

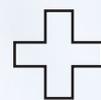
# SPORT

# HEALTH

VOLUME 33 ISSUE 2 2015

## A DIGITAL **FUTURE** ISSUE

Using smartphone ECGs  
Publication in the digital era  
New orthotic technologies



- Useful apps for sports clubs
- Making your practice paperless
- Lower limb tendinopathies and technology
- Sport and exercise medicine in Switzerland
- Working in Olympic sports medicine



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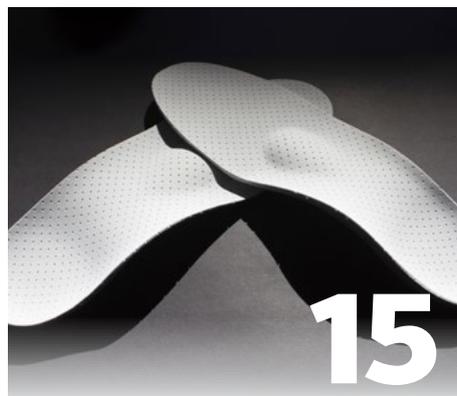
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FROM THE  
**CHAIRMAN**

# DEATH, TAXES AND TECHNOLOGY



**Peter Nathan**  
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SMA CHAIRMAN, PETER NATHAN DISCUSSES HOW TECHNOLOGY IS IMPORTANT FOR CONTRIBUTING TO THE ADVANCEMENT OF SPORTS MEDICINE.

I'm sure most people know the saying about the certainty of death and taxes. As time moves on the certainty of technology playing a more significant role in all aspects of life becomes more apparent. Similarly the certainty of technology playing a major role in sport and sports medicine becomes ever more obvious.

This issue of *Sport Health* features some of the advancements in technology that are perhaps less apparent to many of our readers and provides an opportunity to shine a light on some of the exciting initiatives which continue to advance the profession of sports medicine.

As a practitioner and Chairman of SMA I'm in the privileged position of being exposed to a wide range of technological advancements presented via our conference and numerous journals, including the *Journal of Science and Medicine in Sport*. The sort of technology that randomly comes to mind includes wearable technology that has the potential to minimise the risk of injury or detect when an injury may have occurred. We've also seen enormous advancement in load management technology and the measurement of athlete output as a

means of sustaining performance and predicting and preventing injury.

At a practitioner level we are seeing easier access to an enormous range of analytical tools and rehabilitation modalities enabling our patients and athletes to return to play far more quickly and with greater confidence to both the practitioner and the athlete.

However, sports medicine is still a relatively conservative industry from a technology perspective. The Australian Sports Technology Network (ASTN) is an industry-led national collaborative network with the role of providing leadership in the development and promotion of Australian sports technologies. The ASTN ([astn.com.au](http://astn.com.au)) has identified medical, health and biotechnology as a priority area for development, yet attracting interest and ideas in the segment has been a challenge.

Hopefully this issue of *Sport Health* will assist in inspiring ideas and form just part of SMA's role in supporting technology advancement in the field and contribute to the advancement of sports medicine and related technologies.



*As time moves on the certainty of technology playing a more significant role in all aspects of life becomes more apparent. Similarly the certainty of technology playing a major role in sport and sports medicine becomes ever more obvious.*

# FAREWELL AND THANKS

FROM THE  
**CEO**

SMA CEO, NELLO MARINO SAYS FAREWELL AND THANK YOU AFTER 15 YEARS WITH SPORTS MEDICINE AUSTRALIA.

This is the last 'From the CEO' article I write to SMA Members and the broader SMA community. Yes, after 15 years at SMA and the past five or so as CEO, I've decided it's time for some refreshment for both myself, and more importantly for SMA's leadership.

It's truly been an honour to have been a part of SMA, an organisation which I will continue to hold with great fondness, wonderful memories and lasting friendships.

That's not to suggest the time at SMA is totally viewed with rose coloured glasses, however there is no question that the positives far outweigh the negatives during my time as an SMA employee. It's been far more than a job!

Naturally I hope my time at SMA has left SMA in a better position than when I took on the role of CEO. I'll leave that for others to judge. I do however leave with the knowledge that a number of the complex decisions made over the past five years or so will enable SMA to better face the challenges of the future.

Most notably, the decision on OneSMA. I vividly recall a discussion with a very prominent member which took place only a few days before the historic ballot that

saw the membership unanimously vote in favour to merge the organisation into a more streamlined, unitary structure. The discussion resembled a consolation discussion with the member suggesting that the effort we'd put in should be applauded and we should be proud of what had been achieved by simply getting the issue of OneSMA on the agenda. Sadly at the time his belief was that the vote for unification would be defeated on simple statistics and the tendency to drift to the norm. Naturally we were delighted that the statistics were proved wrong, on this occasion at least.

It would be remiss of me not to thank each and every one of the many, many members that have been so kind, supportive and have contributed so much of their time for the advancement of health during my time at SMA. I'd particularly like to thank the many National Board Members, my Executive Officer colleagues and my SMA National office staff for their ongoing support and loyalty.

I look forward to continuing to support SMA and its great work in the prevention of lifestyle diseases through sports medicine, sports science and injury prevention in a different guise in the future.



**Nello Marino**  
nello.marino@sma.org.au



*Naturally I hope my time at SMA has left SMA in a better position than when I took on the role of CEO. I'll leave that for others to judge. I do however leave with the knowledge that a number of the complex decisions made over the past five years or so will enable SMA to better face the challenges of the future.*

# 5 MINUTES WITH ANTHONY MERRILEES

SPORTS MEDICINE AUSTRALIA  
CHIEF EXECUTIVE OFFICER.



***Tell me about your educational and working background.***

I grew up in Canberra and was educated in Arts and Law at the Australian National University. I used to work part-time jobs to put myself through university, which were mostly builders labouring, playing in bands, tour management and event production. I did my professional legal training at the University of Technology Sydney and then worked for 10 years in government and private sector legal practice. After 10 years in law I realised that I had a real interest in business and decided it was time for a change. So over the last 15 years I've specialised in professional consulting and as a result I've been able to work with a lot of businesses across a very large range of industry sectors. I feel that the experience and knowledge that I've gained from working with these businesses will transfer well to SMA.

***What has been the highlight of your career?***

Running out onto Lancaster Park in Christchurch to play the junior All-Blacks wearing an Australian junior rugby jumper. A very proud moment even though we lost narrowly that day.

***What attracted you to the role at Sports Medicine Australia?***

On a personal level the opportunity to lead and shape an important professional member association, along with the reputation of SMA and its capacity to have a positive impact and influence on safe participation in sport and recreation at all levels.

***What are you looking forward to most in this new role?***

Continuing to build and position the organisation as a multidisciplinary member organisation that is a global leader in sports medicine, the advancement of injury prevention and safe participation in sport, recreation and physical activity.

***What do you see as your main challenges?***

Shaping SMA into a truly national member organisation, balancing and delivering value to an organisation that has a very diverse member base and ensuring the long term sustainability of SMA.

***What are your immediate plans? Long term plans?***

Immediate plans are to conduct a full organisational review and develop a long term strategic plan for SMA.

***What other CEOs do you admire/look up to?***

David Thodey for the change in organisational culture he brought to Telstra. Andrew Liveris for his vision and ability to see and understand the big picture for his organisation. Todd Sampson for his innovative thinking and approach.

***What are you passionate about?***

Making a difference and having a positive impact. The positive impact that sport brings to individuals and society as a whole.

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

Never tell a lie to a client, never tell a lie to the court and never do something that you're not capable or competent of doing.

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

Nelson Mandela – visionary inspiring leader.

Michael Phelps – greatest swimmer of all time.

Muhammed Ali – the greatest full stop.

Jennifer Hawkins – second most beautiful woman in the world (yes I am married).

**FAVOURITES**

**Travel destination:** New York.

**Sport to play/watch:** All.

**Cuisine:** Italian.

**Movie:** American Beauty.

**TV program:** Dancing with the Stars.

**Song:** Back in Black by AC/DC.

**Book:** The Jack Reacher series.

**Gadget:** Sony Smartphone.



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# PUBLICATION DIGITAL ERA

IN THE

DR J HIGHLIGHTS THE DIFFICULTY OF GETTING PUBLISHED IN 'HIGH END' SCIENTIFIC PUBLICATIONS AND HOW NOT MUCH HAS CHANGED IN 10 YEARS. THIS WILL BE THE FINAL DR J ARTICLE IN THE CURRENT UNBROKEN SERIES OF ARTICLES SINCE 1993. *SPORT HEALTH* WOULD LIKE TO THANK DR J FOR THE CONTRIBUTION OVER THIS TIME.

# PUBLICATION DIGITAL ERA

IN THE

I first wrote an article on the topic of scientific publications in the sports medicine field in *Sport Health* about 10 years ago and one of the major arguments I made still applies today: that the supply and demand curve for papers in the so-called top-end journals in the sports medicine field was tilted in favour of the journal. That is, there were many more authors submitting papers to the high end journals than there were publication spots available, so the rejection rate for papers was extremely high. Writing in *Sport Health*, I encouraged more authors to consider submitting their articles which might be high on interest but lower on scientific

rigour directly to a publication like *Sport Health*, rather than, say, going via the route of getting a rejection letter from the *British Journal of Sports Medicine (BJSM)*. In 2015, this is as good a piece of advice as it was in 2005.

What has changed and stayed the same in the previous ten years with respect to scientific publication? Well, getting published in the BJSM has become even harder, with a current acceptance rate of less than 10 per cent (or if you are a pessimist, a rejection rate of over 90 per cent). You may have noticed that tickets to major sporting events like the AFL Grand Final have become even harder to

pick up in the last 10 years as well; a hotel room with a view of the Harbour Bridge on New Year's Eve is prohibitive; the price of real estate in inner Sydney and Melbourne has gone through the roof; and private school fees and golf club memberships at the most exclusive institutions keep going up as well. There are supply and demand curves at work everywhere. They get multiplied by the 'Groucho Marx' effect of people 'only wanting to be members of clubs they can't get into', so that fairly trendy items quickly become white-hot must-haves.

So why do people think that scientific publication supply and demand curves

will be any different? Well, mainly because on initial glance it seems bizarre that a scientific or medical journal, which runs at a profit, does not pay their authors anything for the substantial amount of work they do preparing articles. Given that there are enough authors falling over themselves to provide articles for free to the major journals, they aren't about to start paying authors any time soon. The dynamics for reviewing in major journals may also seem distorted but are just as well established. Reviewers get paid nothing as well and don't even get the credit of seeing their name in print as having assisted with a specific article. It might seem crazy that anyone would

ever offer to be a reviewer for a scientific journal. However, reviewers get to keep ahead of the pack with respect to the latest research in their field, and the act of reviewing probably gets factored-in consciously or subconsciously in supposedly independent decisions on author publications. If you are a valuable reviewer for a particular journal, it might help you get a 'touch and go' paper of your own that is close to acceptance 'over the line' in the same journal. For a clinician-part time researcher, getting published in a high-quality journal is a good ego boost and stamp of approval that you are an expert in an area, which makes it far less important than for full-time career researchers, for whom it is oxygen. Anyone who writes a half-decent paper that is credible and appears scientifically sound can get published, because the journal has an incentive (financial) to accept as many papers as possible rather than a (competitive space) incentive to reject as many as possible.

The most significant change (for the better) of the past decade has been the emergence of Open Access scientific publications, in which the authors themselves usually pay the journal a fee to have their article published. Many of these are 'online only' to further keep publication costs down and keep a journal that is middling (i.e. not highly sought after for subscriptions) from losing money. Yet again, on first glance many people would be incredulous at the idea of an author having to pay to have their work published. Once you understand the dynamics of medical publications then it makes perfect sense. What the Open Access journals are selling you, for a fee, is a far more respectable acceptance rate than the incredibly low ones at the traditional journals. Anyone who writes a half-decent paper that is credible and appears scientifically sound can get published, because that is only going to make extra income for the journal. Now, say you are a clinician-researcher in whatever field. I won't name your profession but for mathematical ease, just say in your line of work you make \$100 per hour. How many hours of 'work saved' is required, economically, to justify a \$1,000 Open Access fee? And then, how many hours of extra work is required to get published in the major traditional journals compared to Open Access (including response to finicky compared to relaxed reviewers and editors)? I'll give you a clue on this second question: answer = way, way more than 10 hours. So Open Access makes a lot of economic sense for a busy clinician-researcher



“

*A researcher who regularly cracks publications in top-end journals is in line for tenure renewal and even academic promotion and pay rises, compared to one who is struggling to publish who is in line to be cut from university staff whenever funding dries up (which can be often).*

# PUBLICATION IN THE DIGITAL ERA



*The citation index is to scientific journals what click-bait is to daily newspapers.*

wanting to get into print without having to take half the working week off in order to do so. It also has a good place for the full-time researchers. For a mid-tier grant, a research team would be hoping to get one publication from the study into a high-end journal once the study is completed. They may also be able to generate another two to four papers out of the same study that won't cut it at the top-end like their key paper will, but might be perfectly acceptable for Open Access. Getting these lesser papers published in this fashion will be factored into the original grant application by a team with foresight. If you can finish off a mid-tier grant project with one high-end paper and a handful of Open Access ones, your track record looks excellent for the funding bodies when you next apply for a similar grant.

Scientific publication is undergoing a similar transformation to Moore's law, which states that the number of transistors in a dense integrated circuit doubles every two years. Scientific publications aren't expanding at quite the rate, but it is certainly an exponential rate rather than a linear one, and a curve whose slope has sharply risen upwards since Open Access became popular. It's

not as if Open Access is the last word in the publication revolution of the last decade. You could categorise the publication options (now) for a scientific author as being: (1) Iconic peer-review traditional journal (e.g. Nature, BMJ, Lancet, NEJM, JAMA); (2) Top-end of specialist field peer-review journal (e.g. BJSM, AJSM); (3) Mid-tier peer-review traditional journal; (4) Reputable Open Access peer-review journal (e.g. *Open Access Journal of Sports Medicine*); (5) Borderline/dodgy Open Access peer-review journal; (6) Non-peer reviewed scientific publication (e.g. *Sport Health*); (7) Non-indexed but reputable publication (e.g. BJSM Blog, Podcast); (8) Non-reputed publication (e.g. personal blog, Facebook post). However, even categorising publications as such doesn't rank them by quality, as crap can get into iconic journals and some personal blogs can be outstanding. Some potentially Nobel-prize winning research (e.g. the Helicobacter discovery of Marshall and Warren) can fail to (originally) be granted a podium presentation at a local conference. Even the Nobel-prize panel can get it wrong, as they did in 1949 by granting a Nobel Prize for Medicine for the discovery of frontal lobotomy in psychiatry.

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\*Dr. D. Graff. Weber State University.

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There is far more upside than downside to the recent publication revolution, but the major downside isn't too difficult to pinpoint. In an era of expanding publications, there is more and more desire to be perceived as putting out 'quality' publications (whether you are an author or journal) and the current surrogate for quality is the 'citation index'. All publishing evils seem to be connected to the ubiquitous citation indices, in that journals (and therefore many authors and funding bodies) are obsessed with the output of papers that will be heavily cited by other papers, as opposed to actual quality of research.

The citation index is to scientific journals what click-bait is to daily newspapers. A story about an 11-fingered man getting charged with arson might be complete and utter crap, but provides a perfect click-bait headline which massages the publication's metrics in the desired direction. At the innocuous end of scientific publications, it is why so many authors are writing and publishing systematic reviews and consensus statements: because these don't have to actually say anything of much interest to still be a good chance of being heavily cited by other papers. At the more

insidious end, citation index obsession creates an incentive to 'fudge' data and analyses in a direction that will result in more 'interesting' conclusions than to stay scientifically pure (and with a higher intrinsic quality). A recent article from Nature ('Top 100 papers') explores the discrepancy between the most cited papers of all time and the most influential or world-changing. Although Watson and Crick's paper in Nature detailing the structure of DNA (possibly the most famous biomedical science paper of all time) has been cited just over 5,000 times, this doesn't get in anywhere near the Top 100. But Wakefield's Lancet retracted 1998 paper which allegedly linked the MMR vaccine with autism (now one of the most notorious biomedical papers of all time) is cited over 2,000 times, far many more than most ethical researchers will ever get for a paper in their careers. Just as you can apparently purchase ghost Twitter followers for a fee, you can now apparently pay dodgy companies to write formulaic scientific papers (that they publish somewhere) to cite your own research and thereby improve your personal citation indices. The goal of the next decade should surely be to come up with 'Moneyball'-type metrics that can measure paper quality



# PUBLICATION IN THE DIGITAL ERA



*The 'Open Access' revolution must surely be succeeded by the 'Open Review' revolution, in that there is less and less reason to keep the reviews of accepted papers confidential.*

aside from the citation index and redress the incentive to 'game' the system rather than strive for scientific purity and original thought.

The 'Open Access' revolution must surely be succeeded by the 'Open Review' revolution, in that there is less and less reason to keep the reviews of accepted papers confidential. The reviews of rejected papers may take longer to ever appear in circulation, but it is not beyond the realm of possibility that some ballsy journal editor somewhere might start publishing an Online 'Sliding Doors' Ghost journal of rejected papers from their main journal aka *'The Rejected Journal of Sports Medicine'* along with reasons why papers were rejected. Post-publication review is already starting to become commonplace in the form of the published comments section of journals (superseding the official Letters to the Editor publications of the past).

Although this edition of *Sport Health* is going to appear as a bit of a Dr J fest, it is a chance for me to go 'out with a bang' as a regular columnist for every issue of the

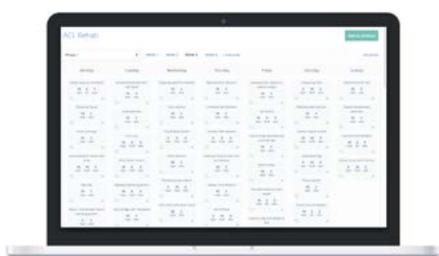
publication. I am personally writing and publishing as much as ever and will continue to do so, including, occasionally, in *Sport Health*. But it is spreading me too thin to be able to rely on creating sports medicine outrage every three months, and spreading myself too widely to force the readership to continue to hear from me in every issue, 22 years after I first penned a regular column. So don't just sit there and read – write something interesting and maybe have others read about it in the upcoming issues.

This will be the final Dr J column of the current unbroken series of articles since 1993, all of which represent only the personal views of the author at the time, and not necessarily SMA, the ACSP, anyone else at the time or the author at any other time!

## ABOUT THE AUTHOR

**Dr J** is a sports physician located in Sydney, NSW. The opinions expressed are his own personal opinions.

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NEW  
**ORTHOTIC  
TECHNOLOGIES**  
AND THEIR CHALLENGES

PODIATRIST DAN EVERSON, QUESTIONS WHETHER RECENT ADVANCES IN SPORTS ORTHOTICS MANUFACTURING HAVE RESULTED IN IMPROVEMENTS AMONG PODIATRY CLIENTS.

**T**here is no doubt the last twenty years have seen great improvements to the materials and methods available for sports orthotics manufacturing. I'd like to examine whether these advances have resulted in a measurable improvement for podiatry clients when it comes to their ability to move with greater freedom and less pain.

While new technologies certainly help us with more accurate assessment and diagnosis, we owe it to our clients to remain primarily focused on assessing whether particular technologies have been proven to help practitioners correct flaws in gait and facilitate more efficient movement.

# NEW ORTHOTIC TECHNOLOGIES

AND THEIR CHALLENGES

To set the scene, the last two decades have seen computer integrated manufacturing of orthotics become far more common alongside the advances in programming and processor power, to the point where today it largely replaces handmade products.

The latest technological development for the industry is the advent of 3D printing. It is still early days for this emerging process, and I believe there is currently little evidence we can point to in order to justify its high cost. We need to be careful of endorsing processes with no real benefit to the patient besides a 'placebo effect' or being seen as a fashionable product.



In order to be of any real benefit to clients, new technology must be used with insight into how the orthotic will function better. There has always been some limitation on how effective an orthotic is in actual practice, sometimes because of the material used but more often due to the design employed.

It is fair to say that the impact of new technologies on orthotic design is the primary issue in evaluating their relevance to sports podiatry and other allied health practices.

On the positive side, new technologies have certainly allowed orthotic manufacturers to make products more rapidly and ensure that whatever the original design is, it can be accurately and

reliably reproduced. However, I fear in the middle of this focus on mass production, a thorough understanding of how orthotics work has been lost. This highlights a need for the industry to move towards more evidenced-based orthotic design application.

Certainly with the available technology one can have far greater control over design and apply this control both individually and with consistency. But the question becomes what lever to pull and when?

Our understanding of how orthotics might work has certainly evolved. The traditional 'Root approach', one based on counterintuitive functional blocking with

“

*Our understanding of how orthotics might work has certainly evolved.*



# NEW ORTHOTIC TECHNOLOGIES AND THEIR CHALLENGES



*...new technologies have certainly allowed orthotic manufacturers to make products more rapidly and ensure that whatever the original design is, it can be accurately and reliably reproduced. However, I fear in the middle of this focus on mass production, a thorough understanding of how orthotics work has been lost.*

a fascination for controlling the foot in the frontal plane has been clearly debunked. However, this approach is still the cornerstone of podiatry courses around the country and hence remains the prevailing norm for the industry.

So no matter what technology is used, the question remains – has the functional standard of prescription orthotics actually improved?

Surely, with advances in research and with the ability to create an accurate, reliable design we should be able to move towards an evidence-based system for prescribing orthotics. The goal of orthotic design should be to help facilitate optimal foot function and reduce soft tissue stress. A successful design should provide a device that can confidently treat functional imbalance and optimise functional performance. It is possible even now for a prescribing practitioner to conduct a series of tests that calibrate core orthotic design parameters and go on to create an optimised functionally specific orthotic product.

The future is certainly exciting. At its best, the use of evidence-based orthotics can result in significant improvements to a patient's quality of life and new technologies backed by clinical research have a large part to play. However, as technology continues to evolve we have a collective responsibility to ensure we fully understand the theory and design application which underpins it to do justice to the patients we serve.

## ABOUT THE AUTHOR

**Dan Everson** is a respected podiatrist, entrepreneur, author and founder of 'kinetic theory', a revolutionary approach to orthotic design. He is also the founder of Dan Everson Podiatry, the largest group of podiatry practices across the Sunshine Coast.



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# LOW TENDIN

SPORTS PHYSICIAN, DR JOHN ORCHARD DISCUSSES HOW MODERN TECHNOLOGY IS NOT ABOUT PROVIDING A MAGIC BULLET FOR TENDINOPATHY MANAGEMENT BUT ABOUT USING IT TO MAKE TRIED-AND-TESTED LOAD MANAGEMENT REGIMES EASIER TO FOLLOW.

The title of this article is a little bit deceptive and deliberately so. Normally if a patient was to read about new technology as part of treatment, they might be hoping to hear of a new machine, drug, device, surgery or some other magic bullet that can miraculously cure their painful tendon symptoms (and hopefully overnight!) The search for these magic bullets will go on, as they are too attractive a concept to stop looking for. But the history of magic bullets for tendinopathy is that most proposed ones turn out to be mirages. If you have a tender, painful tendon there is good news and bad news: the good news is that it won't be a cancerous lesion, as tissue turnover in tendons is so slow that tendons almost never become malignant. The bad news is that tissue turnover in tendons is so slow that recovery will be slow and you therefore need plenty of patience as well as clever tactics. Imaging in tendinopathy (more 'new technology') may offer a degree of assistance with management, but in many cases can be counter-productive, illustrating non-specific pathology but re-affirming the intuitive but false belief of the patient that tendon pain can't be cured without some structural intervention. So this article is not about technology providing a magic bullet. It is about using modern

# THE USE OF MODERN TECHNOLOGY TO TREAT LOWER LIMB TENDINOPATHIES

technology to make tried-and-tested load management regimes easier to follow.

What we know about tendinopathy is that in the vast majority of (non-rupture) cases, the tendon is completely intact and able to connect A (the muscle group) to B (the bony attachment). The tendon just struggles to do its job without sending-off painful signals. The vast majority of tendinopathies are curable and long-term follow-up studies reinforce this: control or placebo groups in tendinopathy studies generally get better if you give them long enough time. However, some patients predictably do better than others and some predictably do worse than others. Those patients with ongoing overload that cannot, will not, or choose not to extract themselves from the overload, generally take longer to get better. This group typically includes elite athletes and exercise addicts. At the opposite end of the spectrum, those patients who have developed a fear of pain and are too apprehensive to work through any painful load, also do poorly and take a lot longer to get better. Workers compensation patients are renowned for getting poor outcomes (i.e. much slower recovery) in tendinopathy cases and this is because within the workers compensation pool of patients, there are many in the ongoing-

overload category and also many in the pain-inhibition category. Ironically the elderly (i.e. retired) tendinopathy patients can do surprisingly well as they are often free of obligations to load too much or too little in a given day.

The number one aim for getting the tendon to repair itself is to find the load that the tendon can just cope with at the current time and repeatedly deliver this load on a regular basis, very slowly increasing load amount as the tendon starts to strengthen (or cope without generating pain signals) again. There is plenty of research to support this paradigm, showing that both high and low loads are bad for tendons, but that moderate load is very good for them, also known as the 'Goldilocks principle' (not too hot, not too cold but just right).

A very important part of the education of the tendinopathy patient is to provide examples and anecdotes of other cases where mistakes in rehab were made leading to pain relapse, compared to other cases where successful resolution



# THE USE OF MODERN TECHNOLOGY TO TREAT LOWER LIMB TENDINOPATHIES



was achieved with moderate upgrading. Honing in on the individual case, I believe the most important function of, say, a physiotherapist, who might be seeing a tendinopathy patient once or twice a week, is to provide sage advice on whether to back off on current loading levels, stay steady or slightly upgrade. Only the reckless would expect to get a cure with open slather loading or a rapid upgrade, but it is becoming apparent that it is just as bad to put a tendinopathy patient on crutches or in a boot and downgrade to zero load. The physiotherapist in private practice might be lucky to provide advice to the patient twice a week, whereas the elite team therapist might be able to check on the athlete every day. But wouldn't the Holy Grail be a method for checking and adjusting loading levels all day and every day? We may be getting close with the modern upgrade on the humble pedometer, the Fitness Tracker. The basic functionality of a Fitness Tracker is that it records the number of steps taken per day and stores the results in a database, so that trends can be recognised over a long period. When assessing a rehab program, Fitness Tracker step count data is gold for managing a lower limb tendinopathy through the earliest stages of activity upgrading. The more that Fitness Trackers become a standard accessory like a watch, the more we'll be able to do injury autopsies to show a patient why they developed their tendinopathy in the first place, i.e. the normally sedentary person who was doing 3,000 steps a day in their Melbourne office job but then on holiday to Paris and Rome averaged 20,000 steps a day. The normally active person who got admitted to hospital ill and then

rapidly jumped back to the 15,000 steps a day that they used to be able to handle without a problem, but hadn't done for six weeks.

At this stage I'd like to provide some free advice to the companies in the Fitness Tracker market, dominated by wearable devices (Fitbit, Jawbone, Garmin, Mi etc) and smartphone health Apps (Pacer, Moves, Map My Walk, Runtastic, Nike Running, Noom Walk, Health Mate etc). The marketing 'sell' for the wearable devices in particular is slanted totally towards one end of the spectrum: more is better. Why should you purchase a wearable Fitness Tracker? So you can 'do' 10,000 steps a day. No wait; make that four million steps per year. But why stop there, how about 20,000 steps a day? How about a gazillion steps a day? The software for the devices come preloaded with virtual gold medals, reward notifications and celebratory music as long as you max out as much as possible. I've had plenty of tendinopathy patients whom I've asked "how many steps per day are you currently doing?" and, despite the fact that they own a wearable Fitness Tracker have told me "I had to stop counting steps because I got injured". That is, when your device marks you down as a failure for 100 days in a row, why would you use something that is auto-set to depress you? Or in the case of a device that is telling you to do 10,000 steps per day when according to your rehab stage you should be doing 4,000 steps per day, is auto-set to stuff up your rehab? The various competitors are currently angling to set themselves apart based on battery life, price, look or funky extra features, but they all seem to have their accelerator foot metaphorically planted to the floor, so to speak. There is a massive void in the market for wearable devices to assist with intelligent rehab. For example an App that maps pain levels with activity levels and then advises you (on a daily basis) when to upgrade and when to downgrade load (all with the aim of a gradual upgrade slope over, say, a period of 3-6 months). I've even got a suggested name for such an App 'Find my step count tolerance', which is only about two words too long to be successful! The good news, though, for the lower limb tendinopathy patient, is that your current step count tolerance can be gradually raised (as long as you religiously try to stick to it as closely as possible). Tendinopathy is a psychologically difficult condition to live with, as it seems so weird and hard to simplify, but it is far more preferable to a major alternative. If you have, say, severe osteoarthritis of a major lower limb joint, you might be stuck with



*A Fitness Tracker that can calculate the degree of difficulty for each lower limb tendon for each of your steps is surely in the pipeline rather than a pipedream.*

a hard ceiling of 4,000 steps per day, beyond which you get severe unrelenting pain. Yes, you might be apparently stuck in the same ditch if you have a tendinopathy, but it is a rare tendinopathy patient who can't lift the ceiling up with a better loading strategy in the medium term.

Now what if you are a lower limb tendinopathy patient but you aren't interested in walking 10,000 steps per day. Say you are an elite athlete and you need to run for a living, making walking seem like a waste of time. If you have had your tendinopathy for 'years' without any resolution, dare I say that having a cavalier attitude towards walking may be your problem? You need to walk before you can run, and if, say, 8,000 steps per day is enough to (currently) flare up your tendinopathy, then pretty much any running would be also flaring it up. But by all means, keep flaring it up if you want. That is, if the Olympics are coming up next month or you have six weeks before your team is playing in the Grand Final then it makes perfect sense to have a 'flare now, cure later' approach to tendinopathy. However, if you think you are in a long-term rehab phase and are actually attempting to cure the problem, how about ticking off 10,000 steps per day without flaring up your pain before you think about running? And of course, only think about 10,000 steps per day after you've conquered 9,000 steps per day, which comes a little bit later than 8,000 steps etc.

It makes perfect biomechanical sense that the most difficult stage in gradual progression of a lower limb tendinopathy is the upgrade from walking to running. Even the slowest jog is many multiples of body weight in ground reaction forces on the stance leg compared to the bipedal option of walking. So how do you successfully negotiate the leap? For years, clever therapists have tried a range of options that represent loading in the twilight zone between walking and running. The mini-tramp; the stair-climber machine; water running with a vest; progression from really difficult walking, including hills and steps, to the easiest running for a short time period. Yet it is still a very difficult-to-negotiate upgrade. Enter another new technology, the reduced gravity treadmill. The Alter-G treadmills have been used in Australia for at least a decade and are 'part of the furniture' for a professional football team. They are particularly good post-operatively, for the player with osteoarthritis trying to keep up fitness, and also for the lower-limb tendinopathy

case. They (Alter-G treadmills) are just starting to pop-up in private physio practices around Australia and make a lot of sense in getting a tendinopathy patient back into running. However at approximately a \$60K entry price, they aren't about to start becoming a fixture in every physio practice in the immediate future. This could change suddenly at some stage though, depending on the status of the design patent. Like many other technologies, as soon as Asian companies can legally manufacture a reduced gravity treadmill in competition with Alter-G, then suddenly the price could drop fivefold and make them a standard fixture in gyms and physio practices. Then they might become an indispensable part of lower-limb tendinopathy rehab, rather than a specialist application for certain practices and professional athletes.

What of the technology future in this area? It is very, very exciting. Smarter apps that can intelligently work out where your rehab is going wrong and fix the loading mistakes are just the start of it. Fitness Trackers can already differentiate whether steps were done walking or running. Smarter versions will soon, I imagine, be able to work out how many steps were done uphill, downhill or on the flat. They may even get to the stage of being able to differentiate walking on a hard surface versus sand or grass. We know, for example, that for Achilles tendinopathy, sand walking and uphill are higher loading than harder surfaces and downhill, but for patella tendinopathy (jumper's knee) the reverse applies.

A Fitness Tracker that can calculate the degree of difficulty for each lower limb tendon for each of your steps is surely in the pipeline rather than a pipedream. This would fine tune rehab even further. And eventually this technology will have to be able to be applicable to the upper limb. A wearable chip in a third finger ring might be able to fine-tune the loading for a tennis elbow patient. The same could apply to a band around the upper arm in rotator cuff conditions or a thumb ring for the De Quervain's tendinopathy patient.

Rehab of the future might be so good that we can give magic bullets the bullet and expect to be able to get excellent results for the vast majority of tendinopathy cases. That's not to say that we can't already do it now, but more to indicate that we may be further able to reduce the small number of tendinopathy cases that we currently label 'resistant to all forms of rehab'.

#### ABOUT THE AUTHOR

**Dr John Orchard** is a Sports Physician with over 20 years experience. He is an Australian and international expert in muscle and tendon injuries (and their non-surgical management).



# SMA MEMBER NEWS



## JSAMS IMPACT FACTOR

SMA is pleased to announce the *Journal of Science and Medicine in Sport* has had a further increase to its Impact Factor from 3.079 (2013) to 3.194 (2014, just released). This sees JSAMS climb to be ranked 7th out of 81 journals in the Sport Sciences category (our highest position yet). **More.**

## MOUTHGUARD POLICY

Sports Medicine Australia and the Australian Dental Association have recently come together to approve the use of a Mouthguard Policy that all sports clubs can sign up to. The policy outlines how sports clubs can commit to reducing the incidence of dental trauma that can occur from the playing of sport. **More.**



## SMA ONLINE STORE

The SMA online store is now open! Buy all of your sports medicine products in the one place! **Click here to start shopping!**

# WEBINAR NOW AVAILABLE IN MEMBER PORTAL

The recent webinar held by Sports Medicine Australia titled: Harnessing Technology and Exercise Intervention to Optimise Patient Outcomes presented by Trish Wisbey-Roth is now available via the SMA Member Portal. **More.**



## NEW BOOK RELEASE

*The Kinetic Orthotics Method*, written by Dan Everson, is a new modern podiatry textbook educating clinicians and researchers around the world through sharing a revolutionary approach to orthotics design. Readers will be able to leverage the theory and information on the robust testing, prescription process and post-production care methods shared on these pages to create the most effective custom-made orthotics for their clients – helping them move more freely and comfortably for longer.

This user-friendly, interactive textbook walks readers through the theory and practice behind Dan's patent-protected orthotics design process. **More.**



### VALE STEVE EVANS

Sports Medicine Australia offers its condolences to the family and loved ones of SMA member Steve Evans, who passed away recently. Evans was a great contributor to the physiotherapy profession and will have a lasting impact on the sports medicine field.

**More.**

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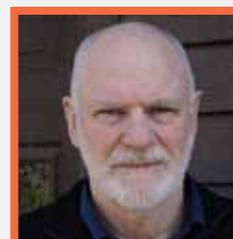
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# SHOULDER

## THE LOAD IN S



THE FOLLOWING IS A REPUBLISHED EDITORIAL WHICH FEATURES IN **THE JOURNAL OF SCIENCE AND MEDICINE IN SPORT** (VOLUME 18, NUMBER 4, JULY 2015) WRITTEN BY EDITOR-IN-CHIEF, GREGORY S. KOLT, PHD.

**T**he shoulder complex is often seen as a challenging area to manage in sports and exercise medicine. The extreme range of movement arising from the glenohumeral joint must be played off against the stability required to prevent injury. The muscles and ligaments of the shoulder joint are in constant interplay to ensure that stability. The combination of passive bony and soft tissue constraints work in concert with the dynamic stability provided by the rotator cuff and scapular muscles. The shoulder is responsible for so much in sport. It provides the mobility to ensure the full aesthetics of upper limb movement and positioning in sports and activities such as gymnastic, ballet, and figure skating, yet must also provide the stability around the upper limb for sports

such as weightlifting and rowing. No wonder it is so complex to manage.

It has been some four years since I focused on the shoulder in an editorial for the *Journal of Science and Medicine in Sport*. Since that time, much more work has been carried out in this area, some of which I would like to highlight. In this issue, we include a couple of interesting papers that have investigated different aspects of the shoulder and its diagnosis and management. Couanis and colleagues from Australia prospectively examined the relationship between subacromial bursa thickness and shoulder pain in endurance swimmers. Using ultrasound investigations they found that subacromial bursa thickness increased with increased swimming training

# TRAINING SPORT



*The shoulder is responsible for so much in sport. It provides the mobility to ensure the full aesthetics of upper limb movement and positioning in sports and activities such as gymnastics, ballet, and figure skating, yet must also provide the stability around the upper limb for sports such as weightlifting and rowing. No wonder it is so complex to manage.*

throughout a season, and that this change in thickness was not usually associated with pain. That said, after an exacerbating event there was a correlation found between pain and subacromial bursa thickness, suggesting a differentiation between painful acute thickening and the chronic, painless, adaptive thickening. In another study of relevance to the complexity of the shoulder, Kim and colleagues from Canada investigated the effects of concentric and eccentric abduction strength training on supraspinatus fibre bundle architecture and strength. Participants underwent an eight-week shoulder abduction training program focused either on concentric or eccentric training. They found that both training modes increased pennation angle, muscle thickness, and peak torque, but with no differences between groups. Eccentric training led to similar strength gains as from concentric training, but it was reported that it might also have the additional advantage of maintaining fibre bundle lengths.

I take this opportunity to highlight a range of other shoulder-related papers we have published in the *Journal of Science and Medicine in Sport* over the past few years. Saccol et al.<sup>1</sup> from Brazil investigated shoulder rotation strength and steadiness in athletes with instability and superior labrum anterior posterior (SLAP) lesions. While those with anterior shoulder instability demonstrated shoulder rotation weakness, those with a SLAP lesion showed higher torque fluctuation during internal rotation. Hughes et al.<sup>2</sup> from Australia investigated methods to isolate infraspinatus contraction from supraspinatus and to analyse the

contraction characteristics of the lower and upper parts of infraspinatus. This work would allow better accuracy of infraspinatus clinical testing. They determined that if differentiation of supraspinatus contraction from supraspinatus is required, external rotation should be performed from a position of shoulder flexion or neutral. In another study by the same authors<sup>3</sup> they clarified the anatomic basis of subacromial compression of the rotator cuff by analysing the compression forces generated and observing the structures impinged in a variety of shoulder positions.

In a study from Brazil, Zanca et al.<sup>4</sup> found that in asymptomatic athletes higher torque fluctuation of shoulder internal rotation may indicate neuromuscular adaptations related to throwing sport training. In a measurement-based study, Edouard et al.<sup>5</sup> from France analysed the reliability of several strength imbalance indices including peak torque ratios, bilateral concentric and eccentric strength ratios, and external and internal rotator peak torque. Finally, in a clinical study, Green et al.<sup>6</sup> from Australia reported that a consistently downwardly rotated scapula associated with young cricketers with shoulder problems may predispose them to ongoing injury through impingement and increased load on the rotator cuff muscles during throwing.

Enjoy reading these papers on the shoulder complex.

## 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](http://jsams.org)

# SPORT AND EXERCISE MEDICINE **IN** **SWITZERLAND**

THIS ARTICLE, WRITTEN BY PETER JENOURE MD, 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.

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In Switzerland, medicine is taught in five medical schools across the country: in Geneva and Lausanne in French; in Bern, Basel and Zurich in German. A medical school in Italian is planned for the near future in Lugano, in close cooperation with one of the other universities for the basic sciences.

The structure of the studies is similar in the five schools, under the coordination of a national body of the Department of Education. Three years constitute bachelor level, with examinations twice a year. The last three years (one of these years is mostly clinical in a hospital) are at master level. In the second year of master level, a master thesis must be presented. Similar to the bachelor level, exams allow students to pass from one year to another. A final state exam closes the study and opens the door to practice (and to post-graduate training). A doctor title is not mandatory, but until now is achieved by most physicians.

A recent enquiry among teachers with a sports medicine interest at all of these medical schools confirmed that, at the time of enquiry, none dispense a structured, controlled training in sports medicine for students. In Geneva, during

the third year, an optional course in sports medicine is proposed to 15 students. A PowerPoint presentation on a topic of the student's own choice acts as the exam. In Lausanne, from autumn 2015, a three hour per week course will start for students in their first master year (=4th study year). In 2014, a 20-hour curriculum was also implemented. In Zurich, sports medicine topics are taught during some specific courses (Orthopaedics and Cardiology for example). Finally, in Basel, 15 medical students can follow a one-week course in sport and exercise medicine. Bern indicated no specific teaching.

After this pre-graduate stage, most physicians apply for a post-graduate training in one of the 45 proposed specialities, including family medicine, a full speciality. These specialities are classical ones such as internal medicine, surgery, orthopaedic, paediatrics and so on. The training of any of these specialities can only take place in accredited hospitals and clinics, and in some of them, the passage in a university clinic is mandatory. The average time to obtain one of these titles is five years, with some requiring up to seven years. An oral and written exam concludes these

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*To obtain this official certification in Sports Medicine, the candidate has to be in possession of a physician's diploma, a specialist title, be member of the Swiss Medical Chamber FMH, have followed the eight courses and passed the oral and written exam. He/she also must attest a six month full time practical stage in a sports medicine institution.*

specialisations. This post-graduate training is managed by a department of the Swiss Medical Chamber (FMH, Foederatio Medicorum Helveticorum) in the name of the National Health Department.

Next to these main professional titles, 32 further qualifications, called complementary formation certificates are at a student's disposal. Sports medicine is one of them, as is manual medicine, or ultrasonography, as examples. The particularity of these qualifications is that it is the scientific society of the specific branch that rules the whole training, according to regulations recognised by the Medical Chamber FMH. Therefore, in our case, it is the Swiss Society of Sports Medicine (SSMS) that organises and runs the eight two to three day courses in the various areas of the discipline.

To obtain this official certification in Sports Medicine, the candidate has to be in possession of a physician's diploma, a specialist title, be member of the Swiss Medical Chamber FMH, have followed the eight courses and passed the oral and written exam. He/she also must attest a six month full time practical stage in a sports medicine institution.

The certificate in Sports Medicine is valid for five years; renewal is achieved by credits one can obtain at recognised congresses and courses.

For doctors coming from abroad with a foreign diploma, recognition possibilities for similar titles obviously exist.

At the end of 2012, 381 sports medicine 'specialists' were recognised in the FMH statistics.

At the present time, there are no efforts to create a full speciality of sports and exercise medicine, as the authorities believe that the needs within a small five million inhabitant country are not sufficient to allow for 100 per cent activity in the field.

#### USEFUL ADDRESSES

- Swiss Society of Sports Medicine SSMS-SGSM: <http://www.sgsm.ch>
- Swiss Medical Chamber FMH: <http://www.fmh.ch>



# THE COUNTDOWN TO

# RIO



THIS IS THE FIRST ARTICLE IN A SERIES TO BE PUBLISHED IN *SPORT HEALTH CHATTING* TO SPORTS MEDICINE PROFESSIONALS IN THE LEAD UP TO THE RIO 2016 OLYMPIC GAMES. THIS ISSUE FOCUSES ON MIRANDA WALLIS, SPORTS MEDICINE COORDINATOR FOR WATER POLO AUSTRALIA'S WOMEN'S PROGRAM.

**M**y inspiration to be a Sports Physiotherapist happened at the early age of 11, when I was playing basketball on a Friday night. One of my teammate's mothers was a physio, and I was fascinated by the way she was able to magically fix the sprains and strains that occurred with some tape and a few reassuring words. I wanted to possess these skills myself which led to a degree in physiotherapy, completed at La Trobe University in 2004. Though we were all warned that Sports Physiotherapy was a highly competitive field, I still maintained big dreams of one day being a physiotherapist for the Australian Olympic team. Watching the Australian women's water polo team win their gold medals in Sydney was particularly

inspiring. Though I knew little about the sport of water polo at the time, I specifically recall thinking that this was the type of thing I would love to end up doing.

Fast-forward to 2015 and here I am – sitting in Szolnok, Hungary, as the team I work with, the Australian women's water polo team, the Stingers, prepare for the 2015 FINA World Championships in Kazan, Russia. Whilst the team's immediate focus is on the upcoming tournament, this is just another step towards the next major event – the Olympic Games in Rio de Janeiro in 2016.

It has been quite a journey to being appointed as the Stingers Olympic team physiotherapist. My career in sports

physiotherapy started at Alphington Sports Medicine Clinic in Melbourne and for the last three and a half years has kept me busy at the Australian Institute of Sport (AIS). Along with obtaining a Masters of Sports Physiotherapy, becoming a titled APA Sports Physiotherapist and commencing my training to become a Specialist Sports Physiotherapist, I have worked across many sports; the highlight so far working with the Australian women's wheelchair basketball team along their journey to win a silver medal at the Paralympic Games in London in 2012. I have worked with high performance gymnastics programs, the AIS men's volleyball and women's basketball programs, as well as the Australian Rowing Team and was lucky enough to have been appointed to the



role of Sports Medicine Coordinator for Water Polo Australia's (WPA) women's program after the London Olympic cycle.

The women's water polo program is decentralised, meaning athletes are training at their state-based institutes rather than living in the one location to train together on a full-time basis. The Stingers get together for domestic and international camps and tours regularly, but the year leading up to an Olympic Games is particularly busy, with the majority of the year spent with the team in camp or on tour.

When the team is together, my role as team physiotherapist is to assess, treat, rehabilitate and case-manage injured athletes; prevent injury where possible by monitoring key clinical measures, training load and athlete wellness and in the instances when no doctor is travelling with the team, manage illness in consultation with sports physicians back in Australia.

There is no time to rest when the camp/tour finishes. All our athletes must complete a daily wellness and training diary. Viewing the data entered by the athletes is a convenient way to monitor wellness (injury, general health, sleep quality, stress, motivation, soreness) and training load. When I am not with the team, I check the Athlete Management System each day to ensure all athletes are on track with their health and fitness. If there are any deviations from the norm, I will get in touch with the athlete to learn more about their current situation. This then allows me to discuss with the relevant coaches and service providers (sports medicine, psychology, nutrition,



strength and conditioning, physiology) and make sure any potential problems (particularly injury and illness) are identified and addressed before they affect an athlete's training and performance. Regular, open communication during these times is imperative to preventing injury and/or ensuring a smooth return to training and competition for those athletes that are overcoming injury. In particular, Water Polo Australia has set up a strong network of sports physiotherapists around the country which I am in touch with on a regular basis.

Along with the three coaches, the Stingers are planning to travel with our usual cohort of support staff to the Olympic Games – myself as team physiotherapist, a sports psychologist, a performance analyst, a team manager and a sports physician who will work across both the men's and women's water polo teams. The Australian Olympic Commission also appoint a headquarters (HQ) medical team, consisting of sports physicians, physiotherapists, soft tissue therapists, psychologists, dietitians, recovery physiologists and sports scientists. The Stingers medical team will certainly be working closely with the HQ team, in particular with the soft tissue therapists and dietitians, given these are two disciplines we do not travel with ourselves.

The aim, of course, will be to prevent any injuries from occurring, but as you will know if you have ever seen a game, water polo is a tough sport and injuries invariably occur. The most common injuries seen amongst this group of athletes arise in the shoulders and hips.

With the high volume of swimming, throwing and wrestling these women do, shoulder injuries can be quite a complex mix of the typical 'swimmer's shoulder', 'thrower's shoulder' and contact/trauma injuries. For anyone that has tried to do eggbeater kick, or has looked at underwater footage of this movement, you can easily see why the hip joints and surrounding soft tissues can quickly become overloaded in this population too. Elbows, knees and fingers also take up their fair share of space on the annual injury statistics pie chart.

Typically, the time on-tour leading into an Olympic Games is extensive. Similarly to many other sports, the Stingers will do a four week tour leading into the two to three weeks spent at the Olympic Village. The biggest challenge as team physiotherapist is related to player availability. In an ideal world, coaches would like all players to be available to train and play at 100 per cent capacity all of the time. Unfortunately, things don't often work out this way and along with the team doctor, it is my job to advise the coach on what injured athletes can and can't do. Usually this ends up being a discussion where the coach and physiotherapist come to an agreement on what is best for the team's performance without putting any individual athlete at risk. At the end of the day, any challenges and pressures that come with the job are well worth it when I see the team improving and succeeding. I feel lucky to have the opportunity to work with a successful team that is aiming to take home the gold medal. It is a very inspiring professional environment to work in!

And after Rio? Well there will be much debriefing, analysis and planning for the future. Specifically, in the sports medicine space, there are many projects that I would like to commence that have been put on hold as things get busier in the lead up to Rio. There are many gaps in the literature when it comes to water polo-specific injury and predictors of injury. I would like to change this and feel that I am helping Australian water polo move ahead of the game with regards to sports science and sports medicine.

#### ABOUT THE AUTHOR

**Miranda Wallis** is the Sports Medicine Coordinator for Water Polo Australia's Women's Program for the Rio 2016 Olympic Games.



# GOING PAPERLESS

## MAKING THE SWITCH

MICHAEL KENIHAN,  
PHYSIOTHERAPIST AND  
GENERAL MANAGER AT  
LIFECARE HEALTH LTD,  
PROVIDES *SPORT HEALTH*  
WITH A PERSONAL ACCOUNT  
OF HOW HE WENT ABOUT  
MAKING HIS PRACTICE  
PAPERLESS.

**L**ifeCare is a privately owned network of Sports Medicine and Physiotherapy practices that operates in four Australian states. In my role as Victorian General Manager my team and I developed a strategy to see all of our eight practices operate in a paperless environment.

We embarked on this strategy with the expectation that this would be a two year project as the practice network is diverse geographically, ranges in size from practices with billings of \$300k to \$2.5million, and has single disciplinary as well as multi-disciplinary practitioners working at the centres.

### **Why do it? Is it worth it?**

We took the view that in the future ALL health care practices would be paperless particularly as the government has been talking about e-health records for some time. My prior experience working in a GP network had shown me that up to 25 per

cent of clerical time is spent handling paper! We saw going paperless as an opportunity to empower such staff to spend more time with clients. In addition, as younger practitioners were highly computer literate, even 'digital natives', they would adapt quickly and seamlessly to the change. In a paperless practice file access and sharing becomes a little easier than in a paper based file system.

Other benefits accrue when practitioners have remote access to their files particularly when having to write reports. Internal communication can also be enhanced. For example, administration staff can message practitioners with intra mail therefore eliminating the need to write notes that can be lost and relay messages which may not be received.

### **What are the challenges?**

Indeed such a process has some issues. As many practices have an older workforce contingent who are not used

# GOING PAPERLESS

## MAKING THE SWITCH

to working in the digital world (with some intending to never do so!) certain work activities to work around this are required; such as scanning written notes to file and printing out reports but provided this is only for a minority of people then it can be managed. There is also the need to devote time to training, induction of new systems, and general support that is needed from the software vendor and your own well trained staff. Such support does come at a cost of lost productivity and greater expenses during the time of transition.

### *What was the impact on staff and clients?*

With any change process one needs to ensure that certain staff 'lead the change' and be enthused about changes to the operation of a business. A formal approach to leading change is necessary and we followed the change strategy according to the seminal work of John P Kotter in his book, *Change Leadership*. Kotter outlines an eight stage process to lead change, namely:

- Establishing a sense of urgency.
- Creating a guiding coalition.
- Developing a vision and strategy.
- Communicating the changed vision.
- Empowering broad-base action.



- Generating short-term wins.
- Consolidating gains and producing more change.
- Anchoring new approaches in the culture.

The most important aspect is having a guiding coalition of people, including some practitioners, who are strong and consistent advocates for the change.

Other than ensuring that clients understood there may be a few teething problems and practitioners and staff needed some time to acclimatise, there seemed to be only positive experiences for the clients.

Other impacts were usually related to connectivity issues, device performance, and software glitches most of which happened during implementation. Ensuring good back up redundancy and Wi-Fi with enough bandwidth are also very important factors to consider.



*My prior experience had shown me that up to 25 per cent of clerical time is spent handling paper!*

### **Where do you start and what are the first steps?**

Software selection is crucial and there are way too many programs to discuss within this article but make sure you trial or review at least three different options. The software must suit the needs of all disciplines and be able to handle the traffic in a large practice. Make sure you get a good handle on the costs and create a budget before you embark. Software, hardware, cabling, connections, data transfer, the number of expected users and who will be your champions are important matters to cover off when you are considering this pathway.

Your first steps once the above are addressed is to set the dates for induction, followed by the 'go live' dates, and ensure that everyone understands what that means. Start by adding only brand new patients to the software so that you don't have to use paper and digital for all patients at the start. And remember to provide enough resources for the first week, i.e. having your 'champions' available full time plus the software vendor's staff on site to help your staff and practitioners.

### **How long does the process take and what other issues can I expect?**

The process is most likely to take 6-12 months from the initial decision to go paperless to full implementation. Having a preparation time of around 3-6 months followed by implementation and 'bedding down' the system and change for another six months seems to work well. Remember to try and stick to the crucial dates along the way, i.e. all personnel to have been trained at least a week before the 'go live' date.

One of the leaderships principles espoused by Sun Tzu in his text, *The Art of War* is to 'expect the worst'. I concur here. Many things can go wrong and being prepared and not panicking will be crucial. Expect the blame game when things go astray and the "we never should have done this" comments. Expect vendors to let you down, often not by intention just the inevitable Murphy's Law. Try and "under promise and over deliver" if you can. Let people know that everything may not go without a hitch and they will be more forgiving. Finally have lots of sandwiches and coffee on tap to calm the nerves and build goodwill with the team. Make the experience one that all can share in and maybe you will even build a better culture by going paperless. Good luck!

#### **ABOUT THE AUTHOR**

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# THE USE OF SMARTPHONE ECG'S IN SPORTS AND EXERCISE MEDICINE

RESEARCHERS JESSICA ORCHARD, JOHN ORCHARD, LIS NEUBECK AND CHRIS SEMSARIAN LOOK AT THE DEVELOPMENT OF NEW DEVICES MAKING ELECTROCARDIOGRAM (ECG) SCREENING MUCH EASIER IN THE SPORTS MEDICINE FIELD.

## BACKGROUND

Sudden cardiac death (SCD) is a tragic outcome for young people playing sport (athletes), their families and the entire community, resulting in many years of life lost. The main cause is usually an underlying heart condition, and they can generally be categorised as 'inherited' or 'acquired'.<sup>1</sup> Within the inherited causes, the two major categories of potentially preventable SCD in athletes are cardiac arrhythmia and structural disorders, most commonly hypertrophic cardiomyopathy (HCM). Acquired causes include viral infection (leading to myocarditis), commotio cordis and drug misuse.

Although relatively rare, SCD is the leading cause of death for people playing sport.<sup>2</sup> In the US, over 90 young athletes die suddenly each year (about 2 per 100,000 athletes per year).<sup>3</sup> Alarming, this rate is 2.5-fold higher than that of the age-matched non-athlete population.<sup>4</sup> It is thought that the population rate of SCD in young athletes is similar in Australia, with about 10 deaths per year. It is clear that, in people under 35 years, being physically active is without doubt of overall benefit as SCD is quite rare. However, playing competitive sport may be a significant risk factor for young people with genetic heart diseases, such as HCM, and familial long QT syndrome, with SCD during sport being the first presentation of an underlying disease in a significant proportion.

In most countries, asymptomatic athletes are not routinely screened for these conditions, which traditionally require a full 12-lead ECG (for arrhythmogenic abnormalities including long QT syndrome, Brugada syndrome, or HCM) or an echocardiograph (for HCM or other cardiomyopathies). Both ECG and echocardiography are costly (for mass screening) and time-consuming.

It is increasingly evident that screening young athletes can prevent premature deaths, however there remains substantial debate about which is the most effective screening strategy.<sup>5,6</sup>

A US study concluded that screening young athletes with a 12-lead ECG and cardiovascular history and physical examination may be cost effective when

# NE



compared to no screening.<sup>6</sup> In Italy, long-standing legislation on health protection of competitive sports has underpinned the development of widespread ECG screening.<sup>7</sup> Evidence from the Veneto region shows an 89 per cent absolute risk reduction, meaning SCD risk for screened athletes is similar to age-matched non-athletes.<sup>8</sup>

Recent studies have emphasised the role of ethnicity on cardiovascular adaptation in athletes.<sup>9</sup> This has implications for appropriate interpretation of ECGs, and also for risk stratification in screening for SCD. Some populations, such as black African-American males, are known to be at much higher risk.<sup>10</sup> There is some evidence of increased risk of SCD in Australian indigenous populations. For example, one study by Young et al

# THE USE OF **SMARTPHONE ECGS** IN SPORTS AND EXERCISE MEDICINE

reported that between 1982 and 1996, the estimated incidence of SCD (related to ischaemic heart disease) among Aboriginal Australian football players in the Northern Territory was 19-24 per 100,000 player-years: a staggeringly high figure compared with a reported incidence of 0.54 per 100,000 player-years among Australian rules players of similar ages in Victoria.<sup>11</sup> However, very little is known about the risk profile of many other populations, such as Polynesians.

Recent improvements to ECG interpretation (particularly the 'Seattle Criteria'<sup>2</sup>) for athletes have dramatically

improved the sensitivity and specificity of 12-lead ECG screening, particularly in identifying abnormalities leading to a later diagnosis of HCM. A 2014 paper found refined interpretation criteria identified ECG abnormalities in 98.1 per cent of athletes with HCM, with an overall sensitivity of 94.7 per cent and specificity of 94.1 per cent for cardiac abnormalities in white athletes<sup>12</sup>

There is currently no widespread screening program in Australia. The Australasian College of Sports Physician's position statement recommends screening with a 12-lead ECG and history and physical examination for elite athletes

only, but notes that indigenous populations should be prioritised.<sup>13</sup> Australian Football League (AFL) teams conduct 12-lead ECG screenings, and at the professional level of many sports this is becoming the norm.

The cost and inconvenience, together with poor specificity, of using traditional clinic-based 12-lead ECGs are often cited as key barriers to implementing screening programs for SCD.<sup>14</sup> In addition, screening requires a high level of compliance to be effective (the high compliance in Italy is due to legislation and has not been matched in any country where screening is voluntary). However, it is possible that the use of innovative technology could make screening for arrhythmias more feasible and accessible.<sup>15</sup>

## THE SMARTPHONE ECG AND PORTABLE 12-LEAD ECGS

Development of new devices such as the AliveCor Mobile single-lead ECG (iECG) and the CardioCard portable 12-lead ECG (see Box 1), make screening for certain arrhythmias far less onerous than the traditional clinic-based 12-lead ECG. These are just examples, and there are many other innovative devices available that perform similar functions.

The portability of these devices together with web integration opens up wide possibilities: for example, a reading could be taken in rural NSW and interpreted by a cardiologist in Sydney moments later. These devices have the potential to radically reduce the cost of screening and increase accessibility, thereby promoting health equity and reducing premature death through early detection.

## POSSIBLE APPLICATIONS

These affordable and highly portable devices have a number of potential clinical applications and research opportunities in sport and exercise medicine, particularly for exercise-only arrhythmias which may not be reproducible during a traditional exercise stress test.

### BOX 1: EXAMPLES OF INNOVATIVE DEVICES

The CardioCard can take a 12-lead ECG in three to four minutes and together with a smartphone or tablet (via Bluetooth) can immediately email a .pdf of the results.

The iECG consists of a smartphone cover with two electrodes and an app. It allows a medical diagnostic quality single-lead ECG to be taken in 30 seconds and seen in real-time on the smartphone screen. This is typically lead I, which is ideal for rhythm detection, but other single leads including precordial (e.g. modified V1, V2 or V5) could be obtained. The app stores the iECG reading and can email, print or send a .pdf of the iECG reading. The app syncs automatically to a secure website where a cleaned-up version of the trace can be viewed.



Figure 1: A portable 12-lead ECG.



Figure 2: The iECG smartphone cover and taking a reading (above).



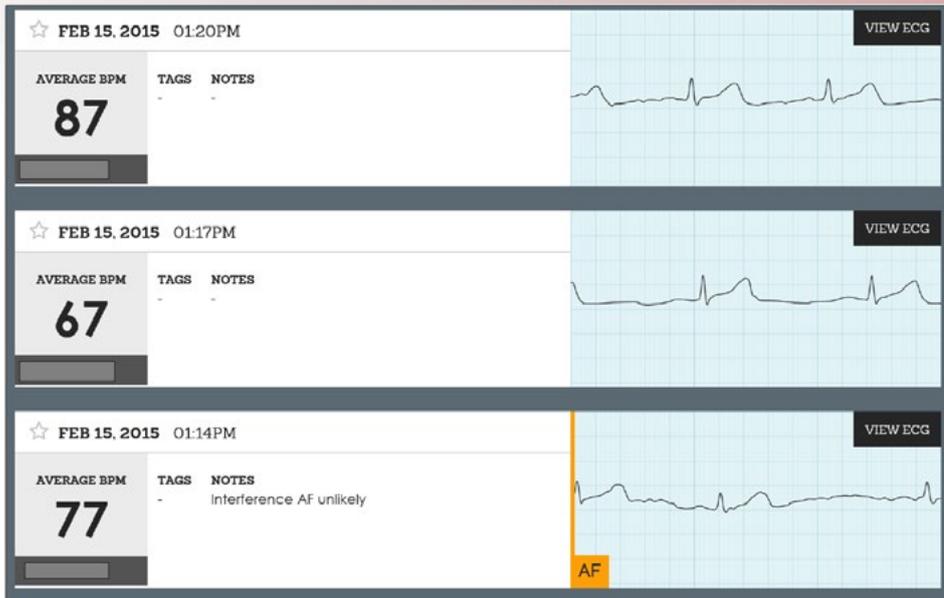


Figure 3: Screenshot from the AliveCor website.

The two main possible applications for sport are:

- as a cheap first line screening option (for certain conditions) for asymptomatic athletes; and
- as a state-of-the-art portable event-recording device, e.g. for a player suffering fainting or tachycardia on the field, with much quicker access to a rhythm strip output (e.g. on the actual playing field) than even a sideline ECG.

The iECG could assist with earlier diagnosis of supraventricular or ventricular tachycardia and other exercise-related arrhythmias, including ventricular or atrial ectopics and atrial flutter or fibrillation. The key issues for future research are to determine the iECG's sensitivity and specificity for diagnosing different conditions.

**Disclosures:** AliveCor have provided free covers for related study purposes. No author or associated institution has received any financial payment from AliveCor, nor owns any shares in AliveCor.



Figure 4: An athlete showing the three iECG readings (L1, V1, L2).



*The cost and inconvenience, together with poor specificity, of using traditional clinic-based 12-lead ECGs are often cited as key barriers to implementing screening programs for SCD.*

**ABOUT THE AUTHORS**

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# USEFUL APPS FOR SPORTS CLUBS

*SPORT HEALTH* TAKES A LOOK AT THE LATEST APPS ON THE MARKET FOR LOCAL SPORTING CLUBS ACROSS AUSTRALIA.

As technology grows throughout the professional level of sport, the trickle down affect has certainly reached the local level. There are plenty of apps available for local sports trainers which cover all sorts of topics on injury management, injury tracking, fitness monitoring and injury prevention. Here are some apps already on the market that sports trainers are using to their benefit in community sport at the local level.



## SPORTS INJURY TRACKER

### SPORTS INJURY TRACKER

SMA-VIC has developed the sports injury tracker tool for community sport, the very first of its kind in Australia. Based on traditional injury recording processes, the injury tracker records details such as the body part injured, type of injury, how the injury occurred, where the injury occurred, the type of first aid treatment provided and whether and where the injured person was referred. Sporting clubs can now enter their injuries into the tracker saving the use of paper and forms, streamlining data collection and establishing the possibility of identifying injury trends.



### INJURY SURVEILLANCE PROGRAM (RECORD PRO)

Developed through a partnership between SMA-ACT and the University of Canberra, the Injury Surveillance Program is an online service which was designed to improve the data collections of injuries across all levels of sport. Analysis of the data collected enables the identification of injury trends and occurrence rates. It can be used by anyone at the local sport level including first aiders, sport trainers and participants.



### GET SET APP

Aimed at everyone who takes part in local sport and any forms of physical activity, Get Set provides effective and evidence-based workout routines to help prevent sports injuries. The app covers exercise programs for 30-different sports and all workout routines are supported by video demonstrations and short descriptions to complete the exercises correctly.



### POLAR TEAM APP

Designed for indoor sports teams, the Polar Team App provides sports trainers with new levels of access to their player's fitness levels, while in-game. The app is synced to heart rate monitors worn by players and gives real-time data to trainers and coaches on their player's heart rates, fitness levels, tiredness and any risk of potential injuries.



### SPORTS INJURY APP

Developed by Sportsinjuryclinic.net, the Sports Injury App has two main features for injury management and prevention in local sport. Symptom Checker allows trainers to virtually diagnosis injuries and it also contains a list of over 100-common sports injuries and possible treatment and rehabilitation methods.

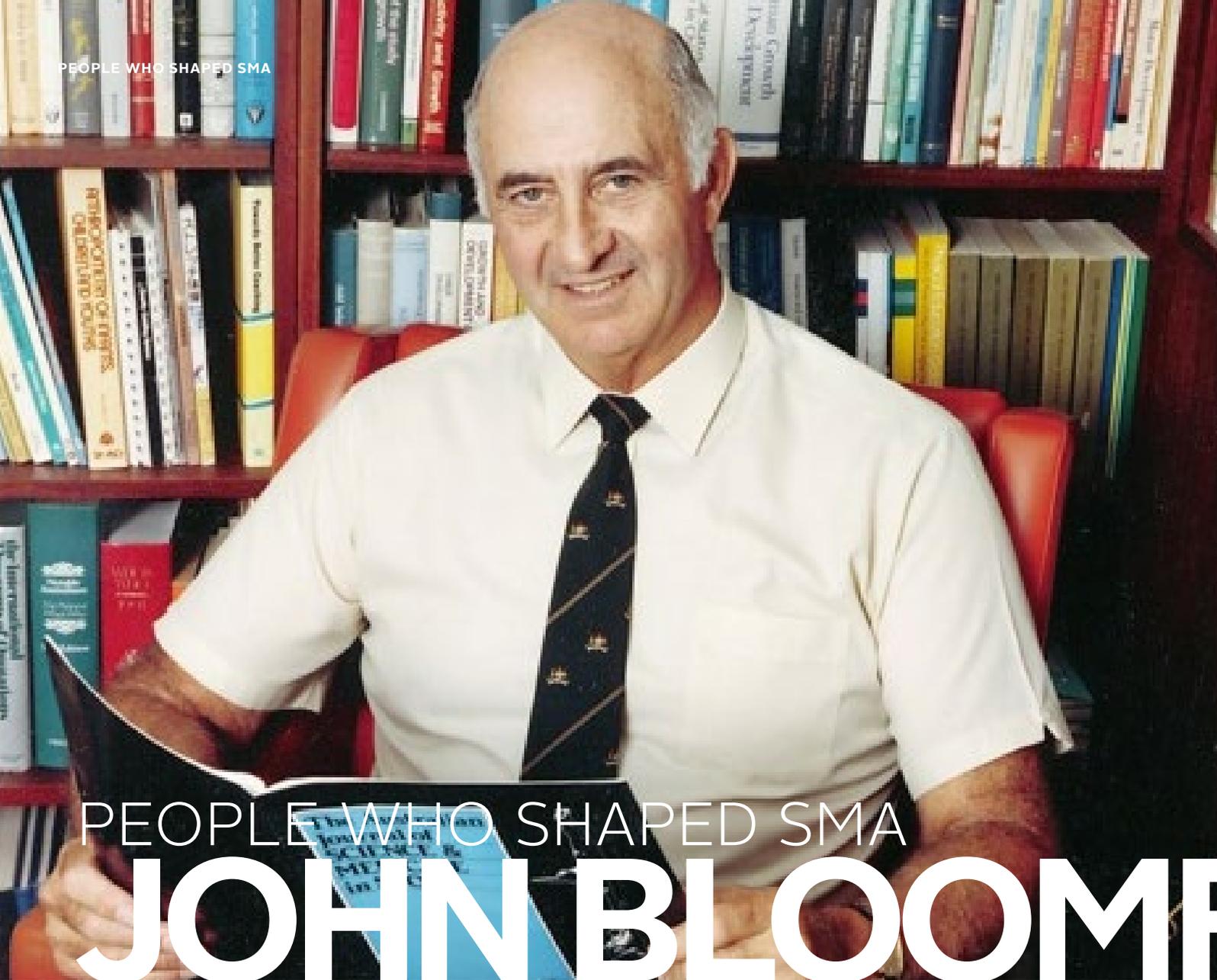


### STRAPPT

Utilising the knowledge of the Australian Physiotherapy Association, Strappt is a mobile app which assists sport strapping for injury prevention and rehabilitation. It features a series of educational videos which covers strapping for all parts of the body including knee, shoulder and elbow strapping support. The videos provide a step-by-step guide of the correct sport strapping procedures for all sport trainers.



Remember, apps are great, but nothing is a substitute for up-to-date knowledge and qualifications. SMA offers a range of courses aimed at diagnosing, managing and preventing sport injuries. For a complete list of courses, visit [sma.org.au](http://sma.org.au).



# PEOPLE WHO SHAPED SMA JOHN BLOOMFIELD

Professor John Bloomfield AM CitWA's professional career commenced in 1954, when he gained a three year Diploma of Physical Education (PE) at Sydney Teachers' College. He then taught Health and PE for six years in the Hunter Valley of NSW. John also competed at the national and international level in Surf Lifesaving and later became an officer in the Australian Army Reserve.

In early 1960 he won a Fulbright Scholarship to the University of Oregon in the USA, to complete a PhD in biomedical science. After four years of study John organised a nine-month lecture tour in nine European countries, where he found the level of sports science and medicine in the mid-1960s to be very impressive, especially in Eastern Europe. After two more years in Oregon the Bloomfield family returned to Australia and both John and his wife Noelene took up academic positions at the University of Western Australia in 1968.

At that time the PE Division was very small, with only two permanent staff and 28 students in the first year. It soon became a Department and joined the Faculty of Life and Physical Sciences 12 years later. By the time John retired from UWA in 1997, the School of Sport Science, Exercise and Health had 54 academic and 18 technical and administrative staff, as well as 468 undergraduates and 85 postgraduate students, 56 of them doctoral candidates.

In 1998 John established the Hollywood Private Hospital's Functional Rehabilitation Clinic with Professor David Wood, an orthopedic surgeon at UWA. This clinic was the first of its kind in Australia to use pre and post operative resistance training as its major modality; within a decade, there were literally dozens of medically oriented functional rehabilitation clinics around Australia. In 2000 John accepted an invitation to become the Principal Research Fellow in the Faculty of Health Sciences at the

University of Notre Dame in Fremantle, and continued in that role for seven years.

During a Sports Medicine Conference in Sydney in 1964, John joined the NSW Branch of the then Australian Sports Medicine Federation (ASMF) as an Associate Member —at that time only medical doctors could be full members. The Federation membership rules changed in 1969, and John was elected to the position of Senior Vice President in 1970, before serving as the President of ASMF from 1971 to 1973. When asked what he considered his most important achievement during his eight years as a national senior office-bearer, he stated that he had attempted to steer Australian sports medicine towards the European/American model. This included the fields of physiology of exercise, applied anatomy and biomechanics, and sports psychology, to join the more traditional Australian model of care and prevention of sports injuries.



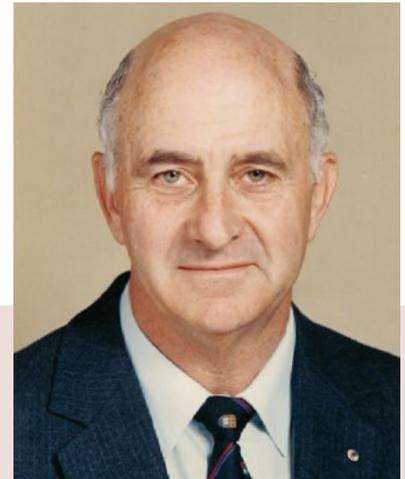
# FIELD

Among his numerous publications during his career, John was Editor-in-Chief, along with Drs Ken Fitch and Peter Fricker, in the publication of an innovative text of almost 700 pages, entitled *Science and Medicine in Sport*, which sold several thousands of copies nationally and internationally.

John was also able to assist the development of sports medicine during the 1980s, by gaining significant funding to corporatise the ASMF (now SMA), as well as developing many educational programs, while he was Chairman of the Australian Institute of Sport and then of the Australian Sports Commission, by convincing the Federal Minister for Sport of the immense value of sports medicine to the Australian sports system.

Listen to the National Library of Australia's interview with Professor John Bloomfield (2008)

## A MOMENT WITH JOHN



### What has been your career highlight?

There have been two significant highlights in my career. The first was when the Federal Government appointed me to write the report on the Development of Sport and Recreation in Australia in 1973. This paper then acted as the government's 'blueprint' for the development of the Australian Sports System.

The second highlight has been the establishment of the first University-level course in Sport Science in Australia, at the University of Western Australia. Our postgraduates with PhDs are now to be found in every high quality university course in this country and in many international-level universities in Europe and Asia. Currently the School of Sport Science, Exercise and Health at UWA is the largest and highest quality school of its type in Australia.

### What does being an SMA member mean to you?

Membership of SMA has enabled me to associate and collaborate with various colleagues in Sport Science and Sports Medicine over a 51 year period. Further, this association has assisted me to keep in touch with a rapidly expanding international field of research. In addition, being a member of this highly regarded body gives me a 'stamp of approval' in the academic and professional fields of Sports Medicine.

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

Try to associate with the tried and proven professionals in your field. If possible, attempt to find a mentor who will guide you in your early career. I found one in the USA and spent five years with him as a junior colleague. He was a wonderfully inclusive man, who guided me wisely in my early professional years.

### Do you have any career regrets?

No. If it were possible, I'd "do it all again".



*Try to associate with the tried and proven professionals in your field. If possible, attempt to find a mentor who will guide you in your early career.*

# COUNCIL OF DISCIPLINE NEWS AND EVENTS



## Sports Doctors Australia (SDrA)

Sports Doctors Australia is looking forward to the ASICS SMA National Conference in October bound to be an excellent event for all disciplines. At this conference (first day, all day event), SDrA is proud to present the very popular on-field emergency medicine workshop. This year the course has been expanded to include true to life scenarios as an excellent teaching tool for doctors and physiotherapists who provide coverage for teams and individuals. Doctors and physiotherapists with an interest in the course should book early as places are limited.

We are also proud to see the SDrA guest editorial of the *British Journal of Sports Medicine* (BJSM) in the August 2015 edition, featuring interesting content about evidence base versus clinical practice.

## Sports Dietitians Australia (SDA)

Can't filter fact from fiction when it comes to nutrition information? Accredited Sports Dietitians are located across Australia and can help you and your athletes with credible sports nutrition advice. Book to see one or have one visit your club, [www.sportsdietitians.com.au](http://www.sportsdietitians.com.au). Follow SDA on Twitter @sportsdietaust and Facebook for more news, events and courses.

# 2015 CALENDAR

## OCTOBER 2015

**23-24**

**2015 SDA Conference Leadership and Innovation for Private Practice Success**  
Docklands, Melbourne

Register at [www.sportsdietitians.com.au](http://www.sportsdietitians.com.au)

## JANUARY 2016

**30**

**Australasian Academy of Podiatric Sports Medicine (AAPSM)  
Lower Limb Sports Medicine Education Event**  
Newcastle, Hunter Stadium

AAPSM Members only price \$150  
Non-Members price \$350

**Confirmed speakers include:**

- Sports Physician, Dr Ross Cairns – Managing the athlete.
- Orthopaedic Foot and Ankle Specialist, Dr James O'Sullivan – Red flags in foot and ankle sports injuries.
- Orthopaedic Foot and Ankle Specialist, Dr Punkaj Rao – Injection therapies for the foot and ankle.
- Orthopaedic Foot and Ankle Specialist, Dr David Nicholson – Surgery for ankle stability injuries.
- Radiologist, Dr Lawrence Josey – Reading MRI in sports medicine.
- Sports Physiotherapist, Anthony Ingram – Ligament injuries acute management and rehabilitation pathways.
- Sports Physiotherapist, Robert Dingle – Tendinopathy; assessment, diagnosis, treatment and management.
- Exercise Physiologist, Jacqueline Allanson – Run strong; preparing your body for running demands.

**More information will be distributed in the coming months.**



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