Incorporating The Bulletin

Opinions expressed throughout this journal are the contributors own and do not necessarily reflect the views or policy of Sports Medicine Australia (SMA). Members and readers are advised that SMA cannot be held responsible for the accuracy of statements made in advertisements nor the quality of the goods or services advertised. All materials copyright. On acceptance of an article for publication, copyright passes to the publisher.

Publisher
Sports Medicine Australia
PO Box 78 Mitchell ACT 2911
Tel: (02) 6241 9344
Fax: (02) 6241 1611
Email: smana@fisma.org.au
Web: www.sma.org.au
Circulation: 5000
ISSN No. 1032-5662

Editors
John Orchard
Kerry Mummery
Managing Editor
Dominic Nagle
Chief Executive Officer
Gary Moorhead
Subscription Manager
Michael Woods
Advertising Manager
Nathan Kruger
Design/Typesetting
Whalen Image Solutions

SMA STATE BRANCHES

ACT
ACT Sports House
100 Maitland St, Hackett ACT 2602
Tel: (02) 6247 5115

New South Wales
PO Box 3176 Rhodes NSW 2138
Tel: (02) 8116 9815

Northern Territory
PO Box 2301, Darwin NT 0801
Tel: (08) 8991 5462

Queensland
Sports House, 150 Caxton St, Milton QLD 4064
Tel: (07) 3367 2700

South Australia
PO Box 219, Brooklyn Park SA 5025
Tel: (08) 8234 6369

Victoria and Tasmania
Sports House, 375 Albert Rd, Albert Park Vic 3206
Tel: (03) 9674 8777

Western Australia
PO Box 57, Claremont WA 6010
Tel: (08) 9285 8033

SUBSCRIPTION RATES 2007

Australia A$35
Overseas A$50

SMA members receive Sport Health as part of their membership fee
Single copies and back copies A$15 (includes postage)

PP No. 226480/00028
For subscriptions contact Michael Woods
Phone: (02) 6241 9344
Email: smana@fisma.org.au

Contents

PROFESSIONAL PRACTICE
When does extending the scope become encroachment?
Gary Moorhead

IS SCREENING ALWAYS USEFUL?
Dr J

ETHICS AND GENETICS RESEARCH IN SPORT
The Australian role
Dominic Nagle

LEAVE NO STONE UNTURNED
Body clock and other strategies for optimising the Socceroos’ performance in the World Cup qualifiers
Andrew Jowett, Jeff Steinweg and Leon C Lack

FIRST GRAB A BLANK PIECE OF PAPER
A sport psychologist’s tips for better golf
Stephanie Hanrahan

RISK MANAGEMENT TO PREVENT SPORTS INJURY
Can it work for community sports clubs?
Kristy Abbott and Paul Klarenaar

CORE STABILITY & EXERCISE PRESCRIPTION: A RESEARCH UPDATE
Implications for physiotherapists
Steve Saunders

“A DUBIOUS RECORD”
ASADA’s plan to clean up Australian weightlifting

BULLETIN
Cover photograph: Australian Sports Commission
When does extending scope of practice become encroachment?

Gary Moorhead

The areas of practice of all of the health professions are in a constant state of flux – and this is probably a natural and desirable condition. New research findings and an ethos of continual improvement mean that everyone is perpetually seeking and embracing better methods of professional practice and better outcomes for patients.

In a hierarchical and heavily stratified sector like health, this inevitably means that at certain times one profession’s pursuit of increased knowledge and better practice may see it unintentionally (or intentionally) encroaching on another’s traditional area of practice.

This issue came to a head in the most recent issue of “Sports Physio” where AIS Chief Physiotherapist, Craig Purdam, raised concerns with the Australian Physiotherapy Association’s (APA) Extended Scope Practice (ESP) proposals.

Encroachment concerns

Craig was concerned that ESP “threatens to jeopardise our relationships with other members of the provider team, in particular those with sports physicians” (1). At the same time, Craig felt it appropriate to mention that sports physiotherapy had its own professional encroachment concerns with “alternative practitioners, soft tissue therapists and ‘exercise/rehabilitation specialists’.

In my short seven years of acquaintance with sports medicine, such concerns have formed an on-going background chorus to the activity of the industry.

While Craig Purdam is worried about the possible reaction of sports physicians to ESP, the major concern of this group in recent years has been about any potential negative impact on their quest for specialist recognition. The encroachment issue that concerned sports physicians in this regard has been the potential for a blurring of the boundaries between sports physicians and sports doctors – most particularly in the mind of those determining specialist statuses. Sports physiotherapists (as in “APA Sports Physiotherapy Titleholders”) had similar status/distinction issues with other physiotherapists working in sport. To potential patients, they were all “sports physios”.

‘Recapture the foot’!

Encroachment concerns also temporarily impaired relations between physiotherapists and podiatrists when a rumour was circulated of a physio plan to “recapture the foot”! Ironically, this rumour emerged at a conference where a senior sports physiotherapist publicly stated that the emergence of podiatry in sports medicine and its assumption of responsibility for most foot problems was one of the more liberating experiences of his professional life(2).

The prescription of physical activity has at varying times in recent years been claimed by physiotherapists and exercise physiologists, while much initial government support (e.g. green scripts programs) went to medical practitioners. The emergence of a “fitness therapist” from the fitness industry had physios and exercise physiologists joining ranks to express concern at this “therapists’” lack of capacity to operate in this area and all groups were taken to task by public health and physical activity advocates for failing to unite to attack the problem.

Other voices in the chorus have included soft tissue therapists worrying about internal encroachment in their discipline from those not qualified to apply remedial massage, psychologists carefully marking out registration boundaries for who can and cannot “counsel” and dietitians worried about blurring of boundaries between those with particular training in diet in relation to sport and encroachment by those with a more generalised training in nutrition.

Sports Medicine Australia (SMA) even received a complaint about the ultimate encroachment - sports trainers inappropriately carrying stethoscopes – until investigation revealed the sports trainers in question to be registered nurses. In fact, given the numbers who work in sport, there are surprisingly few encroachment-type complaints about sports trainers. Possibly this is testament to the emphasis placed on teaching sports trainers what they don’t know and the “Referral” part of the RICER acronym.

The irony of all of this – and the danger – is that, if encroachment/scope of practice issues start to run out of control, they will – as Craig Purdam warns – seriously damage relations between the professions and the whole philosophy of multi-disciplinary practice. There is also a danger of constraining the natural development and evolution of professions.

As multi-disciplinary practice and information sharing are generally held to be one of the cornerstones of Australia’s sporting success and the high quality of sports medicine and science in this country, we have an obligation not to let these matters run out of control. To this end, SMA has programmed a symposium at the 2007 national conference in Adelaide to address the issue. Anyone interested in participating directly is asked to contact the author of this article at gary.moorhead@sma.org.au.

Sports Dentists seek a greater role

Dentists who are members of SMA have let it be known that they wish to formalise their involvement with SMA by...
Is screening always useful?

One of the so-called advances of sports medicine in recent years has been the advent of routine screening of athletes. For example, most state institutes of sport will require all their scholarship holders undergo a routine annual medical and physiotherapy assessment to have any issues "addressed." As the years progress, the more likely it becomes that these assessments routinely involve imaging, so that the niggling shoulder or back pain gets an MRI scan and the associated pathology (which is always present) is uncovered. When the inevitable labral or disc lesion is revealed on the MRI, the medical professionals usually put themselves on the back and claim to have "picked up early" the brewing problem, thereby justifying the screening process. They might even get a bigger pat on the back by the owner of the local MRI machine, who is perhaps the greatest beneficiary of the medical staff's curiosity. (NB It is no secret that sports physicians are big imaging requesters although they hopefully more than make up for this impact on health budgets by being good diagnosticians and small drug prescribers and pathology requesters. It is also relevant to point out that screening imaging is covered by the athlete or team budget rather than the Medicare one).

I definitely don't want to write an opinion piece saying that all screening is a waste of time, because it often uncovers critical information. I do, however, want to play devil's advocate and ask when it might be possible that screening is counter-productive, to help administrators and doctors think about when they really do want to screen and what they are doing it for.

Let's start by examining a form of screening that is almost universally considered to be desirable: cancer screening. This is considered so holy that Medicare, which refuses to pay for almost any form of preventive service, makes specific exception for Pap smears, mammograms, etc. Lay people think that getting tested to make sure that don't have cancer is one of the cleverest preventive health decisions they can make (and at their peril they often prioritise this over making sure they exercise, don't smoke and have a good diet). There is also unequivocal evidence which shows that Pap smears reduce deaths from cervical cancer, ditto mammograms and breast cancer and even colonoscopy in individuals at high risk of bowel cancer. But what about testing for PSA in men over 50, which is routinely done and considered by most GPs to be "good medicine"? I'm not an expert on this area, but apparently amongst the experts there is plenty of disagreement (1). Whilst some early prostate cancers can be picked up and surgically resected before they spread, there is a cost involved. Some tumours that are essentially benign (meaning in this sense that they won't kill the patient) can subject the patient to invasive biopsies that can lead to infection, impotence, depression at being labelled a cancer-sufferer etc. It apparently isn't yet unequivocally clear (level 1-II evidence) that the death rates from prostate cancer in areas which mandate screening for PSA are lower than those which don't, and so we have a form of cancer screening which is controversial and even possibly (although science can't yet answer our question fully) causes net harm. A common expert opinion for prostate screening is to inform the patient of the risks and benefits of screening and then let him decide (which means that if you have a demented patient then you shouldn't bother screening for prostate cancer!). Even for tests which are unequivocally helpful (like Pap smears) there is an upper limit for screening beyond which point further testing becomes at best cost-ineffective and at worst detrimental. Different countries vary as to whether Pap smears should be done every 2, 3 or 5 years. If, say, it was common practice to conduct 6-monthly Pap smears on every asymptomatic woman, then the net harm from excess colposcopy, cervical excisional biopsy and the associated anxiety might start to overtake the net positive of preventing further cervical tumours. This is because there is apparently a very high incidence of minor abnormalities of the cervix that can regress if left alone for 6-12 months – it can be appreciated that a 3 or 5 yearly scan will miss a lot of these self-limiting cases but hopefully they won't miss a slow-growing metastatic cancer. For a screening test with universal acceptance of its value, there is still plenty of argument as to how often it should be performed, and following on from this, whether minor abnormalities warrant wait-and-watch or interventional management.

Let's move back to sports medicine. A story I heard from a British medical student last year (so I can't vouch for its accuracy, although this in no way infers that rumours in the UK are any less accurate than those in Australia) was that Ruud van Nistelrooy was subjected to a medical by Manchester United when he was very young. He had just injured his knee and the Man U doctors thought his ACL was unstable and therefore he failed the medical. He subsequently needed an ACL reconstruction. Man U ended up signing him, but thanks to the medical they saved paying for a season in which he was recovering from an ACL reconstruction. Even if parts of this story are inaccurate, in theory it could be true, and this sort of history is one which makes screening so attractive.

I can balance the ledger with a few other anecdotes, but my favourite to start with concerns Tony Lockett. Plugger is an all-time AFL great and legend of both

Dr J
the St Kilda and Sydney Swans football teams. It is probably due to a screening medical NOT being performed that he actually joined Sydney in the first place. Those AFL fanatics with a good memory may recall that when Tony decided to leave St. Kilda, the Swans were in a 3-way bidding war with Collingwood and Richmond to try to get his signature. Ron Joseph, then CEO of the Swans, basically stalked Plugger at his house to get him to sign, with the AFL helping to sweeten the deal by promising to back Sydney to help them get off the bottom of the ladder (which they were rooted to at that stage). Ron Joseph got the Plugger signature with a buy-now, ask-questions-later attitude to his signature, which won the day over Collingwood in particular, where the board was split over whether he was worth the risk due to injury and suspension history.

Plugger got a medical in Sydney after he had arrived and the contract was rock solid. At this medical Tony revealed that he had been recently suffering from a rare condition secondary to a head knock that gave him double vision when looking overhead (a rather important symptom if your job is to mark the football). The good news was that he was already booked in for surgery to correct it. The bad news, which was found out after consulting the surgeon, was that the expected success rate of the operation was only 50%. As you will expect from knowing the history of Tony’s success and the Swans, the coin came down heads, the operation was successful, Plugger kicked bagfuls of goals and the Swans rose up to be perennial finalists. However, if a medical screen had been done before the contract was signed, with the current status of his eye problem revealed, history may have been a lot different (i.e. possibly no Plugger at the Swans and perhaps they would still be at the bottom of the ladder).

That story may seem like the exception that proves the rule, but I can give you another eerily similar story from the same football club. It doesn’t quite top the last one, but it gets close. This is after I had left the Swans, but I pieced it together from the media reports available at the time. It relates to the modern day superstar full forward of the Swans, Barry Hall, who is the opposite of injury prone and would probably breeze through any medical (and like Plugger would probably threaten to snap the doctor’s arm in half if it was suggested that he was going to fail). When the Swans signed Barry Hall (which involved a complex 3-club trade of players and draft choices that was completed at the last minute), as part of the deal they also had to pick up another player to satisfy all 3 clubs with the bargain. One of the other players they picked up came with a pre-existing injury and although he was previously a very good player, he was quite a spent force on arriving in Sydney. This became pretty obvious when this injury forced him to retire half way through his first season with the club after hardly playing. Again on this occasion, no medical was done prior to the deal (most likely because this extra player was added in during trade week at short notice). And yet again if a medical bad have been done the clubs involved may have rejected the whole trade. The Swans wouldn’t have been landed with a player on his last legs but also wouldn’t have ended up without a new superstar full forward (who has paid off the other bad part of the trade many times over). Out of interest, St Kilda, who lost Barry Hall in this trade, picked up Nick Dal Santo with one of the draft choices, so it has turned into a classic win-win deal.

As I like to say when I’m being cryptic, these stories aren’t common but they aren’t rare either. Adrian Morley, recent strong man forward of the Sydney Roosters, has played his entire career with an axillary nerve palsy on one shoulder, which caused him to fail a medical at his first rugby league club in England. Adrian is still playing rugby league a decade later and I think the original doctor’s arm has just healed.

Moving on from anecdote and players who would snap your arm in two, it has been found that in asymptomatic NBA players, 48% have knee chondral lesions on MRI whereas 20% have knee meniscal lesions (2). If you are doing a screening medical on an NBA player who claims to be asymptomatic but who has a chondral lesion and meniscal tear on MRI, what do you do? The stats are similar with cricket fast bowlers and low back abnormalities (3). Cricket players don’t tend to get screened for changing teams that often, but it is still a dilemma if you happen to be screening a fast bowler who suffers minimal back pain on bowling and then scans reveal an active, un-united, pars stress fracture.

You can hazard a guess that this has a chance of getting worse if bowling workload increases or stays the same, but I doubt you can be certain. You can certainly get egg on your face if you declare that the player isn’t fit to bowl shortly before he goes out and takes five wickets.

Recently it has been shown that MRI in the assessment of hamstring injuries is only as accurate as clinical examination in predicting clinical outcome (4). In order to justify screening as a particularly valuable tool, one would need to demonstrate that a screening medical had superior predictability than a more standard basic measure. A good comparative measure would be “% of possible games played” (i.e. if a player could have possibly played 100 games in his career and he had played 83 of them, missing 17 through injury, his % of possible games played is 83%). As we now stand, I would think that % of possible games played would stack up very well against a medical screening examination in predicting the number of games that a player would miss through injury over the next few seasons.

Perhaps a good last word on this topic can come from radiologist John Read, with whom I co-authored a review paper on the use of imaging in sports medicine a year ago (5). One of John’s contributions to the article was this quote: “Paradoxically, as imaging tests become ever more sophisticated and sensitive, the importance of clinical judgment in determining both when to order tests and the relevance of abnormal findings [actually] increases. This is because real but incidental anatomical derangements, such as developmental variants and asymptomatic degenerative changes, which become more prevalent with age and high-level sporting activity, are frequently detected……Thus, physicians must always remember to treat the patient, not the scan”

References


If this scan belonged to an AFL player should he fail a medical? (MRI scan showing moderate grade osteitis pubis and adductor tendinopathy changes)

affiliating with both the Australian Dental Association (ADA) and SMA as a special interest group. The dentists are interested in a greater role at conferences, in publications and in servicing the sports trainer education program (the Safer Sport Program - SSP).

One area of particular concern to dental members is the reported higher rates of dental decay among athletes. Dentists point the finger squarely at sports drinks, soft drinks and fruit juices as the culprit(3).

This is likely to provoke serious discussion about appropriate advice and guidelines for the use of these products in sport. SMA will again use this year’s national conference in Adelaide to convene a symposium where dental members and others interested can take up this issue.

References


Ethics and genetics research in sport

By Dominic Nagle

Australia’s role

Australia is playing an influential role in drawing up a position statement which would lead to a global policy to govern the use, misuse and abuse of genetics research in sport.

The ethical basis of the policy is being considered by the Hastings Center – the renowned independent bioethics research institute based in upstate New York – in the first instance for the US Anti-Doping Agency (USADA) and hopefully then for the World Anti-Doping Agency (WADA).

Professor Peter Fricker, Director of the Australian Institute of Sport (AIS), is a participant in the Hastings Center study, which involves experts in bioethics and sports science from around the world.

The Hastings Center is widely recognised for its expertise in the field. Among its current and recent projects, it is producing or has produced more than 20 studies on various bioethics issues, including reprodogenetics, the gene transfer issue in doping and its influential project which concerned the ethical, conceptual and scientific issues in the use of performance-enhancing technologies in sport.

The basic reason for the Australian involvement in its study is that a significant amount of work has been done by the ASC on the issue of genetic research and genetic information in sport in response to the The Protection of Human Genetic Information report in 2003 by the Australian Law Reform Commission and the Australian Health Ethics Committee of the National Health and Medical Research Council (reported in Sport Health, Vol 21, Issue 3, pages 22-24).

It was in this context that the ALRC-AHEC enquiry recommended among other things that the ASC should:

• monitor the use of genetic testing and genetic information for identifying or selecting athletes with a view to developing policies and guidelines for sports organisations and athletes. The policies and guidelines should be developed in consultation with the Human Genetics Commission of Australia (HGCA), the Human Rights and Equal Opportunity Commission (HREOC), the Office of the Federal Privacy Commissioner (OPFC) and other stakeholders; and

• develop policies and guidelines for sports organisations and athletes on the use of genetic information in relation to predisposition to sports-related illness or injury. The policies and guidelines should be developed in consultation with the HGCA, HREOC, OPFC and other stakeholders.

(In the event, a Human Genetics Advisory Committee, has been set up, but the OPC declined to be involved because of pressure of other work.)

The ASC has had a long-established position on the issue: that, unless the issue of genetics research in sport is dealt with positively, the prospect is that not only will Australian sport and medicine generally miss out on the good and ethical benefits of genetics research but also that other, less ethical nations will benefit from getting a head start on this research, discovering and using methods of gene manipulation which are undetectable.

The process chosen for meeting the two recommendations was through a steering committee comprising representatives from the ASC, the organisations cited above and other interested experts, and chaired by Professor Fricker.

The steering committee has consulted a number of stakeholders in sport in its study of the possibilities in meeting the ALRC-AHEC recommendations, including Sports Medicine Australia, the Australasian College of Sports Physicians, the Australian Olympic Committee, ASADA (now ASADA) and Sport Industry Australia. Neither the steering group nor the ASC has yet published a response to these recommendations but sports medicine/sports science sources report that a number of ideas have been canvassed for principles governing the use of genetics research and genetic information in four major areas: ethical, governance, privacy and legal issues.

These ideas are reported to include:

• that genetic information must only be collected with the informed consent of those taking part in research and after consultation with the Human Genetics Advisory Committee;

• that it must not be used for non-therapeutic manipulation of genes to improve sports performance;

• that genetics research should not be conducted on children below secondary school age;

• that only when it is proved to be scientifically valid and reliable can genetic information (and not genetic technology) be used to enhance sports performance and that it must be relevant only to enhancing sports performance;

• that genetics research should only be applied with permission of an appropriate authority, such as the National Health and Medical Research Council, and in accordance with the NH&MRCs 1999 National Statement on Ethical Conduct in Research involving Humans;
that ‘the need to know’ genetic information by sports institutes and organisations who care for athletes should prevail over the athlete’s choice of not wanting to know and that athletes should have the right to decline to know the results of genetics tests;

• that genetics research must not be conducted purely for commercial purposes and that any commercial development of intellectual property stemming from genetics research must satisfy all the ethical conditions laid down by the appropriate authority and conform with the legislation governing privacy; and

• that the ASC co-operates with such organisations as ASADA, WADA and the Australian Federal Police to improve knowledge of gene doping, which is forbidden under the World Anti-Doping Code, so as to develop better ways to combat it.

The Hastings Center study seeks to take advantage of this early work by the steering committee and the ASC towards complying with the ALRC-AHEC recommendations.

Sport Health asked Professor Fricker about progress in the study.

“We’re a fair way along the road but there are still a few issues to be worked through,” he said.

“It’s clear that before we get to the stage of offering ideas for firm guidelines and principles we need more research on some fundamentally important questions. The scientific validity of the use of genetic information to identify sports talent or to enhance performance (perhaps by tailoring training methods, for example) wasn’t yet established, Professor Fricker said. More research was needed into that – not only the scientific validity of the information but also into its practical value in identifying talent and identifying the risk of injury or illness in athletes. If it was proved that gene markers could be used to help indicate possible performance or risk of injury and illness, then the question arises how they could be used.

So the Hastings Center study has been considering not only how the potential use of genetic information to predict talent or risk of injury might be handled but also ideas on how to handle its potential misuse – gene doping or gene manipulation to enhance performance, for example, or the unethical use of genetic information for commercial purposes.

“But first we need to give priority to establishing the scientific validity and reliability of genetic information and its value in identifying talent or injury risk.

“When we have the answers, then we can work on guidelines for how it can and should be used – the ethical, legal, health and other implications – and also the still unanswered question who should be bound by these guidelines.

“Clearly there’s plenty of work to be done.

“The whole process needs good science – good science within ethical boundaries,” Professor Fricker said.

“The ASC and AIS are happy to help.”
Leave no stone unturned

Body clock manipulation and other strategies to optimise player performance in the Socceroos’ World Cup qualification campaign

An article based on what the authors call a ‘pseudo-scientific’ presentation at the 2006 Asics Conference of Science and Medicine in Sport, Fiji, by Andrew Jowett, Jeff Steinweg and Leon C Lack

Summary

In November 2005, the Australian Socceroos, representing Oceania for the final time, were set the daunting task of defeating Uruguay, ranked 16th in world football, in a standard home and away tournament; in other words, two games separated by three days and 11 877 kilometres and with a 13-hour time difference.

The first game was in Uruguay. Given the importance of the return game, the management and medical team set about identifying factors in the trip back to Australia that could be modified in order to maximise recovery, performance and outcome. Standard advice recommends that two days are needed to adapt per time zone. In this non-randomised study, the intervention group were the 23 Australian players and the control group were the 23 Uruguayan players. The Australian team were assigned to a plan that managed chronobiology from before the first game. As well, this group were assigned a charter flight back to Australia, in which the medical staff instituted further strategies within the specially-adapted aircraft cabin: absolute control of environment, light, activities, and meals. The control group, the Uruguayans, were assigned to a commercial airline, with preset schedules and mealtimes. There was a small but statistically significant increase in player performance from the intervention group as demonstrated by the score line. Additional positive comparisons, including individual performance and game statistics, further highlighted the significance of the intervention efforts and provide further evidence of the success of the project. Our study highlights the importance of attention to detail in improving player performance and rapid recovery at the elite level. It enhances the understanding of current methods of adjusting circadian rhythms as well highlighting the importance of developing newer technologies for the future.

Introduction

Soccer or football as it now wishes to be known has long been the sleeping giant of Australian sport. At a grassroots level it is a sport played by huge numbers of boys and girls. Increasingly, Australian players were heading overseas to develop their professional careers. However, in the modern era of international sport, the Australian national men’s team has been conspicuous by its absence from the world stage.

In April 2003, a revolution took place in Australia, in which the medical staff instituted further strategies within the specially-adapted aircraft cabin: absolute control of environment, light, activities, and meals. The control group, the Uruguayans, were assigned to a commercial airline, with preset schedules and mealtimes. There was a small but statistically significant increase in player performance from the intervention group as demonstrated by the score line. Additional positive comparisons, including individual performance and game statistics, further highlighted the significance of the intervention efforts and provide further evidence of the success of the project. Our study highlights the importance of attention to detail in improving player performance and rapid recovery at the elite level. It enhances the understanding of current methods of adjusting circadian rhythms as well highlighting the importance of developing newer technologies for the future.

World Cup qualification: the Australian story

1974 Qualified
1977 Did not qualify
1981 Did not qualify: New Zealand qualified ahead of Australia!
1985 Did not qualify: lost to Scotland 2-0 on aggregate
1989 Did not qualify
1993 Did not qualify: lost to Argentina 2-1 on aggregate
1997 Did not qualify: drew with Iran 3-3; lost on away goals
2001 Did not qualify: lost to Uruguay 3-1 on aggregate

Many lessons were learnt from the failed qualification series against Uruguay in 2001. Apart from the head coach and the high performance manager, the majority of the current players and support staff were involved in the 2006 World Cup campaign. This experience was invaluable in the planning and execution of the task in the qualifying stages in 2005.

Fortunately Australia won the right to choose the order in which the games were to be played, selecting to play away first. This is widely accepted in football as the preferred option. It allows a team to defend in the initial game, limit the number of goals conceded and then perhaps score a valuable goal in the away game. In the home leg the team knows what is required and executed in the familiar surrounds of home and with the backing of a supportive crowd.

From a sports science perspective, the support staff were aware of the effects that travel and jetlag may have on the performance of our players. There was a very short period of time between the
games (only 84 hours), a long flight (21 hours between Montevideo and Sydney and a number of time zones to cross (11 hours difference plus the international Dateline). Our role was to deliver the Australian team in the best condition possible to contest the all-important home game.

The Australian players assembled in Argentina from their clubs (mainly based in Europe) over one week prior to the away leg. This allowed for acclimatisation and adjustment to a small time zone difference between Europe and South America. The first match was played in the Centenario stadium in Montevideo, home of the first World Cup final in 1930. Its previous experience there meant that the team was not overawed by the hostile home crowd of 60,000. The Socceroos were unlucky not to score and most felt the 1-0 loss left Australia in a good position to qualify. Planning for the return to Australia had been going on for over 12 months – now we would see the results.

The FFA, recognising the importance of qualification, decided to fund a charter flight back from Uruguay at great expense. Qantas is the team's major sponsor and provided excellent support throughout the planning process as well as on the flight. A Boeing 767 was the plane chartered, with a standard cabin divided into three sections. The large business class section was devoted to players; the second cabin was designated as a treatment section and on either side seats were folded down and two stretcher beds installed for player treatment and massage. Treatment equipment and ice were arranged prior to the flight. The third cabin was occupied by staff and journalists.

The timing of the inflight schedule was arranged by the team doctor (“Ladies and gentlemen this is your doctor speaking...”), according to expert advice from a chronobiology specialist. Melatonin (which had been previously trialled by most players) was provided to simulate the commencement of a sleep cycle in a dose of 3mg. Zolpidem was provided to players unable to sleep at the designated time. During the planned wake cycle, cabin lights were set to maximal levels and augmented with individual reading lights to maximise light exposure according to principles explained below.

The Uruguayan team attempted to organise a charter flight but was unable given the late notice. Thus it boarded a commercial flight from Montevideo to Sydney, stopping in Buenos Aires and Santiago. We have no information regarding the Uruguayans' management of chronobiology or their use of pharmaceuticals.

As usual, despite the best laid plans, events did not go entirely as expected.

Changes at the last minute required flexibility on Qantas' behalf and rapid re-adjustment by the Socceroos' support staff. The charter Boeing 767 was flown from Australia with two sets of crew, including ground staff, and an extra FFA doctor to assist with the team. In Papete, Tahiti, it was found that the fuel was potentially contaminated and inappropriate for refuelling, which required that the stop-over for the return flight be changed to Raratonga in the Cook Islands. This in turn required a change in the inflight schedule we had devised and also a transfer of the second aircrew from Papete to Raratonga. Making matters worse, we lost a member of the cabin staff who slipped and broke her arm in Tahiti.

No risks were taken with the plane on the ground in Montevideo with Qantas ground staff taking responsibility for security of the plane and luggage. Once the team had boarded, the pilot had to deal with some questionable delays and obstruction thrown up by Uruguayan air control prior to departure. The flight leg from Uruguay to the Cook Islands was one of the longest flown by a Qantas 767 and a challenge our pilots took on with great gusto.

Factors identified as being important parts of athlete recovery were addressed as possible. Fortunately, there were no serious injuries in the first game, though management of muscle contusions and previous conditions was required. Hydration status was assessing using body weights and urinary specific gravity. Fluid deficits were replaced accordingly, as well as increased baseline hydration required for flights. Inflight meals were preplanned by a nutritionist and augmented with protein and specific amino acids. The team masseur provided recovery massage and all players wore upper and lower body compression garments during the flight. Inspired air was humidified using commercially available masks for this purpose.

Interventions to manage jetlag were discussed well in advance. Circadian rhythms describe patterns of peaks and troughs throughout a day in a number of important body functions including hormones (eg, cortisol), body temperature, performance and arousal (sleep/wake cycle). T min is the time of minimum core temperature and appears to correlate with a trough in many of these circadian rhythms, including possibly sporting performance and strength. The period around T min is described as a 'dead zone'. In our case, if the players' body clocks remained at the same setting as in Uruguay, they would be playing the home game right in the 'dead zone' – potentially the lowest part of their performance cycle. Our aim was to shift their T min as quickly as possible to avoid this eventuality.

Individuals have variations in their chronobiology and its plasticity. Early-birds and night-owls probably accurately reflect this status and these are called chronotypes. In a team situation, this complicates a universal approach significantly.

Moving T min earlier is called 'phase advance' and moving it later "phase delay". It is believed that the maximum phase shift that can occur is four hours per day. Phase delay is usually considered easier, as our circadian rhythms may in fact have a natural cycle slightly greater than 24 hours. In simple terms, it is easier to stay up later than go to sleep sooner when not tired. On an individual basis, perhaps early-birds would tolerate phase advance and night-owls prefer a phase delay approach. With a time difference of 11 hours, our specialist suggested that it was safer to phase advance than phase delay, but this strategy is logistically more difficult. These difficulties led us to risk a phase delay, with the possibility that an incomplete shift might result in the team lining up for the Sydney return game in their dead zone. It was also feared that more rapid phase shifts might result in desynchronisation or normal cycles.

Methods of phase shifting involve manipulating environmental and behavioural factors such as light, temperature, mealtimes, activity and sleep, as well as the use of melatonin and sedatives. A combination of these techniques were used on the Socceroos.
Phototherapy is believed to be the most effective method of phase shifting with its impact proportional to the intensity of light received and the timing of its application relative to T_min. Daylight provides up to 10,000 lux while aircraft cabin lighting provides approximately 200 lux. (A recommended dose of 2000 lux is considered effective in causing phase shift.) Similarly players must be protected from light exposure at other times in accordance with the phase shift desired; the use of dark glasses and staying indoors can assist with this. Application of bright light before T_min will cause a phase delay, whereas bright light after T_min will cause phase advance.

In this case, the timetable of light exposure, meals and activity was carefully planned both on the flight and after arrival in Sydney to gradually shift our body clocks accordingly.

History documents that the game finished 1-0 to Australia after 120 minutes (including extra-time), requiring a penalty shoot-out to decide the qualifier for the World Cup finals in Germany 2006. John Aloisi sealed the result with his penalty after a remarkable performance by Mark Schwarzer at his peak in goal. This result represented, scientifically speaking, “a small but statistically significant difference”!

Observations would suggest that the Australian team suffered less jetlag, less fatigue and fewer cramps than their opponents.

**Conclusions**

Management of circadian rhythms in athletes is an important consideration, especially with competitions held in short timeframes across the world. While early arrival allows for a natural adjustment and acclimatisation, this is not always possible given the demands on professional athletes. Australia’s success in the 2006 World Cup and entry into the Asian Football Confederation promise ongoing challenges to our elite footballers.

Future developments in the field promise more in the way of controlling these rhythms. Personal glasses with inbuilt LED lights that shine on the retina may provide a practical solution to phase shifting. The role of tryptophan is being studied, as well as a number of pharmaceuticals to affect the sleep-wake cycle. Some research being done with regard to a military application for soldiers in the field may be useful for athletes.

Those with an interest will find more detailed information in the following references.

**References**


Sport Performance – Waking up to the importance of sleep. *Peak Performance*


Dr Andrew Jowett was the Socceroos’ team doctor and is Medical Director of Olympic Park Sports Medical Centre. Dr Jeff Steinweg is the Medical Director for the Football Federation of Australia (FFA). Professor Leon C. Lack is at the School of Psychology at Flinders University

Inflight treatment for Scott Chipperfield from team physiotherapist Les Gelis and masseur Luke Atwell
First grab a blank piece of paper

A sport psych's tips for better golf

By Stephanie Hanrahan

Biomechanical analysis of your golf swing may help you develop better technique. Suitable strength and conditioning should help minimise injuries and proper nutrition and hydration should exclude physiological fatigue as a factor on the back nine. However, the finest equipment and the best physical preparation will not result in consistently good performances if the mental aspects of the game are not controlled.

Thoughts and feelings influence behaviour and therefore performance. If thoughts and feelings are left to chance, then performance will most likely fluctuate with changes in mood and ideas. The challenging aspect to all this is that there is no single correct way of thinking and feeling that will lead to great performances. What works brilliantly for one person could be disastrous for another. For example, some golfers need to feel relaxed and peaceful to perform their best, whereas others play better when pumped up and energised. The trick is to discover what works for you.

Becoming aware of how you need to be thinking and feeling to play your best golf, and then putting in place routines that encourage the desired thoughts and feelings, will enhance the consistency of performance. To begin this process you need to grab a blank piece of paper and a pen. No, don't keep reading – go get something to write with and on!

OK – draw a line down the middle of the page. At the top of the left hand column describe a specific tournament, hole or series of shots where you performed really well. At the top of the column on the right describe a golf performance where you did not perform particularly well. Avoid using an experience when you were sick or injured; instead pick an occasion when physically you were fine, but for some reason things didn't click and you had a less than wonderful performance. Write down any descriptors that will help you remember the specifics of these two different performances.

Now under each of the two experiences write down everything you can remember about how you were feeling and what you were thinking before and during these performances. Again – don’t keep reading until you have done this. If by chance you are reading this even though you are not a golfer, you can use the same process with any area of performance – other sports, music, job interviews, brain surgery, anything.

Now read through the two lists you have created. Do you notice any differences between the two lists? Sometimes the results are not too surprising: thoughts and feelings related to confidence, focused attention and a positive attitude may be associated with the positive performance, and feelings related to pressure and thoughts of self-doubt may be associated with the not so positive performance. But, as I mentioned above, not everyone is the same. I’ve had athletes who have associated feelings of confidence and invincibility with poor performances (something which in retrospect tended to be more a sense of over-confidence than genuine confidence: “I’m so good I don’t need to train, try, or prepare…”). I’ve also had individuals who have reported feeling nervous before or during their best performances. For them a complete lack of nervousness suggested that they did not care; the presence of a few butterflies indicated that the adrenalin was pumping and they were ready to kick #*!#

The idea is to become aware of what works best for you. This snapshot of two performances may not be representative of your golfing experiences, but it should allow you to begin to develop awareness of your ideal performance state. If you want to be more methodical and scientific about it, your best bet is to record relevant thoughts and feelings immediately after each performance over a significant period of time as well as noting the quality of each performance. This judgment can include scores, but should also contain a qualitative rating (eg, 1-10) that reflects how well you thought you played. For example, on an extremely windy day you may have scored above your average but actually played very well given the conditions. Over time you should begin to see a consistent pattern between the ratings of your performances and your thoughts and feelings.

Anyway, moving on with the lists you have created for these two specific performances…place a tick mark by each thing you feel you can control. If it is something that you think you currently can’t control but could potentially learn to control, place a dash or some other symbol next to it. Again – go through your list now, before reading any more.

OK - now make a rough estimate of the percentage of factors you listed that you feel you can or could control. Carefully check anything you listed that you have not marked as at least potentially controllable. What you listed were your thoughts and feelings, factors that with practice you CAN control. Now it
may be that the specific incident that led to a particular feeling or thought is beyond your control but you should be able to find alternative means to create the same feeling or thought (assuming of course it is one that you want to have). For example, a golfer may have felt confident and positive because, as he was approaching the first hole, a pro from whom he used to take lessons and who had not seen him in a number of months commented on how after observing him on the driving range she was impressed by how much his swing had improved. No, this golfer cannot control the appearance of a knowledgeable golfer to give the proverbial ego boost just before playing, but the golfer can learn to recreate that feeling using skills such as imagery and self-talk.

Whichever mental skills you choose to use to help you think and feel the way you need to perform your best, the key is to use them consistently. The easiest way to remember to use the skills is to develop a routine that you stick to. The complexity of that routine will vary between people, and it may take trialling a few different routines (varying in composition and detail) before deciding on what suits you best. Routines should help you pay attention to what is important (and ignore what is not), assist in creating the optimal level of activation (ie, calming you down when you feel uptight and energising you when you feel flat) and establish an appropriate level of confidence. Some of the elements that may be included in your routine include breathing, imagery and cue words.

Slow, deep, abdominal breathing can calm you physiologically and fast, shallow breaths can increase your activation (and cause you to pass out if you do it for too long). Alternatively, you might release tension by practising a version of progressive muscular relaxation. For example, right now while you are sitting or standing, shrug your shoulders. Try to touch your ears with your shoulders. Hold it there for about 10 seconds and then relax, drop your shoulders and let the tension drain away.

Some golfers when nervous or tense tend to squeeze their clubs. Some find it difficult to relax and loosen their grip on the club. Sometimes, by first increasing the tension (ie, squeezing the club harder) and then relaxing, people find it easier to relax their grip because ironically the state of tension in the muscles tends to drop below the initial level after contraction. Imagery can also be used to help you achieve an optimal level of activation. Sticking with the grip example, one golfer I worked with found it useful to picture that his club was a tube of toothpaste with the cap off. If he gripped the club too tightly all the toothpaste would squeeze out. This image helped him to keep a relaxed grip.

Imagery also can be used to see and feel yourself playing the shot you want. Research suggests that it is more effective to image the trajectory of the club than to image the path of the ball. Imagery, however, is only useful if individuals have the ability to create vivid images and to control those images. Vividness is enhanced by incorporating multiple senses into the image. When playing golf you not only see things but you also feel, hear, smell and maybe even taste. For some, the smell of freshly mown grass may help to trigger a vivid image of a fairway and a tee shot; alternatively, the feel of the grip might help trigger a vivid image of a great putt. In addition to being vivid, images also need to be controlled to be effective. Including an image of the shot to be made as part of your pre-shot routine will not be helpful if you cannot control the image in your head. Obviously you need to be able to control the image and see/feel yourself using correct technique.

In addition to images and breathing or muscle tension/relaxation, cue words can be a beneficial component of a pre-shot routine. Having pre-determined cue words or phrases can help you to control the little voice in your head. Instead of having negative thoughts related to self-doubt, distracting thoughts about other players on the course or even irrelevant thoughts about what you might have for dinner when you get home, the habitual use of cue words can help you be constructively focused.

For some a cue word such as “calm” might aid relaxation if they tend to get tense; for others having a technical cue phrase such as “head down” might increase the consistency of the physical execution of shots. Some golfers prefer specific cues for different shots (eg, approach shot, putt), some have cues for different feelings they may want to create (eg, to develop confidence) and others may have a phrase that they use in a variety of situations (eg, “what’s my next job?”) to help them focus on the present. Being in the present is essential for good performance. Stressing about past mistakes, worrying about your placement in the tournament or thinking about what your coach/partner/team is going to say to you after the round will not allow you to focus on making the best play at the moment.

What I have covered in this article is just a taste of psychological skills that can be incorporated into a pre-shot or pre-competition routine. There are entire books written about relaxation and imagery but I hope I have provided a few ideas that will allow you to experiment with developing a routine that will work for you. Start simple: perhaps just “breathe, image, meaningful cue word”. Remember to use your routine, figure out how you can have built-in reminders. Athletes I have worked with have written symbols or words on the toes of their shoes, on a towel or on a small card that is then laminated and attached to their gear in a place they will see it regularly. Remember though, that your routine has to work for you. Base the content on how you need to think and feel to play your best golf.

It doesn’t have to make sense to anyone but you!

Stephanie Hanrahain is at The University of Queensland
Risk management to prevent sports injury

Can it work in community sports clubs?

By Kristy Abbott and Paul Klarenaar

For years now the concept of risk management has been bandied about as the way forward in sports injury prevention. However, while the theorists and the upper echelons of the sporting world continue to advocate risk management, the reality is that most community sports clubs aren’t embracing it.

The phrase ‘risk management’ makes community sports clubs anxious. For clubs to adopt risk management, they need to be supported in a way that considers this anxiety in the context of their volunteer membership status. The SafeClub program was developed with these considerations in mind. SafeClub helps community sports clubs to adopt risk management in a way that is accessible and useful to clubs, not an additional burden.

Community sports clubs in Australia are almost entirely reliant on their volunteer base. While some clubs are considering paid administrators, the majority rely on hundreds of unpaid man-hours to ensure that their players can run on the field each weekend. With more and more dual income families, and an increasingly time-poor society, those hundreds of unpaid man-hours are increasingly hard to come by. On top of this ‘volunteer-squeeze’, community sports clubs are now being asked to introduce formal risk management programs by their governing bodies. Given their constraints, it is not surprising that community clubs avoid introducing risk management. Even if they knew where to begin, they would be hard pressed to find the time.

What is risk management?

Risk management refers to the “culture, processes and structures that are directed towards realising potential opportunities whilst managing adverse effects”.

From a sports injury perspective this means realising the healthy lifestyle benefits that come from participating in sport while managing the injury risks that inevitably arise as a result of that participation. Such activities seem to be fundamental to running a sports clubs, and indeed most sports clubs are making risk management decisions as a matter of course. However, few clubs take a formal approach to risk management that leads to the ‘culture, processes and structures’ that are the cornerstone of a successful risk management program.

Risk management has a long and successful history in the fields of finance, legal and occupational health and safety. While risk management in these fields can be a complex and highly specialised phenomenon with teams of risk specialists dedicated to the task, the basic principles of risk management can be applied by anyone in any circumstance to reduce any risk. It is this flexibility that makes risk management so suitable for managing community sports injury risks.

An Australian standard exists for managing risk in sport and recreation, and several resources and training...
intensive practical
one and two day
workshops
presented by Trish Wisbey-Roth

1. **3-dimensional assessment and treatment of the cervical and thoracic spine**
   - 3-dimensional assessment of the cervical spine/thoracic spine
   - 3-dimensional treatment to optimise functional joint and muscle biomechanics
   - Functional exercise intervention to complement manual therapy
   - Neural system assessment, and identification of the problem interface in the upper quadrant.

2. **3-dimensional assessment and treatment of the lumbar spine, pelvis and hip**
   - 3-dimensional assessment of the lumbar/pelvis/hip complex
   - 3-dimensional treatment to optimise functional joint and muscle biomechanics
   - Functional exercise intervention to complement manual therapy
   - Neural system assessment, and identification of the problem interface in the lower quadrant.

3. **Optimising motor control of the lumbar spine, pelvis and hip**
   - Assessment of dysfunctional local/global muscle recruitment pattern of the lumbar spine, pelvis and hip.
   - A grading system to assess and progress a core stability program from the acute stage of treatment, to return to normal function
   - Wide variety of graded core stability exercises using motor control cues, and balance reaction exercises. Designing the right level exercise difficulty for the appropriate grade of core stability exhibited and how to progress.
   - Taping techniques to optimise pelvic stability

4. **Optimise cycling/ running biomechanics**
   - Practical workshop with Trish Wisbey-Roth and Jason McLaren. For more information please telephone Take Control Active Rehab, (02) 9570 7800.

**Course dates**

**2007 Dates**

<table>
<thead>
<tr>
<th>Course</th>
<th>Melbourne 28 &amp; 29 Apr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney 25 &amp; 26 Aug</td>
<td></td>
</tr>
<tr>
<td>Launceston 8 &amp; 9 Sept</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Sydney 10 &amp; 11 Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melbourne 16 &amp; 17 Jun</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Sydney 9 Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melbourne 15 Jun</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Sydney 20 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melbourne 11 August</td>
<td></td>
</tr>
</tbody>
</table>

**Cost**

| 1 day course | $340 |
| Early bird rate | $290* |

| 2 day course | $540 |
| Early bird rate | $490* |

| 1+ 2 day course | $740 |
| Early bird rate | $690* |

Register now by email
admin@takecontrol.com.au
or phone (02) 9570 7800

www.bbclasses.com.au

* When course fees paid in full 6 weeks prior to course date
programs have been developed to encourage and assist community sports clubs to adopt a risk management approach to sports safety. However, these have tended to have an insurance/legal liability interpretation of risk management rather than a public health/injury prevention focus.

Why risk management for sports injury prevention?

In a national review of injury prevention priorities, risk management was identified as the ‘best-buy’ in the sports injury arena. In a community sports club it is risk management’s flexibility that makes it such a suitable approach to reducing the individual club’s particular safety risks. Our work with sports clubs has consistently shown that the safety issues of concern to community sports clubs vary significantly from club to club. Even within the same sports code, we find clubs’ safety priorities vary considerably as a factor of each club’s size, facilities, human resources available, geographic location and the characteristics of its player and spectator base; among other things. The risk management process provides a framework for finding and subsequently reducing any identified injury risk. Unlike other approaches, risk management doesn’t attempt to force a club to deal with any particular safety issue. Instead it asks clubs to identify the safety issues that are the biggest risk to the club, and work with these in a prioritised way – one step at a time.

The SafeClub approach

SafeClub is a risk management training program designed for community sports administrators. It aims to help community sports clubs to improve their sports safety activities by de-mystifying risk management and providing simple tools to undertake risk management in their club. The program consists of three training sessions of two hours each session. In between sessions participants are asked to ‘try-out’ the new ideas they come up with during the training and report back on how they are working for their club. The training helps clubs to identify and prioritise their own safety issues, and teaches clubs how to address these issues using a basic risk-management approach. At the end of the training, participants are expected to have a working and sustainable Sports Safety Manual and Action Plan that they have designed specifically for their club.

The SafeClub program was piloted with football (soccer) clubs in 2002 and, based on positive feedback from participating clubs, a large scale two-year evaluation of the program was commenced in 2004 to measure the impact of SafeClub on sport safety policies and infrastructure amongst participating clubs. In partnership with the NSW Injury Risk Management Research Centre at The University of New South Wales and with funding support from the New South Wales Sporting Injuries Committee, the controlled trial evaluation involving 76 clubs has recently been completed and is showing impressive results. Results of the evaluation are expected to be published soon.

SafeClub was recognised at the 2006 Australian Risk Management Awards as ‘Best Risk or Compliance Education and Training Program’ and also won a gold award at the New South Wales Sports Safety Awards in 2006. In addition, individual clubs who participated in SafeClub received gold and bronze awards at the 2005 New South Wales Sports Safety Awards for their risk management-based safety programs.

Conclusion

“Risk management was not as difficult as I had feared. There was something in this program for everyone.” SafeClub participant.

While risk management has been identified as the best buy in sports injury prevention, a level of anxiety about its use exists among community sports clubs. Much of this anxiety is related to the way risk management has historically been presented. However in its basic form risk management is a very simple, flexible and practical approach to safety. By going back to basics and focusing on what aspects of safety risk management are important and relevant to community sports clubs, it is possible for clubs to integrate the approach into running their operations.

The SafeClub program provides a good example of how the ‘tool’ that is risk management can be made available in an accessible way to support community sports clubs to improve their safety practice.

Kristy Abbott is at Youthsafe and Paul Klarenaar at Northern Sydney Central Coast Health, both in New South Wales.

References

Physiotherapists frequently prescribe exercises to improve core stability. These exercises aim to improve the capacity (strength, power, endurance) and/or control of lumbo-pelvic muscles and are generally based on the premise that improving core stability can improve movement efficiency and reduce lumbo-pelvic and lower leg injury.

Initially, intuition and anecdotal evidence were the basis for these programs. However, scientific investigations of lumbo-pelvic anatomy, biomechanics and motor control during simple tasks have provided insight into the muscles responsible for different components of core stability, changes in these muscles associated with pain, and how these muscles may be assessed and trained. More recently, investigations of lumbo-pelvic kinematics and muscle activity during locomotion and measures of lumbo-pelvic muscle capacity in healthy and symptomatic populations have provided further knowledge. This work has implications for physiotherapists assessing and training core stability for locomotor tasks.

Core stability and locomotion

Before reviewing this research, it is important to define a ‘stable core’ as the term is used in a variety of contexts and has a number of components. The core is generally considered to be the lumbo-pelvic complex. Stability is a dynamic state in which a system has sufficient stiffness to resist displacement from and ensure return to the equilibrium position when perturbed. It is dependent on a complex interplay between movement and stiffness and is not a simple rigidification of the system. Lumbo-pelvic stability requires control at three interdependent levels: control of intersegmental shear and translation, control of gross posture, and control of whole-body equilibrium (centre of mass relative to base of support). During locomotion, repetitive cyclic whole body movements cause cyclic displacements of the centre of mass outside the base of support in the line of forward progression. These movements and ground contact events generate repetitive internal and external lumbo-pelvic forces that challenge control at each level. Activity of all lumbo-pelvic muscles is coordinated to aid propulsion, control lumbo-pelvic motion and maintain stability.

Lumbo-pelvic locomotor kinematics and injury

Clinicians commonly assess lumbo-pelvic kinematics as a measure of core stability and prescribe exercises based on perceived movement inefficiencies. Lumbo-pelvic kinematics have been investigated in runners who have had at least one leg or lumbo-pelvic injury attributable to running in the 12 months prior to testing (Schache et al, 2002). Data showed no difference in anthropometric measures (height, pelvic width, relative pelvic width, standing pelvic tilt, active knee extension, hip extension, hip internal and external rotation) or gait cycle parameters (stride time, stride rate, stride length, stance and swing time, relative stance and swing time) between injured and control groups. However, they did show that:

(i) the lumbar spine was more extended during early stance for injured subjects;
(ii) injured females displayed greater amplitude of hip adduction-abduction;
and (iii) injured males displayed increased peak hip flexion. In addition, investigations of transverse plane thoraco-pelvic rotation showed low back pain subjects demonstrate decreased thoraco-pelvic dissociation (increased trunk rigidification) and increased inter-stride variability (poor control) during walking. These data provide evidence of altered lumbo-pelvic or trunk movement in injured runners and low back pain subjects during walking. However, further investigation is required into whether or not the relationship between these changes and injury is causal, into the changes in muscle control and capacity underlying kinematic differences and into whether or not retraining changes the likelihood of injury or that re-injury is required.

Abdominal and paraspinal muscle activity during walking and deficits in low back pain

Abdominal and paraspinal muscle exercises are commonly included in core stability programs for locomotor tasks. However, the fact that there have been few investigations in the area makes evidence-based training of these muscles for locomotion difficult. In general, researchers had:

(i) concluded that phasic superficial paraspinal activity associated with foot strike controlled trunk motion in the frontal and sagittal planes (Thorstensson et al, 1982);
(ii) found the relationship between superficial abdominal muscle activity and locomotor movement unclear (Callaghan et al, 1999) and (iii) not investigated deep abdominal and paraspinal muscle activity during gait.

Recent investigations (Saunders et al, 2004a; Saunders et al, 2004b; Saunders et al, 2005; 2006) describe the coordination of these muscles during walking and running in normal and low back pain subjects. A component of the highly integrated muscle system that controls lumbo-pelvic motion, transversus abdominis, is tonically active throughout the gait cycle. The superficial abdominal
muscles and all paraspinal muscles are phasically active and peak periods of activation of all muscles are associated with foot strike. Tonic activation is consistent with transversus abdominis (in synergy with the diaphragm and pelvic floor) providing constant intersegmental stiffness and therefore a first line of defence against the cyclic internal and external lumbo-pelvic forces associated with locomotion. In addition to a role in control of dynamic lumbo-pelvic stability, it is also proposed that tonic activation of deep lumbo-pelvic muscles may act to support the abdominal viscera and provide a mechanical advantage to respiration by defending the length of inspiratory muscles (Dempsey et al, 1996; Detroyer et al, 1990; Dempsey et al, 1996). In short, this simple neuromotor strategy (tonic activation of deep lumbo-pelvic muscles) may provide a number of significant advantages to therapists training core stability during locomotor tasks.

The significance of tonic transversus abdominis activation to clinicians prescribing exercise to improve locomotor core stability is further highlighted by locomotor studies of low back pain and subsequent clinical intervention trials. Saunders et al (2004a) have provided initial evidence of loss of tonic activation of transversus abdominis during walking in low back pain. Importantly, the periods of silence of transversus abdominis evident in low back pain are coincident with ipsilateral foot strike (periods of high lumbo-pelvic impact). When considered in light of the proposed functions of this muscle, these data suggest that intersegmental control of the spine and pelvis, support of the abdominal viscera and respiratory efficiency may be compromised in low back pain subjects during walking. In addition, they are consistent with studies that describe a strong association between low back pain and disorders of respiration and continence (Smith et al, 2006).

Changes in superficial muscle activation are also associated with low back pain (Saunders et al, 2004a). Subjects with a history of recurrent low back pain who were pain-free at time of testing demonstrate increased duration of rectus abdominis activity. This is similar to the findings of Arendt-Nielsen et al (1995) who described increased paraspinial muscle activity during swing phase of gait with in experimental induction of pain and in clinical populations. Furthermore, increased activity of superficial abdominal and paraspinal muscles has been described during lifting (Van Dieen et al, 2003a; Van Dieen et al, 2003b), trunk flexion (Kaigle et al, 1995) and trunk unloading (Radebold et al, 2000) in low back pain. Over-activity of superficial abdominal and paraspinal muscles in low back pain. This overactivity is consistent with significant in light of the increased rigification and loss of transverse plane control previously described.

The efficacy of exercise aimed at retraining changes in locomotor-related activity of lumbo-pelvic muscles in low back pain has recently been investigated (Tsao and Hodges, 2005). Data confirm that a six-week exercise program performed twice daily involving 30 10-second, low-level isolated isometric contractions of transversus abdominis improves feedforward activation and measures of tonicity of transversus abdominis during walking in low back pain. Importantly, improvements in coordination of deep muscle activity during function that follow specific exercise were also associated with improvements in low back pain and function.

Decreased hip abductor strength

Hip abductor exercises are frequently targeted in core stability programs in an attempt to improve control of lumbo-pelvic motion in the frontal plane. This is thought to be particularly important with progression from walking to running when foot strike occurs during single leg stance and increased control at the hip is required to maintain lumbo-pelvic posture at this time. At present, there are insufficient EMG investigations of locomotor hip control in normal and symptomatic populations. However, diminished hip strength has been implicated as contributing to poor control of lumbo-pelvic posture, subsequent lower extremity malalignment and injury. Fredericson et al (2000) report that they have completed a number of investigations into iliotibial band friction syndrome (ITBFS). In this work, long distance runners with ITBFS have decreased hip abductor strength compared to their non-symptomatic side and to non-symptomatic runners. Furthermore, symptom resolution and return to pre-injury training levels are associated with improvements in hip abduction strength following a six-week rehabilitation program. In this program open and closed chain hip abductor exercises were performed once daily and progressed from one set of 15 to three sets of 30 repetitions as symptoms permitted.

Ireland et al (2003) describe an association between reduced hip abductor strength and patellofemoral pain with young female patellofemoral pain subjects demonstrating 26% and 36% reduction in hip abduction and external rotation strength than age-matched controls. Furthermore, it has been demonstrated that a physical therapy program including VMO retraining and isometric hip abduction exercises improves vastii motor control and is associated with reduction in symptoms (Cowan et al, 2005).

Summary

Core stability during locomotor tasks is dependent on a high degree of neuromuscular control of intersegmental shear and torsion (at the hip pelvis and spine), lumbo-pelvic posture and centre of mass displacement. Kinematic, electromyographic and strength measure based investigations provide preliminary evidence of altered locomotor lumbo-pelvic control and decreased lumbo-pelvic muscle capacity in association with lumbo-pelvic and lower limb injury. These data provide direction for clinicians as to how some components of locomotor core stability and muscle function can be assessed and trained. However, further research into the validity and reliability of clinical measures, the association between changes in them and injury and the efficacy of different interventions is required.

Steve Saunders is at Saunders Sports and Spinal, Adelaide, in South Australia and at the Department of Physiotherapy at The University of Queensland
The first stage of the Young investigation for the Australian Sports Anti-Doping Authority (ASADA) into Australian weightlifting found evidence of organised distribution and supply channels for a range of prohibited substances.

Releasing this information recently, Richard Ing, CEO of ASADA, announced an eight-point plan to protect the integrity of the sport. The plan is supported by the board of the Australian Weightlifting Federation.

An edited text of Mr Ing’s statement follows:

Australian weightlifting is a sport that has a dubious track record when it comes to the issue of Pure Performance. In the last four years, 10 weightlifters have been sanctioned for doping offences which is more than any other sport within ASADA’s government-funded testing program.

In March of this year, following allegations of the use of performing enhancing substances and subsequent allegations of trafficking within weightlifting in Australia, ASADA announced a wide-ranging investigation of these allegations.

To date three weightlifters, Coran Hocking, Jenna Myers and Camilla Fogagnolo, have received two-year sanctions and a fourth is still awaiting a hearing before the Court of Arbitration for Sport (CAS). All these matters relate to the use of the powerful stimulant BZP. In addition, a fifth weightlifter was the subject of allegations from within the sport for trafficking in BZP.

These issues prompted the opening of the investigation under the leadership of the experienced and internationally respected anti-doping expert Mr Richard Young.

The investigation has been conducted with the cooperation of a number of government agencies including the Australian Customs Service, the Therapeutic Goods Administration and the state police forces of South Australia and Victoria.

What I am announcing today is the findings of the first phase of the Young report. This investigation firstly has uncovered evidence of organised distribution and supply channels for a range of prohibited substances including steroids, human growth hormone (hGH), and BZP.

As a result, several persons of interest are assisting ASADA with its ongoing investigation and the possible resulting anti-doping rule violations.

As a direct result of the report, ASADA has now taken an eight point plan to protect the integrity of the sport to the Australian Weightlifting Federation (AWF) Board. This action plan has been unanimously supported by the AWF Board. (It requires that) the AWF will:

- assist ASADA in compiling urine and blood profiles for Australian weightlifters on the ASADA Registered Testing Pool as determined by ASADA;
- require that Australian weightlifters on the ASADA Registered Testing Pool provide accurate and timely whereabouts information as determined by ASADA;
- require that Australian weightlifters on the ASADA Registered Testing Pool seek prior approval from ASADA for international training locations;
- develop and observe selection criteria for the appointment of athlete support personnel in consultation with ASADA, whereby the athlete support personnel commit to pure performance in sport, particularly taking into account any anti-doping rule violations;
- compile a register of athlete support personnel to meet ASADA requirements and provide that information to ASADA on request;
- require all Australian weightlifters on the ASADA Registered Testing Pool, and registered athlete support personnel to attend mandatory ASADA education sessions (on a minimum of an annual basis);
- implement an education program to ensure that Australian weightlifters on the ASADA Registered Testing Pool and registered athlete support personnel are aware of the risks associated with the use of nutritional supplements to ASADA’s satisfaction;
- refer matters of non-compliance with these measures by Australian weightlifters on the ASADA Registered Testing Pool and registered athlete support personnel to an ASADA monitored AWF disciplinary body for action including loss of funding or other support, membership and/or selection under AWF rules.

These measures have been supported by the Australian Sports Commission.

The report also determined that the positive drug tests for BZP by four Australian weightlifters in October 2005 are likely to have resulted from the consumption of nutritional substances containing BZP. We now know from the report that the BZP was legally imported into Australia, sold to an Australian nutritional supplement company for inclusion in a product, and then repackaged for sale.

The report also found that there was no evidence to support an allegation that Belinda van Tienen had any knowledge or reason to suspect that the nutritional supplements sold contained BZP and recommended that unless further evidence comes to light Ms van Tienen has no case to answer in relation to the anti-doping rule violation for trafficking.

I would like to close by stressing the importance of our new power of investigations in fighting anti-doping in Australian sport. It is no longer good enough to just rely on the testing of athletes to successfully fight the war of doping in sport.

ASADA, as it is now structured, is an organisation that investigates as well as tests, realigning itself from the old model that relied solely on testing. Of the 8 anti-doping violations under the WADA code, testing will detect only one. Detection of the remaining seven including serious matters such as trafficking and administration rely heavily on professional and thorough investigations.
The New South Wales Conference of Science and Medicine in Sport, organised by SMA NSW, will take place on Saturday 5 May at the Waterview Convention Centre, Bicentennial Park, at Sydney Olympic Park.

Keynote speakers are Associate Professor Milton Cohen and Dr Leo Pinczewski. Professor Cohen is a rheumatologist and pain physician at St Vincents in Sydney and the Immediate Past Dean of the Faculty of Pain Medicine of the Australian and New Zealand College of Anaesthetists.

Dr Pinczewski is the Visiting Medical Officer at the Mater Private Hospital in Sydney. He received the Best Conference Paper at the National Annual Scientific Conference in Sports Medicine in 1994 and the Evelyn Hamilton Trust Memorial Prize for Best Paper at the Australian Orthopaedic Association Annual General Meeting in 2001.

Presentations include:
- Gut pain in endurance
- Rheumatology in sport
- Radiology in sport
- Strength and speed in athletes
- Psychological profiling of athletes at risk of doping
- Independent biomechanical footwear research.

The 2008 conference of SMA ACT has been set for the weekend of 16-17 February 2008. It will be held on the New South Wales South Coast. Those who would like to submit a paper should contact Patricia Donoghue by mail at the SMA-ACT office at ACT Sports House, 100 Maitland St, Hackett, ACT 2602, by phone on 02-6247 5115 or by email at trish@sportsmedicineact.org.au.

Olympic Park Sports Medicine Centre in Melbourne is celebrating its 20th anniversary later this year with its largest ever conference. Cutting Edge in Sports Medicine will be a one-day conference on 3 August at the Melbourne Cricket Ground – claimed by Melburnians as the spiritual home of sport.

The keynote speaker is Dr Tom Best, Professor and Pomerene Chair in Family Medicine at Ohio State University, Co-Medical Director of the OSU Sports Medicine Centre, Assistant Editor-in-Chief of Medicine and Science in Sport and Exercise and team physician to the OSU Buckeyes.

For details, go to www.opsmc.com.au/ and click on Seminars & Forums.

More information is becoming available about the 17th annual conference of the International Association for Dance Medicine and Science to be held at the Australian Institute of Sport in Canberra from 25 to 28 October.

IADMS works to improve the health, wellbeing and performance of dancers and this is the first time it has organised its annual conference in Australia or even the Southern Hemisphere.

The conference is co-hosted by the Australian Sports Commission, the Australian Ballet School and the Australian Dance Council (Ausdance).

Details of the program, registration fees, travel and accommodation and a post-conference day at the Australian Ballet School in Melbourne can be found at www.iadms2007.com.au.

On the subject of conferences, Sport Health readers may be interested in Health Conference Central, a new one-stop-shop central reference site that helps health professionals worldwide to find out what conferences are on in Australia and New Zealand, book their place conferences and find and arrange accommodation, air fares and car hire, etc. For more details, go to www.healthconferencecentral.com.au/search.php.

Past issues of Sport Health are now available for online viewing via PDF download. Go to the SMA website (www.sma.org.au) , click on Publications and follow the links to Sport Health. The 2005 and 2006 series are available and all but one so far of the 2004 series.

Some personnel changes around SMA:
- Anne Johnson, Executive Officer in WA, will be taking some extended leave during 2007. Her role will be job-shared by long time SMA staff member Karen Jones and new addition Jill Powell. Jill has spent many years in the sport and recreation field with positions on numerous boards and within local government.
- Michael Woods has joined National as Subscription Manager of Sport Health and SMA Membership Officer.
- Lesley Crompton is the new Projects Officer at National.
- Janine Yin is the new Membership Coordinator and Administration Assistant at SMA Queensland
- And SMA NSW has a new team member: Brooke McKenzie, Administration Officer, who is completing an Internship through the Australian Training Company. Brooke will be working at SMA NSW on a full-time basis over a 12-month period, assisting with the Safer Sport Program administration, Sports Trainer coverage service and general office administration.
Charles Sturt University is looking for participants for two important research studies.

The first -- Adolescent athletes’ return to sport from injury: A parental and athlete perspective -- aims to obtain in-depth information on the challenges and demands of the injury recovery and return-to-sport processes among adolescent athletes. To achieve this, the perspectives of both athletes and their parents will be sought.

This research is being carried out by Dr. Les Podlog, Lecturer in the School of Human Movement Studies at the university. The information provided will be used to develop strategies to assist athletes in returning to sport after injury.

Participants must:
(a) have suffered an injury requiring a minimum two-month absence sport-related training and competition, and
(b) currently be attending rehabilitation/physiotherapy sessions for their injury.

Participation in the study involves taking part in three separate interviews over a six to eight-month period. Interviews should take approximately one hour and will be audio-taped. Participants have the right to discontinue participation at any time, without penalty or discriminatory treatment.

The second study -- Psychological need satisfaction and return to sport outcomes among injured athletes -- will examine athletes’ injury recovery needs and return-to-sport outcomes. The aim is to obtain information to assist athletes in making the most effective injury recovery possible.

This research is being carried out by Dr Podlog and Dr Scott Cresswell, Post-doctoral fellow at The University of Western Australia. The information provided will be used to develop strategies to assist coaches and medical practitioners aiming to meet athletes’ physical and psychological recovery needs.

In order to participate in this study, participants must:
(a) have suffered a past injury requiring a minimum two-month absence from sport-related training and competition,and
(b) have since returned to compete following the injury.

Participation in this study involves completing a short questionnaire (approximately 10 to 15 minutes). Again, participants have the right to discontinue participation at any time, without penalty or discriminatory treatment.

The information provided in both studies is confidential and measures will be taken to ensure participants’ anonymity. All data collected will be stored and secured in the School of Human Movement at Charles Sturt University. Although information gathered from the interviews may be published in scientific journals, names or other information about participants will not be used.

Would-be participants should contact Dr Podlog via email (lpodlog@csu.edu.au) or telephone 61 (02) 6338985 (Office).

**Core stability and exercise prescription**

**References**


