UPDATING THE INTERNATIONAL RESEARCH AGENDA FOR SPORT INJURY PREVENTION RESEARCH

Caroline F Finch

The International Olympic Committee's (IOC) World Conference on Prevention of Injury and Illness in Sport, the 3rd in series of triennial international conferences, was held in the very sunny city of Monaco in April 2011. This conference is now the leading research event for many sports injury prevention and sports medicine researchers and was well-attended by over 940 delegates from 85 countries. A particularly pleasing part of the program for me was the large emphasis of a number of sessions(including a keynote, several symposia and proffered papers), on the primary prevention of sports injuries, particularly issues relating to the delivery, implementation and uptake of preventive measures in this important context of injury. Abstracts from this meeting have been published in the April Injury Prevention and Health Promotion issue of the British Journal of Sports Medicine (http://bjsm.bmj.com/content/45/4.toc) and on-line presentations are available for viewing at the conference website (http://www.ioc-preventionconference.org/).

The IOC support for this conference is part of its very recent increased support for sports injury prevention efforts globally.[1] The current state of art of the sports injury research field, as presented at the Monaco meeting is very well summarised by the strategic keynote addresses that covered topics ranging from the identification and management of sport and exercise-related acute deaths and overuse conditions to current research knowledge needs in relation to the biomechanical mechanisms of sport injury to an overview of new implementation science approaches that need to be used by sports injury prevention researchers to a description of some current implementation activities associated with football.

Fortunately, death during sport is a rare occurrence but, when it does occur, sudden cardiac death (SCD) is the leading cause. This topic was discussed by A/Prof Jonathan Drezner, from the University of Washington, USA and Prof Antonio Pelliccia, Institute of Sport Medicine and Science, Rome who argued that recognition of SCD is likely to be underestimated but that its effective prevention in young athletes can be achieved through proper pre-participation cardiovascular screening (including an ECG to detect underlying predisposing cardiovascular conditions)[2] and comprehensive emergency planning with access to defibrillators.[3] Primary prevention through screening and secondary prevention assisted by defibrillators are complementary strategies for the prevention SCD in sport. In addition to more medically-orientated recommendations, from a prevention point of view the research needs in this field were summarised as 1) Determining the accuracy, sensitivity/specificity of ECG screening and modern ECG criteria in different athlete populations; 2) Developing educational tools to train physicians in ECG interpretation in athletes to increase workforce capacity; and 3) Establishing the cost-effectiveness of AED programs in different athletic settings.

Prof Michael Kjaer from the Institute of Sports Medicine in Copenhagen presented the second keynote address through a very informative talk about sports tendinopathy, a major category of injury

particularly in high performing athletes and those who experience repetitive and/or high loading to their tissues. Whilst presenting mainly a medical overview of tendinopathy and other overuse injuries in sport,[4] he also discussed how effective training programs could be used to prevent such injuries. Whilst inconsistent with the commonly used acute energy transfer definition of injury, overuse conditions are important in sporting populations because of their significant impact on sports activities and their increasing of the risks for long-term poor musculoskeletal health and functioning in affected athletes.

Dr Tron Krosshaug from the Oslo Sports Trauma Research Centre in Norway delivered a keynote address that was an excellent overview of the international status of biomechanics research, as it applies to better understanding the causes of sports injury and their mechanisms in terms of player/opponent behaviour, playing situations, gross biomechanics and detailed biomechanics. He described the eight common research approaches for understanding injury mechanisms in sport as: injuries during biomechanical experiments, athlete interviews, clinical studies, video analysis, cadaver and dummy studies, in vivo studies, motion analysis of non-injury situations and mathematical modelling and simulation.[5] He concluded that future gains in knowledge and prevention will only be achieved if these research approaches are combined in multidisciplinary collaborations. Three areas where he highlighted particular research knowledge needs were in relation to: 1) How to improve muscle coordination when fatigued; 2) The benefits of eccentric strength training; and 3) Understanding how non-contact Anterior Cruciate Ligament (ACL) injuries, one of the most common in sport, occur.

In the fourth keynote address, I presented an overview of the status of implementation and dissemination research in sports injury prevention, particularly from a public health point of view.[6] My talk provided an overview of the very recent international approaches that have begun to describe the implementation context for the delivery of safety interventions and the complexities of determining their effectiveness in real world sports delivery settings. This talk drew on broader implementation science frameworks and approaches, as well as studies from other injury prevention fields. I concluded to that, in order to start to meet set sports injury prevention priorities and to achieve necessary for real world safety gains. it will be necessary to start to conduct research into: 1) New understandings of how to translate research evidence into preventive action; 2) New forms of information dissemination and program delivery that can be easily understood and taken up by community sport and the athletes themselves; 3) Theoretical perspectives underpinning intervention studies; 4) Innovative methods and study designs for their evaluations; and 5) Real world effectiveness studies.

The final keynote session was jointly presented by Prof Jiri Dvorak and Dr Astrid Junge, both from Switzerland and associated with F-MARC, the Federation Internationale de Football Association's (FIFA) Medical Assessment and Research Centre, and Prof Colin Fuller, University of Nottingham and described some real world examples of how FIFA has been actively engaged in implementing both health and safety messages through its international game. Focusing on the injury prevention aspects

of their talk, the development and implementation of the FIFA 11 and improved FIFA 11+ programs were discussed.[7] These were initially developed through F-MARC's identification of opportunities for preventing football injuries through better preparation for the game, ensuring the laws of the game are adhered to, better education of players and participation in regular exercise specific exercises for football players. The presenters concluded that future translation of scientific evidence about prevention through sport will require partnerships between scientists, player role models, member sports associations and national and regional governments.

Whilst the international sports medicine community is clearly making significant advances in its research efforts into injury prevention in sport, it is always somewhat surprising for me to find that many people in that research community are largely aware of the broader advances in injury prevention research more widely including the science of injury surveillance; methodological advances in study designs for better understanding injury risk; examples of successful engagement with the target groups for interventions; best practice models of engagement with policy makers and practitioners; new understandings about the ecological context for injury prevention and setting specific or cultural influences on both injury risk and the uptake of interventions, etc. Based on a somewhat ad-hoc vox pop of attendees at the Monaco conference, this still seems to be the case. Conversely, I expect that many "traditional" injury researchers are unaware of the quality and large amount of descriptive epidemiology studies, detailed etiological and biomechanical research, and randomised controlled efficacy evaluations of sports medicine related interventions aimed at all stages of the injury prevention chain. On the basis of my observations and attendance at international injury conferences AND international sports medicine conferences, there are very few people who regularly straddle the two. I see this disconnect as a major limitation with the sports injury field at the moment and a barrier towards more prevention progress in it.

As one attempt to reduce this divide between the science and practice of injury prevention in general and the context-specific focus of much sports medicine research, I will be leading a new BLOG focus through both this journal, *Injury Prevention*, and its sister journal the *British Journal of Sports Medicine*. The *Injury Prevention* BLOG will alert interested *Injury Prevention* readers to particularly relevant items from the BJSM's latest edition and the BJSM BLOG will be used to do this in the other direction. I do hope that all researchers, of any persuasion, who are interested in sports injury will find this new focus useful and will also contribute to it through commenting on the BLOGS or Twitter feeds.

Of course, this is only one step and, as any good injury epidemiologist would say, it will take some time before we will have an adequate sample size of observations against which robust conclusions could be drawn about its effect with much statistical confidence! Nonetheless, I would be keen to hear from others about other possible strategies that could be adopted to help break down the current apparent barrier between injury prevention and sports medicine research.

REFERENCES

1. Bahr R. Monaco 2011: IOC commitment moves injury prevention to centre stage. 2011;**45**:236-7.

2. Corrado D, Basso C, Schiavon M, et al. Pre-participation screening of young cmpetitive athletes for prevention of sudden cardiac death. J Am Coll Cardiol. 2008;**52**:1981-9.

3. Drezner JA, Rao AL, Heistand J, et al. Effectiveness of emergency response planning for sudden cardiac arrest in United States high schools with automated external defibrillators. Circulation. 2009;**120**:518-25.

4. Cook J, Kongsgaard M, Khan K, et al. Preventing tendon overuse injuries: Wiley-Blackwell; 2009. 197-196.

5. Krosshaug T, Anderson T, Olsen O, et al. Research approaches to describe the mechanisms of injuries in sport: limitations and possibilities. Br J Sports Med. 2005;**39**:330-9.

6. Finch C. No longer lost in translation – the art and science of sports injury prevention implementation research Br J Sports Med. 2011;(in press).

7. Soligard T, Myklebust G, Steffen K, et al. Comprehensive warm-up programme to prevent injuries in young female footballers: cluster randomised controlled trial. BMJ. 2008;**337**:a2469.