICS Medal for 2015 for his research on hamstring injuries in Australian soccer.

Our popular social calendar once again didn't disappoint, with delegates enjoying catching up with old and new friends over many drinks throughout the week, including "Drinks with Deek"! We were honoured to have Rob De Castella join us at Sanctuary Cove and had the delegates enthralled as he provided tales of his career and also gave an insight into his Indigenous Marathon Foundation.

Sports Medicine Australia would like to thank all conference partners and trade exhibitors for their involvement in the 2015 ASICS Sports Medicine Australia Conference, most notably the naming rights partner ASICS for their continued support of the conference and help shaping it into what it is becoming today. SMA also owes its thanks to the Conference Chair Ms Kay Copeland and the committee consisting of Professor Garry Allison, Professor Andrew Cresswell, Dr Anita Green and Dr Luke Kelly.

All Conference abstracts will be published online as a supplement to the Journal of Science and Medicine in Sport. More details about this journal, including subscription information can be found at www.jsams.org

We hope that all those who attended the 2015 ASICS SMA Conference were encouraged by the research being undertaken in the industry and we look forward to seeing you all back in Melbourne at the MCG for the 2016 Sports Medicine Australia Conference, 12th-15th October!





AWARDS

We would like to congratulate the fantastic 2015 ASICS SMA Conference Award Winners.

ASICS Medal – Best Paper Overall Mr Ryan Timmins

Strength and architectural risk factors for hamstring strain injury in elite Australian soccer: A prospective cohort study.

BEST PAPER AWARDS

ASICS Best Paper – Clinical Sports Medicine Dr Natalie Collins

Prevalence and factors associated with radiographic Patellofemoral joint osteoarthritis (PFJ OA) in young to middle-aged adults with chronic patellofemoral pain.

ASICS Best Paper – Exercise and Sports Science Professor David Lubans

Improving muscular fitness enhances psychological well-being in low-income adolescent boys: findings from the ATLAS Cluster RCT.

ASICS Best Paper – Physical Activity and Health Promotion Professor Philip Morgan

Engaging dads to increase physical activity and well-being in girls: The DADEE (Dads And Daughters Exercising and Empowered) RCT.

ASICS Ken Maguire Award for Best New Investigator – Clinical Sports Medicine Miss Joyce Ramos

Cardiorespiratory fitness and not body fat is independently associated with beta cell function in individuals with metabolic syndrome: Fitness versus Fatness.

John Sutton Award for Best New Investigator – Exercise and Sports Science Mr Ryan Timmins

Strength and architectural risk factors for hamstring strain injury in elite Australian soccer: A prospective cohort study.

ASICS Award for Best New Investigator – Injury Prevention Miss Gillian Weir

Injury prevention and athletic performance are not mutually exclusive: An anterior cruciate ligament injury prevention training program.

ASICS Award for Best New Investigator – Physical Activity and Health Promotion Dr Carol Maher

An online social networking physical activity intervention delivered via Facebook: a randomised controlled trial.

Wendy Ey, Women in Sport Award Dr Toby Pavey

Is the recommendation of 300 minutes of physical activity a week achievable?

POSTER AWARDS

ASICS Best Poster – Clinical Sports Medicine Miss Stephanie Filbay

Quality of life in anterior cruciate ligament deficient individuals: A systematic review.

ASICS Best Poster – Exercise and Sports Science Mr Craig McNulty

New method for processing and quantifying VO₂ kinetics: linear VO₂ onset kinetics.

ASICS Best Poster – Physical Activity and Health Promotion Associate Professor Rochelle Eime

Participation in modified sports programs: A longitudinal study of children's transition to club sport participation.

AMSF FELLOWS

During the 2015 ASICS SMA Conference the AMSF Fellows enjoyed an entertaining evening at the AMSF Fellows Dinner, held at The Fireplace at the Intercontinental Sanctuary Cove Resort.

Congratulations to the following two SMA members who were awarded Fellowships:

- Dr David Bolzonello
- Mr Peter Garbutt

These inductees now join an esteemed group of Professional members that have made a great contribution to SMA and the sports medicine industry.



2016 SPORTS MEDICINE AUSTRALIA ACT SYMPOSIUM

SPORTS MEDICINE AUSTRALIA-ACT AND THE AUSTRALIAN INSTITUTE OF SPORT (AIS) ARE PROUD TO JOINTLY HOST THE 2016 SYMPOSIUM "SILENT CONTRIBUTORS TO INJURY, ILLNESS AND PERFORMANCE" AT THE AIS FACILITY IN CANBERRA. THE ORGANISING COMMITTEE IS EXCITED BY THE LINE-UP OF SPEAKERS AS THEY ALL HAVE OUTSTANDING SCIENTIFIC ACHIEVEMENTS AND KNOWLEDGE THAT HAS BEEN RECOGNISED BOTH DOMESTICALLY AND WORLDWIDE.

SILENT CONTRIBUTORS TO INJURY / ILLNESS / PERFORMANCE

Injury and illness can be catastrophic to athletic performance. These conditions not only place pressure on the individual athlete but also the coach, support staff, national sporting organisation and the health care system. But how much do we really know about the contributors to these conditions? Are we missing something? And are we doing the simple things well enough. The 2016 symposium will focus on the Silent Contributors to Injury and Illness and ultimately performance.

Four sub-themes of the symposium have been chosen, given their potential to both enhance and interrupt performance.

PERIODISATION

Periodisation is an accepted method of structuring training programmes to produce maximum performance at the right time. However, emerging evidence shows that the way we periodise an athletic plan may expose athletes to increased susceptibility to injury; a silent contributor to injury and illness. This sub theme will address topics such as training errors, planning for performance and the management of training loads to minimise the risk of injury and illness while maximising performance.

Dr Paul Gastin is an associate professor in the Centre for Exercise and Sport Science and Associate Head of School (Teaching and Learning) in the School of Exercise and Nutrition Sciences at Deakin University, Australia. Paul's teaching and

research focuses on innovation in sport science and coaching practice to enhance the performance of people and organisations across the sport participation spectrum. His work is multidisciplinary and includes athlete monitoring, performance management and sport system development. Focus areas include assessment methods to quantify load and the monitoring of athlete responses to training and competition. In addition to his work in academia, Paul worked in Olympic/ Paralympic and professional sport in Australia and overseas over many years holding senior positions in leading organisations such as the Victorian Institute of Sport, the UK Sports Institute and UK Sport. He is an Exercise and Sports Science Australia (ESSA) accredited sport scientist.

PATHOLOGY SPECIFIC

Stress can have detrimental effects on the body and is closely related to pain, injury, and illness. Stress in other aspects of life can affect training, lead to injury/ illness and negatively affect performance and mental health. Poor stress management and higher injury rates are associated. Not only can the body and immunity become weaker, but muscles are tense, concentration is poor, and self-confidence is down. When designing an injury and illness prevention program do you consider mental health in its design? If not, this may be silently contributing to injuries and illnesses.

This section will also cover pathology specific topics of pain, tendinopathy and muscle injuries. Pain is contextual and subjective. In the last decade pain research has increased but these findings do not always translate to sports medicine/science practice. This section is aimed to give an updated understanding of pain science, muscle physiology and best practice muscle and tendon injury treatment.

Prof. Per Aagaard was a keynote at the 2013 SMA Conference in Thailand and was so good he has been invited back. Per is a Professor in Biomechanics and appointed Head of the Muscle Physiology and Biomechanics Research Unit (MoB) at the Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark. He also holds a position as Guest Professor at the Institute of Neuroscience and Physiology, Department of Clinical Neuroscience and Rehabilitation, Sahlgrenska Academy, University of Gothenburg, Sweden. His research covers the adaptive change in neuromuscular function and muscle morphology/architecture induced by training and detraining/inactivity, including aging and immobilisation. His research has focused on the effect of resistance training on musculoskeletal health and neuromuscular function in young and old adults, myogenic stem cell activation with acute exercise and long-term training, antagonist muscle coactivation, spinal motor function during walking and running, in vivo muscle-aponeurosis-tendon function, knee ligament (ACL) injury, muscle-tendon injury, tendinopathy, and exercise/training/biomechanical analysis in elite sports including aging master athletes.

MEDICAL

Medical conditions too affect performance. In sport, there are few prospective studies looking at medical conditions. They are under-reported but

equally as detrimental as injuries. To illustrate this, AFL clubs can expect 2.4 illnesses per season, a number almost equal to calf strains and groin strains and have the fifth highest incidence when compared to injury data. Think to yourself, how long would you take to get back to training following being ill? For muscle injuries we have risk factor studies, prevention and rehabilitation programs yet comparatively little research is available for medical conditions that affect athletes.

If physical performance is depressed for extended periods of time the situation may result in a decreased desire to exercise and may also increase the risk of illness or injury. There may even be phases of training where an individual experiences short-term performance decrements that are easily recovered from with several days of decreased exercise stress, but how does one recognise this? The presenter line up is yet to be finalised for this section but you are promised an engaging and informative session from some of Australia's leading sport physicians and researchers.

PHYSICAL: SLEEP/BODY COMPOSITION

The cause of a bad workout week might be as simple as not getting enough sleep. Sleep is sometimes called a legal performance aid because of its ability to promote recovery. Research also suggests sleep helps embed a task or skill. Equally, poor sleep hygiene is associated with increased injury and illness, but what is good sleep? How do we assess if an athlete is getting enough sleep? What do we do if we know they are not? Dr Shona Halson is the Head of Performance Recovery at the Australian Institute of Sport. Dr Halson will touch on how important sleep is to the athlete, its assessment and treatment options.

It's important to make sure your overall caloric intake matches your activity level. Mismatched energy can lead to weight gain or loss and alter an athlete's resting metabolic rate. The female triad of inadequate energy, poor bone health and altered menstruation is well understood, but what about male athletes? Men too can have insufficient energy intake, with equal but gender specific consequences. This has been acknowledged now as "relative energy deficiency" where an individual is eating insufficient energy for the amount of activity. Athletes tend to eat a lot but how do you know if they are eating enough? What are the consequences? And what can we do about this silent contributor?

Dr Anna Melin is a Swedish dietician with a PhD from the Department of Nutrition, Exercise and Sports, University of Copenhagen. She has 20 years of experience as a sports nutritionist; the first 15 years at Team Denmark and now at the Swedish Olympic Committee. She is specialised in disordered eating behaviour and has developed and implemented a national prevention and multidisciplinary treatment strategy for eating disorders in elite athletes in Denmark. Her research area is energy deficiency in athletes and the impact on health and performance.

Sports Medicine ACT and the Australian Institute of Sport are proud to jointly host the 2016 Symposium "Silent Contributors to Injury, Illness and Performance" at the AIS facility in Canberra. The organising committee is excited by the line-up of speakers as they all have outstanding scientific achievements and knowledge that has been recognised both domestically and worldwide.

See you in Canberra, March 18-19 2016.



Silent Contributors to Injury Illness Performance

18-19 March 2016, Canberra

RISING IN THE RANKS WITH OUR IMPACT

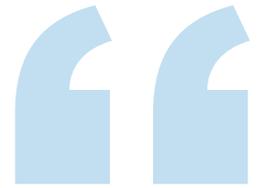


THE FOLLOWING IS A REPUBLISHED EDITORIAL WHICH FEATURES IN **THE JOURNAL OF SCIENCE AND MEDICINE IN SPORT** (VOLUME 18, ISSUE 5, SEPTEMBER 2015) WRITTEN BY EDITOR-IN-CHIEF, GREGORY S. KOLT, PHD.

The message is simple – the Journal of Science and Medicine in Sport has again been recognised internationally for the quality and impact of the papers we publish. What I am referring to is the recent release of the Journal Impact Factors for 2014. Impact Factors are essentially a metric that describes the journal's citation influence, and tend to be used vigorously by journals and their publishers to indicate esteem and to attract further high-quality papers. The impact factor is calculated by counting all the citations in a given year (in this case 2014) of the papers that were published in that journal in the previous two years (in this case, 2012 and 2013), and then dividing this by

the total number of papers published in that same 2-year period.

We are proud to announce that in 2014 the Journal of Science and Medicine in Sport achieved its highest ever impact factor, a score of 3.194. This resulted in our rise in the journal rankings to 7th out of 81 journals in the category where all the sports medicine and sports science journals are included. We can all be very proud of this, as it places us in good company that includes the other leading sports medicine and sports science journals including British Journal of Sports Medicine (ranked 2nd), American Journal of Sports Medicine (ranked 3rd), and Medicine and Science in Sports and Exercise (ranked 6th). In 2014, the



This overall result, once again, truly acknowledges our journal as one of the leading and well-respected journals internationally. As readers and contributors to the journal you can all be proud.

Journal of Science and Medicine in Sport was one of only four journals in the top 10 that increased their impact factor on 2013 results. This overall result, once again, truly acknowledges our journal as one of the leading and well-respected journals internationally. As readers and contributors to the journal you can all be proud.

A particular challenge we face, is ensuring that we provide a very balanced group of papers in each of our issues that collectively cover areas of sports and exercise medicine, sports injury, physical activity and health, and sports and exercise science. As a multidisciplinary journal, unlike many others, we need to ensure that each issue offers papers of interest to our very broad reader-ship. While research in certain areas comes in and out of vogue, it is the responsibility of the entire editorial team to provide you with papers that are of a high quality, that demonstrate scientific and academic rigour, and that allow our many

practitioner readers to take away evidence around new approaches for their clinical application. We will continue to do this, as the multidisciplinary nature is a key feature of our journal. My thanks go to the members of the editorial team who work so tirelessly in contributing to the journal's achievements.

The editorial team will continue to provide you with a high quality journal that maintains its place among the most esteemed journals internationally.

ABOUT THE AUTHOR

Gregory S. Kolt is the Editor-in-Chief of *The Journal of Science and Medicine in Sport*.

The Journal of Science and Medicine in Sport, published by Sports Medicine Australia (SMA), is the major refereed research publication on sports science and medicine in Australia. The Journal provides high quality, original research papers to keep members and subscribers informed of developments in sports science and medicine. Produced for SMA six times a year by Elsevier Australia, it reflects SMA's commitment to encouraging world-class research within the industry, and its commitment to the continuing education of its members. Journal articles can be found at jsams.org

SPORT AND EXERCISE MEDICINE IN JAPAN

THIS ARTICLE, WRITTEN BY TORU OKUWAKI, MICHIKO DOHI, AND TAKASHI ONO FORMS PART OF A SERIES PUBLISHED IN SPORT HEALTH TO LOOK AT THE STRENGTHS AND WEAKNESSES OF THE SPORT AND EXERCISE MEDICINE (SEM) SYSTEMS IN VARIOUS COUNTRIES, PROVIDING IDEAS AND INSPIRATION FOR ALL COUNTRIES ON HOW TO IMPROVE INFRASTRUCTURE IN THIS EMERGING SPECIALTY.

[VIEW PAST ARTICLES HERE.](#)

[VIEW PAST SPORT AND EXERCISE MEDICINE AROUND THE WORLD EDITORIAL HERE.](#)

Which types of practitioners typically look after athletes and what training do they require?

In Japan, medical doctors and physiotherapists working at medical institutions mainly look after athletes, as well as practitioners in private or alternative medical areas, such as oriental medicine (Kampo) doctors, acupuncturists, masseurs, Judo-therapists, or chiropractors who are also in charge of paramedical care for athletes. The license for medical doctors and physiotherapists is the national qualification, however some other practitioners in alternative medical areas are allowed to practice medicine.

On the other hand, in the sports field, 'sports doctors' and 'athletic trainers' are in charge of medical and paramedical care for athletes. 'Sports doctors' have been certified by three organisations; the Japan Sports Association (JASA, 1982-), the Japanese Orthopaedic Association (JOA, 1986-), and the Japan Medical Association (JMA, 1991-), in chronological order. There are 5,596 doctors currently registered as JASA-certified sports doctors (current as of 01/10/2014). There are 2,324 athletic trainers currently registered as JASA-certified athletic trainers (current as of 01/10/2014).

What are the main sports played in Japan and which injuries are most common?

According to the statistical data provided by the Ministry of Internal Affairs and Communications (2011), walking is the most popular activity in Japan (40 million people, 35 per cent of all those who are active), followed by bowling (15 million, 13 per cent), swimming (12 million, 11 per cent), training and exercise with a machine, jogging, climbing and hiking, cycling, fishing, and golf. Baseball, which is one of the nation's popular sports, is played by eight million people (seven per cent), and soccer by 6.4 million people (six per cent).

Unfortunately, the epidemiological data on sports injury that covers all ages and sports categories has not been obtained. The School Safety Department of Japan Sports Council has conducted research on injuries and accidents that occur to school children whilst under school supervision, and has reported the data every year since 1980. The Department has also provided a medical expenses system (Injury and Accident Mutual Aid Benefit System) for school children and 99 per cent of school children nationwide subscribe to the system.

According to their research results, during 2009-2013, the occurrence of sports injury (within the sports of soccer, baseball, volleyball, basketball, rugby, tennis, kendo, judo, gymnastics, swimming, and track and field) was approximately 260,000 cases per year and the frequency was approximately 9,300 cases per 100,000 per year. In terms of gender, the number of occurrences in men was more than twice that in woman (180,000 cases per year in men > 80,000 cases per year in women), but hardly differed in the frequency of occurrence (about 9,000 cases per 100,000 per year). In terms of age, the occurrence rate was largest in 14 year olds, where the frequency was highest in 17 year olds. Looking at the number of occurrences each month, injuries occurred most often at the beginning of the new school year, especially in May (in Japan the new school year starts in April). For the site of injury, the ankle joint suffered most (21 per cent of all injuries), followed by the hand and fingers, head, and knee joint. Sprain was the most observed in terms of ankle injury, fracture and sprain for the hand and fingers, and bruises for the head (including face, especially eyes or teeth). When viewed by pathology, fracture occurred most, followed by sprain and bruise, with these three injury types accounting for 75 per cent of the whole injuries (about 200,000 cases per year). In terms of sports category, the most injuries were recorded in basketball (about 68,000 cases per year) followed

by soccer and baseball, however, rugby was the most at risk of injury (about 33,000 cases per 100,000 per year) when viewed by occurrence frequency in relation to participation, with the sport being more than twice that of basketball (about 14,000 cases per 100,000 per year). In the autumn of 2015, a nationwide epidemiological research project for sports injury is expected to be established by the National Sports Agency.

How are athlete treatment visits funded at the professional, university and amateur level (public, private, insurance)?

In Japan currently, there is no division of insurance due to competition level. Typical insurance targeting all competitive categories is done via the National Health Insurance System, which is intended for use by the entire nation. Via this system, people can visit medical institutions and access medical services at 30 per cent of the actual costs. This is the same even in top athletes. At the Medical Center of Japan Institute of Sports Science (JISS), athletes pay 30 per cent of the actual cost for any medical services they have sought. In some universities and companies, athletes can access services for free or low-cost provided they are done by their own health management center or medical office. In regards to the compensation system when receiving medical treatment, there is a disaster mutual aid benefit plan for school children, general life insurance, or failure solatium system for each sports association. It is expected that a nationwide insurance system for sports injury is to be established by the National Sports Agency in the autumn of 2015.

Are anti-doping measures seemingly effective in Japan?

Since it was established in 2001, the Japan Anti-Doping Agency (JADA) has actively provided information and guidance on doping in sports competitions held in Japan, not only at the international level, but also at a domestic level ranging from junior tournaments to the National Sports Festival, and has conducted educational activities even for sports-related medical affiliates. However, in spite of the anti-doping activities of the Japan Sports Association Sports Science Committee, people engaged in sports are not so interested in doping control at present. Furthermore, before the establishment of JADA, implementation for providing

education or the testing of doping has been entrusted to each sports association which has resulted in a difference of consciousness between each association.

With the establishment of JADA, anti-doping activities in Japan have been implemented however it was not a smooth transition. Triggered by the Japanese Government's conclusion to the UNESCO International Covenant in 2006 and the Tokyo Olympics bid activities for 2016 and 2020, anti-doping activities in Japan have begun to accelerate, and now, 78 organisations are currently members of JADA (current as of 09/01/2015). Since 2009, JADA has started to cooperate with the Japan Pharmaceutical Association for certifying the 'Sports Pharmacist' and has been involved in anti-doping activities such as providing accurate information on drugs for athletes and preventing athletes from the unauthorised use of drugs. Since 2013, the Japan Ministry of Education, Science and Culture has incorporated descriptions about doping in the government course guidelines for high school students with the aim of preventing not only athletes but all young people from drug abuse.

Doping tests are regularly done with 2,300 done in 2005, 4,000 in 2006, and more than 6,000 in 2013. Among the 6,145 cases tested in 2013, only six were positive (0.1 per cent positive rate) and most were a result of 'careless doping'. Since 2008, the highest positive rate has been 0.2 per cent per year.

The Japan Olympic Committee (JOC) and JISS have also been integral in providing anti-doping education for athletes and in checking what drugs/supplements have been taken prior to international tournaments, such as the Olympic or Asian Games. The Japan National Team has never had a doping violation at an Olympics, and this cleanliness is considered to be one of the factors that led to the success of the 2020 Tokyo Olympic bid. In summary, in Japan, the anti-doping activities and measures developed by various organisations in various forms can be said to be effective.

How did sports medicine services work in any recent major international events held in Japan?

The international multi-sport event most recently to have taken place in Japan was the Nagano Winter Olympics in 1998. World Championships or the World Cup,

have also taken place in various competitions, such as the FIFA soccer World Cup co-sponsored by the Korea Republic in 2002. Within each competition, the medical committee organised as part of the central committee has prepared a venue doctor, an emergency system and hospital arrangements. At the IAAF World Championships in Athletics (Osaka, 2007), care booths for all athletes were installed and paramedical services were provided.

What kind of medical support do we expect in anticipation of the Tokyo Olympic and Paralympic Games in 2020?

Looking towards the Tokyo Olympic and Paralympic Games in 2020, the medical committee of each sport association and each prefecture unit have commenced medical and scientific support in the form of workshops (topics on injury prevention/medical checks) for athletes. In regards to a nationwide effort, polyclinics are being planned for and the 'Multi-Support House' (newly established since the London Olympic Games in 2012) is planned to be installed for the Tokyo 2020 Games.

The Multi-Support House will be entrusted to the Japan Sports Promotion Center for all planning and management. Specific duties of MSH are to provide information support (video analysis, provision of information strategy or meeting space), or medical support (self-care [stretching or cooling bathing], recovery [meals, contrast baths, or dry CO₂ baths], condition checks, medical/psychological counseling, medical care, and relaxation/refreshment). At the Tokyo Games the MSH is planned to be installed as a strengthening base outside the village for the Japanese team.

ABOUT THE AUTHORS

Toru Okuwaki and **Michiko Dohi** are from the Japan Institute of Sports Sciences.
Takashi Ono is from Kitasato University.



THE COUNTDOWN TO RIO



SPORT HEALTH CONTINUES ITS SERIES OF ARTICLES CHATTING TO SPORTS MEDICINE PROFESSIONALS IN THE LEAD UP TO THE 2016 RIO OLYMPIC GAMES. THIS ISSUE FOCUSES ON KYLIE HOLT, PHYSIOTHERAPIST FOR THE AUSTRALIAN HEADQUARTERS MEDICAL TEAM.

Growing up I participated in many sports including athletics, gymnastics and netball. Being sporty I wasn't sure whether I wanted to be a physical education teacher or a physiotherapist. It wasn't until I competed for Australia at the 1992 World Junior Athletics Championships that I saw what being a sports physiotherapist involved – travelling the world! The team physiotherapist at those championships was Professor Kay Crossley, who made being a team physiotherapist look fun and exciting. My decision was made. 12-years later my very first international appointment was the Australian team physiotherapist at the very same World Junior Track and Field Championships.

As my athletic career was cut short due to injury, I knew I wanted to help other athletes avoid my misfortune, so my sports physiotherapy career began. To this day I still laugh with Kay as to how little I saw in my half hour appointments every few days. I was ignorant to the long days of treatment, meetings and what carrying the kit and physio table around the world really involved! Since graduating I was extremely lucky to have amazing mentors at South Sydney Sports Medicine and Sydney Sports Medicine centres for 10-years, with the past seven years working at the Australian Institute of Sport (AIS). Since becoming an APA Sports physiotherapist in 2006, I have been lucky enough to travel internationally with athletics, gymnastics, netball and swimming.

I finally achieved my Olympic goal by attending the 2012 London Olympics as the appointed physiotherapist with the Australian Women's Artistic gymnastics team. It was very surreal that with all the hard work and sacrifice, I had gone from watching in the stands at the Sydney 2000 Olympics to the competition floor wearing the green and gold. As a mother of three young kids, I would not have achieved this without the amazing support of my husband, family and the AIS.

After being part of the Australian Headquarters medical team for the 2010 and 2014 Commonwealth Games, I applied to be part of the Australian Headquarters team for the 2016 Olympic Games in Rio de Janeiro. To be selected



for this position, you need to be working closely with national sporting organisations that compete at the Olympics as you require a nomination from these sports to the Australian Olympic Committee. For me this included gymnastics, athletics and swimming, and I was appointed to be one of seven sports physiotherapists for the Rio headquarters in June this year.

As part of the Headquarters team, we are responsible for servicing the sports with smaller numbers that are unable to get accreditation to take their own team physiotherapist. Such sports include triathlon, diving, synchronised swimming, archery, shooting, badminton, table tennis, beach volleyball, weightlifting and all the combat sports. Twelve months out from Rio 2016 each physio has been given a liaison role for 4-5 sports each. This is to provide a point of contact for the different sports in the lead up to the Games, to give us any information that the sport has or needs regarding HQ physiotherapy services and physiotherapy coverage during the Games. As we get closer to the Olympics, when athletes gain selection, further information will be gathered such as screening results and injury histories.

During the Olympics the full Australian Headquarters medical team (medicine, physiotherapy, soft tissue therapists, nutrition, psychology, recovery, sports science and medical administration) will arrive at the village as soon as it opens to setup the medical area. This area will be in the heart of the Australian team residence for easy access by the athletes. Setup includes unpacking the numerous pre sent freight boxes of treatment tables and consumables (tape, braces, cream, dry needling equipment, theraband, etc.) as well as packing individual kits to be taken by each physio to the venues when required. We try and make the medical

area as homely as possible by decorating it with flags, posters, and of course some big boxing kangaroos! If possible some televisions are setup to allow staff and athletes to cheer on their fellow team members whilst receiving treatment. As a member of the Australian team we also receive our own team gear in these first few days.

In the first week while athlete numbers are low, the physiotherapists will each travel out to the different venues of the sports they are assigned with, to check out crucial details such as travel times and what medical rooms, staff and facilities are available at these venues. This information will be important as one of the challenges in Rio will be servicing the three sub sites away from the main village. Generally, the medical area will be open from 7am to 10pm with the physio's working a 10-hour roster in the clinic, which may also include going out to the venues with a sport when required. There will be a booking system for athletes to book in treatment times in advance around their training and competition schedules. Working with a few different sports at once requires you to be extremely flexible with your schedule throughout the two weeks of competition. Inevitably when injuries occur you may be required for strapping or treatment at the venue before, during or after competition rounds. This is where the headquarters team step in to cover your other athletes back at the village.

As part of my role it is important to be constantly liaising with the sport coaches and management teams as to athlete injury status, management and potential implications for competition. Being at the games does not mean the paper work is ignored – treatment notes must be written and at the end of the games ongoing management, rehabilitation plans, follow up and handovers must

be completed. At the end of the games we are also required to help pack up the headquarters area; this includes boxing up equipment to be freighted back to Australia and cleaning the area. Any unused consumables are usually donated to a local hospital.

In comparison to the above role, attending London 2012 with gymnastics came with different experiences and challenges. I had worked closely with the gymnasts and staff for the three years prior to the games attending camps and travelling to international competitions, so I had developed strong relationships. The team had been together at the AIS for a training camp for the six weeks prior to the games and once in the village, I lived in an apartment with the girls and coaches so was on call 24-hours a day. I also attended every training as well as being on the competition floor for all sessions. The week prior to heading over to London, we had two significant injuries that required extensive treatment and management of training loads. With these injuries it was great to have access to medical and headquarters physiotherapists for additional support.

I am looking forward to attending my second Olympic Games in a different role. Being a member of the headquarters team is a great honour, and I love working closely with highly experienced practitioners. It is extremely rewarding working with the different sports that access headquarters. Many of these athletes have been travelling the world for the months leading into the Olympics without medical support and are so appreciative of the support that we provide them. To be able to assist them in achieving their goals is a fantastic feeling and our ultimate reason for being there.

Post Rio, it will be back to work at the AIS and focusing on completing my training to become a Specialist Sports Physiotherapist through the Australian College of Physiotherapists. I have also been heavily involved in research with Swimming Australia so will aim to complete those projects for publication.

ABOUT THE AUTHOR

Kylie Holt will be a member of the Australian Headquarters Medical team at the Rio 2016 Olympic Games. Kylie was also an appointed physio for the women's artistic gymnastics team at the London 2012 Olympic Games.

OBESITY &

WHAT'S THE LINK AND



FOOT PAIN

AND DO THEY IMPACT ON PHYSICAL ACTIVITY?

PODIATRIST THOMAS WALSH LOOKS AT THE VICIOUS CYCLE OF HOW FOOT PAIN ASSOCIATED WITH BEING OVERWEIGHT OR OBESE MAY STOP PEOPLE FROM EXERCISING AND TRYING TO LOSE WEIGHT.

At last count, 68% and 56% of Australian men and women were either overweight or obese, respectively. Excessive weight brings with it an increased risk of various comorbidities including diabetes and cardiovascular disease. People are often warned against gaining excessive weight, as it will increase their risk for these conditions however, many ignore this risk because related symptoms may be mild or possibly non-existent. But, excessive weight also increases the risk for pain, something that is easily ignored. Pain is experienced in the present, it is depressive and from all accounts it is not much fun. Despite what your average B-grade football coach will tell you, pain probably isn't weakness *literally* leaving the body and it should be listened to.

The most preferred treatment for excessive weight is to modify diet and increase physical activity. But the idea of performing physical activity when you have painful joints is probably something only a masochistic would enjoy and most people are not this way inclined. So how do we keep people that are carrying excessive weight active, despite their pain? How do we square that circle? To tackle this we need to know, (1) Is foot pain caused by excessive loading? (2) Should people remain physically active when they have foot pain?

OBESITY AND FOOT PAIN

Overweight and obese people get sore feet. This seems logical, an open and shut case. The more weight someone has to

OBESITY & FOOT PAIN

carry the more mechanical stress is borne by the feet and musculoskeletal pain ensues. This premise is supported by a systematic review in 2012 that found an increased body mass index (BMI) was strongly associated with non-specific foot pain in the general community and chronic plantar heel pain in a non-athletic population¹. A study published in 2014 found that over a five-year period that as BMI increased, the risk of developing foot pain also increased even after adjusting for age². Whilst there is no doubt that increasing your BMI will increase your chances of developing foot pain, it may be a bit more complicated than simply an overloading issue.

The beauty of the BMI is that it requires minimal equipment (no equipment if you have an honest patient) and can be immediately calculated. One of the problems with using the BMI is that it is an arbitrary measure of weight/height and cannot account for body composition, namely fat mass and lean soft tissue mass nor can it account for the location or activity of these tissues. There has been much debate as to the usefulness of the BMI as a risk factor for pain and disease given it can underestimate the prevalence of adiposity and because of the known differences in body composition across age, gender and race.

Body composition can be measured using techniques such as dual-energy X-ray absorptiometry (DXA). This provides measures of fat, lean soft tissue and bone mass (lean soft tissue mass and bone mass are often combined to calculate 'fat-free mass'). It can also provide details on location of these tissues and has allowed investigators to determine if the type and location of tissue is associated with pain. It turns out that fat mass is routinely associated with pain, whereas fat-free mass is not, particularly when both of these measures are normalised for height (giving fat mass index [FMI] and fat-free mass index [FFMI]) and adjusted for each other respectively. To make this a bit clearer, using quite rudimentary mathematics if $BMI = FMI + FFMI$ and both BMI and FMI are associated with pain, but FFMI is not, then it is not unreasonable to conclude there may be something about fat that makes it a bit more than an aesthetic nuisance.

Of the investigations exploring body composition and foot pain, all have found that fat mass, but not fat-free mass, was associated with pain after normalising for height³⁻⁵. The largest study⁵, found that despite BMI being significantly associated with foot

pain in univariable analysis, when FMI was considered in the same model BMI became non-significant for both prevalent and future foot pain. One of the most compelling studies regarding a metabolic link to musculoskeletal pain was published this year⁶, which found the number of painful sites in the lower limb increased as FMI, but not FFMI, increased following



“I know I need to lose weight, but I can't exercise because my foot hurts and now I'm in a vicious cycle of weight gain and more pain.” Patients will often recognise that their weight is probably a factor, but all too frequently will blame their pain for the inability to lose weight.

appropriate adjustment. It may not be considered politically correct, but people with chronic joint pain may be too fat, not heavy.

FOOT PAIN, OBESITY AND PHYSICAL ACTIVITY

“I know I need to lose weight, but I can't exercise because my foot hurts and now I'm in a vicious cycle of weight gain and more pain.” Patients will often recognise that their weight is probably a factor, but all too frequently will blame their pain for the inability to lose weight. Implying that if a clinician can help them resolve their pain, they can get on with their weight loss program. There are a few problems here. Firstly, people are not generally on a weight loss program and then develop disabling foot pain, they generally get foot pain and then look at

their body and realise all this extra weight can't be good. Secondly, the majority of weight loss is achieved through a change in diet and only supplemented with exercise – you can't outrun a bad diet. Finally, a reduction in pain does not necessarily mean people will lose weight or do more exercise.

As clinicians, it is important that we provide some empathy, but we do need to stress that foot pain does not preclude a change in diet and should not limit physical activity per se. It may, however limit activities performed whilst weight bearing. Podiatrists can address local factors, but in order to tackle the difficulties of being overweight or obese, patients may require advice from a dietician regarding what to eat and when. Patients may also benefit from consultation with an exercise physiologist who are great at explaining how to maintain muscle mass, continue to exercise and remain motivated. Given the association between depression, pain and obesity, physical activity may not only be useful in using calories, it may have a positive effect on depressive symptoms – reducing the perception of pain.

Is foot pain in overweight or obese individuals caused by metabolic or mechanical factors? Probably both, but fat does seem to be a major player. As seductive as the BMI is, it does have its limitations and if we are going to provide sound advice to people regarding foot pain, then we have to start considering body composition, fat in particular. Physical inactivity should be discouraged and we need to stress that there are many activities that can be performed that don't stress a painful foot. There is much research to be done on understanding the underlying mechanisms and potential management strategies for foot pain, but we are now starting to address the elephant in the room.

ABOUT THE AUTHOR

Thomas Walsh is a podiatrist and current Director at the Adelaide Podiatry Clinic and also works for SA Health. He is completing his PhD at Flinders University.

HEEL PAIN

A SIMPLE DIAGNOSIS?

DOCTOR KARL LANDORF HIGHLIGHTS THE MANY CAUSES OF HEEL PAIN AND THE DIFFICULTIES FACED WHEN TRYING TO IDENTIFY THE PROBLEM.

“There is a condition worse than blindness, and that is, seeing something that isn’t there.”

— Thomas Hardy

While the context of Thomas Hardy’s quote above would have been substantially different to the one I am using in this article, it nonetheless serves as an appropriate opening. Foot and foot-related problems in sport and exercise are a curse to most that are not couch potatoes. Even if one is a couch potato – a heavy couch potato, that is – foot and ankle problems can be a curse. The problem is, whether we place excessive demands on our feet from over-doing it on the sporting arena or over-doing it on the calorie arena, the humble foot takes a pounding!

When the foot hurts it is hard to rest. Who really wants to sit down and take the daily weight-bearing grind away from it? No-one. Because of this, people with foot and foot-related problems rightly want to relieve themselves of the pain and get back to doing what they want to do. Frequently, this means heading off to a sports physician, physiotherapist or podiatrist to be diagnosed and then treated appropriately. But how certain is the diagnosis, and by default, how appropriate then is the treatment? Are clinicians truly clear-sighted with their diagnosis or are they blind? Or maybe worse, do they see something that isn’t there? With these questions in mind, are patients really receiving appropriate treatment?



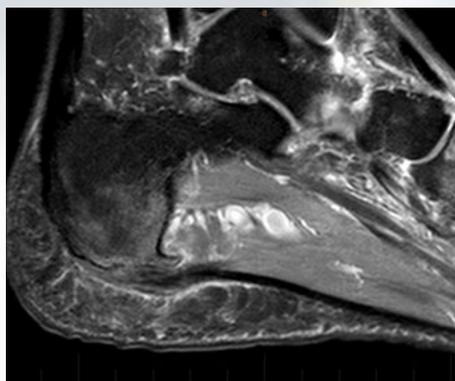
HEEL PAIN

A SIMPLE DIAGNOSIS?

Many clinicians dealing with regional problems from low back pain, to shoulder pain, to foot pain grapple with this issue on a daily basis. How do clinicians act with clear sight rather than act as if they were blind? How do they see what is really there and not see something that isn't there? Some conditions are relatively easy to diagnose – a frank fracture of a metatarsal is one such entity. However, others are more difficult. Take plantar fasciitis as an example. For many, the term 'plantar fasciitis' has been used to describe most cases of pain under the heel; a common condition in people trying to walk or run, whether that is starting a walking program to benefit general health or running long distances to compete in running events. The term implies that the plantar fascia is the culprit, but do we really know if it is just the plantar fascia that is affected? Could other structures, such as the plantar fat pad or the calcaneus be contributing to the problem? Could there be alterations in the stiffness of the plantar fascia or plantar fat pad? Could there be other conditions, such as a soft tissue tumour or a nerve entrapment? Without appropriate investigation, do clinicians really know what they are dealing with? Without really knowing what they are dealing with, are they treating the symptoms appropriately? If I were a patient with this condition, I would want to know what structures were causing the problem before I began an expensive course of treatment. But I would also want to know if the medical imaging I was being referred for was going to benefit me. This balancing act is challenging, and it needs to be guided with good evidence. Consideration of the evidence for the benefits (or otherwise) of medical



If I were a patient with this condition, I would want to know what structures were causing the problem before I began an expensive course of treatment.



imaging cannot be understated and is a hot topic in relation to public expenditure on health care.

Sports medicine has been at the forefront of many investigative tests, including medical imaging. From early bone scan investigations, where for the first time, some of the more nebulous manifestations of bone pathology could be detected, sports medicine clinicians have been keen to image. The value of medical imaging cannot be underestimated. It is one of the cornerstones of modern medicine and it has relatively quickly changed the way we practice. But, don't just assume that imaging prevents blindness...it may still make you see something that isn't there. Like many components of health and medicine, medical imaging requires robust evaluation prior to being used in a binary manner ('yes, they have this on the MRI, therefore this is the problem').

In one of our most recent studies, the *La Trobe University Heel Pain Imaging Study*, we are attempting to do this. This cross-sectional observational study (commonly, but erroneously,

referred to as a case-control study) of those *with* and *without* plantar heel pain, is evaluating the role of imaging in this common condition. Utilising this methodology is important because it will lead to more valid findings. Not using appropriate methodology, for example just investigating people *with* plantar heel pain, may lead us to believe that certain imaging findings only occur in people with this condition. Indeed, many imaging findings (i.e. supposed pathologies) have been detected in people with plantar heel pain, including fractured calcaneal spurs, partial tears of the plantar fascia, bone marrow oedema in the calcaneus, oedema in the plantar fat pad and space occupying soft tissue tumours. However, these same imaging findings may also be present in people *without* plantar heel pain. Accordingly, we need studies that compare the findings to a control group. We also need the study to be appropriately powered to provide meaningful estimates of the odds of having these findings. Until we have this data, we don't know if we are really seeing something of importance, or we are just seeing something that isn't there (or isn't really a problem).

So, next time a patient comes in with plantar heel pain, do you know for certain if it is 'just' plantar fasciitis? Should you refer the patient for medical imaging to find out more? Do you know if the results of the imaging will truly be diagnostic of what is causing the symptoms? More questions than answers? Yes, but to some extent this is the nature of research. However, these small steps not only cure our blindness, but hopefully stop us seeing stuff that isn't there!

ABOUT THE AUTHOR

Dr Karl Landorf is an Associate Professor and Research Coordinator in the Discipline of Podiatry and a member of the La Trobe Sport and Exercise Medicine Research Centre at La Trobe University in Melbourne. Karl is also the deputy editor for the *Journal of Foot and Ankle Research*.

ANKLE TAPING

SPORTS MEDICINE AUSTRALIA PROVIDES SPORTS TRAINERS WITH ADVICE ON HOW TO TAPE AN ANKLE EFFECTIVELY.

The ankle is probably the most commonly sprained joint during sporting activity. It is important for the sports trainer to have a good understanding of the anatomy and functioning of the ankle to manage injuries effectively.

TAPING AN ANKLE

Ankle taping applied directly to the athlete's skin affords the greatest support. The aim of taping an ankle is to:

- Provide protection.
- Prevent injury.
- Decrease the severity of the injury if an injury does occur.

TECHNIQUE FOR TAPING AN ANKLE

1. Ensure the ankle and lower leg are clean and dry.
2. Position the foot at 90 degrees.
3. Apply protective padding and cover any existing wounds.
4. Apply two anchor strips around the base of the calf muscle:
 - a) The first strip at the base of the calf.
 - b) The second strip overlapping the first by half the width of the tape.

Apply 2-3 stirrups (depending on the size of the foot/ankle)

1. Begin from the ankle on the medial side, cover half the malleoli (bony part of the ankle), hook underneath the heel and finish at the anchor on the lateral side.
2. The second and third stirrup should be applied as for the first stirrup but should overlap the first by half the width of the tape.

Apply a figure of 6.

Begin from the anchor on the medial side, follow the stirrup under the heel and return across the front of the ankle to where the tape commenced.

Closing down of stirrups

1. Start above the ankle and work down the leg.
2. Apply separate strips of tape, each overlapping their predecessor by half the width of the tape until the stirrups are covered.
3. Finish at the malleoli.

Heel locks (two complete sets)

1. Commence at the front of the ankle and lay the tape diagonally across the top of the foot towards the medial side of the calcaneus:
 - a) Across the malleoli.
 - b) Around the back of the calcaneus.
 - c) Under the calcaneus.
 - d) Across the front of the foot.
2. Repeat this sequence from the lateral side.

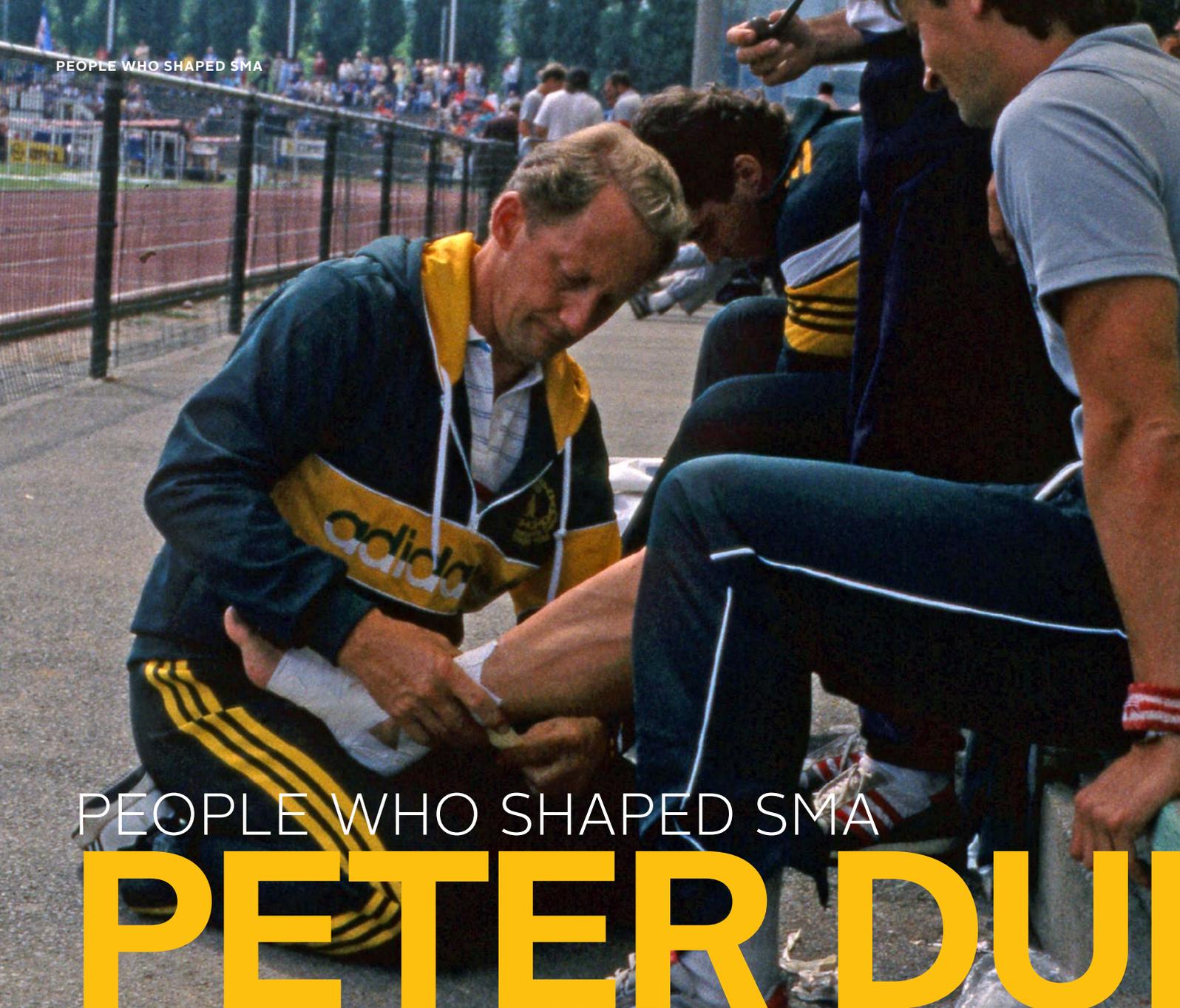
Closing down

Lay a piece of tape gently around the midfoot, covering the extreme edges of the heel locks. Check:

- Distal capillary refill.
- Movement and sensation.
- Restriction.

Want to learn more on taping? Sports Medicine Australia runs the following sports taping courses: Advanced Sports Taping, Introduction to Sports Taping and Introduction to Kinesiology Taping. Visit sma.org.au for more information.





PEOPLE WHO SHAPED SMA

PETER DURAS

Peter Duras was always destined for a career in sports medicine. The son of a distinguished sports medicine pioneer, he grew up, in his own words “with SMA in my DNA”.

His father Dr Fritz Duras had an illustrious career in sports medicine and physical education. He was Director of the Sports Medicine Institute at Freiburg University in Germany from 1929 – 1933. Though a highly respected lecturer, researcher, clinician and administrator he was removed from that post by virtue of his Jewish ancestry. In 1937 he was recruited by Melbourne University to establish Australia’s first tertiary course in Physical Education. He was one of a small group of medicos who established the Australian Sports Medicine Association (ASMA) in 1955. Several of those early meetings were held in the Duras home in Canterbury. Despite a tumultuous

first decade, ASMA morphed into the ASMF in 1963 and later into the SMA.

As a youngster Peter shared his father’s love of sport, trailed along with him while he covered athletic events at Olympic Park, and sat with him to witness some of the unforgettable performances at the 1956 Olympic Games. It’s hardly surprising that he was drawn towards sports medicine when he graduated in physiotherapy some years later.

Peter joined SMA in 1971 while working at Toronto General Hospital in Canada. After opening a private practice in the sports orientated Melbourne suburb of Essendon, he began his lengthy career as a valued member of SMA. Over more than two-decades on the Victorian Branch Council he served in a number of roles including treasurer, newsletter editor and member of a host of sub-

committees. These included ethics, education, coverage, course establishment and conference groups. He also represented SMA on several State Government health and education committees. More recently he served on SMA’s National Board and the Fellows National Council.

He watched, and was part of the evolution of SMA. As he puts it, “initially all activities, including training, coverage and administration were carried out on a voluntary basis by skilled, highly dedicated but unpaid health professionals. The addition of professional administrators and the proliferation of formal education allowed SMA and its associated groups to grow into the highly advanced network that is Australian sports medicine today”.

Peter’s biggest contribution to that change fell just outside SMA. In the mid



1970's it became clear that neither SMA nor the Australian Physiotherapy Association (APA) at the time could service all the needs of a rapidly growing group of physiotherapists wanting to expand their knowledge and opportunities in the sports medicine area. In response he chaired the newly formed Sports Physiotherapy Group (SPG) in Victoria and in 1982 was Foundation Chairman of the National SPG. The need was there and membership rapidly grew to 1800. His belief has always been that cooperation, communication and joint membership of SMA and APASPG have added great strength to both organisations.

Outside of SMA Peter has had an active career in physiotherapy. With his wife Sue he operated a busy private practice for over 30 years. He spent five years as physiotherapist at Western Bulldogs

A MOMENT WITH PETER



What was your career highlight?

My first overseas trip as an athletics team physio in 1981. I worked hard, but it was incredibly satisfying to see every athlete compete well at the main international event despite a number of injuries on tour.

I've also had the opportunity to meet and sometimes work with many of the quiet achievers and some of the colourful characters that have made such a contribution to sports medicine. It's quite amazing how many larger than life personalities emerge in this field. I would start with Howard Toyne, Izzy Zimmerman and Fred Better and then the list would go on and on. Great people.

What is your advice to those starting out in their career?

Sports medicine is very rewarding, but it's tough right now. It's crowded, so you'll need to be smart, dedicated, confident and look for opportunities. Work with as many sports as you can and then find a niche. Volunteer at the 2018 Commonwealth Games on the Gold Coast; it will be a life changing experience. Become active in SMA and your own professional association. Attend their courses and National Conferences. They will be a rich source of knowledge, inspiration and networks. Work with a mentor. Participate in a sport or active recreation in order to stay fit and engage with your sporting clientele. Finally, aim to balance pleasure and achievement.

Do you have any career regrets?

See my last piece of advice. I never got the work – life – family balance right.

What is your next challenge?

At 75, survival and maintaining synapses between the few remaining neurons.

Football Club and three years at Essendon Football Club. He toured with a host of Athletics Australia and Commonwealth Games teams between 1981 and 2002. After retiring from his private practice, he worked for a number of years as a volunteer physiotherapist at the Asylum Seekers Resource Centre, and later worked as a project manager on the demolition and refit of their massive new headquarters. He believes he's the only sports physio with a current fork lift licence. He is also a member of the Australian Society of Sports Historians and a volunteer guide at the National Sports Museum.

COUNCIL OF DISCIPLINE NEWS AND EVENTS

Sports Dietitians Australia (SDA)

An Accredited Sports Dietitian (AccSD) can help you & your clients:

- Eat better, without dieting
- Stay fit, healthy and strong
- Avoid injuries and help promote faster recovery
- Get educated on safe legal effective use of supplements

Find your nearest AccSD here: www.sportsdietitians.com.au

Wishing all our SMA friends a safe holiday season.



Australian Physiotherapy Australia (APA)

The 2015 APA Connect Conference was run on the Gold Coast in October. Key sports topics included the hip and groin, injury prevention, exercise strength and condition and the latest tendinopathy update.

Sports Physiotherapy Australia (SPA)

SPA has signed along with Sports Medicine Australia as a stakeholder in the Youth Sports Injury Prevention Program.



2016 CALENDAR

JANUARY 2016

12

The popular joint SMA and SPA lecture evenings will continue in 2016. The next lecture will be held on Tuesday the 12th of January. There are also three other planned joint events between SMA and SPA in 2016.

Watch this space for future dates.

FEBRUARY 2016

12-16

**Australasian College of Sports Physicians (ACSP)
Annual Scientific Conference – Treating the Elite Athlete**

Surfers Paradise, Marriott Hotel, Gold Coast

- Registrar Conference: 12
- ACSP Scientific Conference: 12 – 16
- MOST Course: 15 – 16
- MSK USS Course: 15 – 16

Please refer to the ACSP website for registration www.acsp.org.au
or contact nationaloffice@acsp.org.au



Publisher

Sports Medicine Australia
PO Box 78 Mitchell ACT 2911
sma.org.au
ISSN No. 1032-5662
PP No. 226480/00028