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### Injuries of athletes in training for 2010 Pan Pacific Masters Games: Types and locations



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**Introduction:** Masters sport events are among the largest single sporting events in terms of participation in the world and as a consequence it is important to know the characteristics of the injuries present in this population and how they can be minimised. The 2010 Pan Pacific Masters Games recorded over 10,700 athletes, representing 26 nations, across 36 sports and thus presents an excellent opportunity for the collection of data regarding injuries in master's sport. Furthermore, this data may be compared to previous research on the 2009 World Masters Games. The aim was to assess the type and location of injuries sustained by athletes in training for the 2010 Pan Pacific Masters games.

**Methods:** 1569 athletes, (731 male and 837 female, age mean = 49.13, SD ± 9.017, range = 25–83) competing at the 2010 Pan Pacific Masters Games completed an online survey regarding injuries received during training within the three months prior to competition.

**Results:** In total 200 participants reported an injury and 95 were female and 105 were male. The most common sites for injury for pooled data were legs (74), knees (44), ankles (42) and shoulders (40). For males the most common sites were legs (45), knees (20), shoulders (18), ankles (16) and back (15). For females the most common sites were legs (29) ankles (26) knees (24) and shoulders (22). Most common combined types of injury were muscle/tendon strain (108), joint pain (58), inflammation (48), ligament sprain (47) and muscle pain (46). The most common types of injury for men were muscle/tendon strain (68), joint pain (34), ligament sprain (25), muscle pain (25) and inflammation (23). For women most common types of injury were muscle/tendon strain (40), inflammation (25), joint pain (24), ligament sprain (22) and muscle pain (21). Of note is the finding female participants reported 15 sprains and 7 fractures compared to male participants who reported 7 sprains and 2 fractures.

**Discussion:** Injuries reported at 2010 Pan Pacific Masters Games were similar to those reported by athletes participating in the football codes at the 2009 World Masters Games and thus may serve as a guide when implementing strategies aimed at injury prevention. As there are few differences between genders the gender specific injury prevention programs are not necessary. On the basis of these findings it is suggested a greater emphasis be directed to the importance of injury prevention strategies as enhancing joint stability through strength training and proprioceptive training.

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### Risk management in the Australian fitness industry: The results of the first national survey



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This paper will set out the findings of the first ever national survey of fitness professionals conducted under the auspices of the AFIRM Project. The Australian Fitness Industry Risk Management Project is a three-year Australian Research Council Linkage Project being conducted in partnership with Sports Medicine Australia and Fitness Australia that will answer two important questions:

How does Australian regulation currently control risk management in the fitness industry and thereby prevent adverse health outcomes and injury, and the legal liability associated with those risks?

What sustainable changes could be made to Australian regulation for more effective risk management in the health and fitness industry in order to prevent the risk of adverse health outcomes and injury, and the legal liability associated with those risks?

Using nominal group technique in focus groups in urban and regional centres in four States, the research team identified key issues and concerns of fitness professionals in a wide variety of categories. This research guided the development of the national survey, and in this paper we will set out the results of this groundbreaking research. The findings will be used to make recommendations for improvements in safety practices and improvements in policy and regulation.

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### Australian hospital admission and emergency department-reported snow sports injuries: A summary of the past decade



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**Introduction:** Participation in snow sports, such as skiing and snowboarding, are popular recreational activities among Australians, particularly in the states of New South Wales and Victoria. These activities make a large economic contribution to Australian tourism, with approximately 2,000,000 visitor-days to the Australian ski fields annually. Similarly with international ski areas, participation in, as well as the nature of, snow sports in Australia carries an inherent injury risk, leading to a correspondingly high incidence of injury cases. Recent reports of Australian snow sports injury surveillance are lacking. This paper aims to provide an up to date summary of hospital admission and emergency department-reported injuries and injury trends relating to snow sports occurring over the past decade in Victoria, Australia.

**Methods:** Retrospective summary data from two datasets collected by the Victorian Injury Surveillance Unit (VISU) of hospital admissions (Victorian Admitted Episode Dataset [VAED]) and emergency department (ED) presentations (Victorian Emergency Minimum Dataset [VEMD]) were analysed over a 10-year period

including 2002/03–2011/12. Hospital treated injury events relating to skiing, snowboarding and unspecified ice/snow sports were included. Data pertaining to injury type, body region injured, cause of injury and participant age and gender were analysed.

**Results:** Trends illustrated an increase in hospital treated snowboard injuries, with fluctuations in ED presentations and declines in admissions for ski injuries. More skiers (57%,  $n=1720$ ) were admitted to hospital than snowboarders (37%,  $n=1117$ ), however snowboarders (45%,  $n=1437$ ) presented to ED more frequently than skiers (39%,  $n=1243$ ). Hospital admission and ED data, respectively, showed that lower limb injuries were most common among skiers (44% and 16%), while upper limb injuries were common among snowboarders (35% and 20%). Approximately two thirds of all hospital treated injuries were sustained by males (65%), with falls being the most common cause (68% admissions, 72% ED). Younger participants were generally injured more frequently, however, some differences in age group and injury type existed across the two activities.

**Discussion:** Data indicates some trends in snow sports injury during the past decade, most likely reflecting participation rates and comparative snow conditions. The injuries common to each activity demonstrate the relative physical demands and differences in technique requirements, unique to each, and may also be a result of differences in terrain exposure. This evidence suggests that injury prevention measures be targeted to young male participants to decrease the impact of falls. Strategies could include use of personal protective equipment and/or education of correct landing/falling techniques.

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### Challenges when implementing a sports injury prevention training program into real-world community sport



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**Introduction:** A full understanding of the ecological context is critical in the implementation of an effective sports injury prevention intervention. There are many complexities and challenges associated with the delivery of a successful intervention in a community team-based setting. Although the development and efficacy of interventions are regularly reported, rarely are the lessons learnt during the delivery of the intervention published. Therefore, the purpose of this paper is to describe the key issues experienced in the delivery of a lower limb injury prevention training program in community-level Australian football.

**Methods:** A 26-week periodised training program, combining skill and perturbation-based activities, was delivered in the 'Preventing Australian Football Injuries through eXercise' (PAFIX) program in 40 community-level Australian football teams in two Australian states and across two seasons. It was delivered by undergraduate and graduate exercise and sports science students from the universities managing the PAFIX project. They provided regular feedback to the program managers and were encouraged to record issues experienced during the implementation of the program. In addition, the program manager in each state randomly attended training sessions to observe the program delivery and seek feedback from coaches and players.

**Results:** The implementation challenges experienced can be assigned to three broad categories; player, coach, and equipment/environmental factors. The ability to appropriately advance individual players through the program's progressions in a team-based setting was a constant challenge. This was influenced by players' punctuality, previous and existing injuries, absences and motivation. The support of the coach and senior leadership team and their understanding of the importance of injury prevention were also critical. The impact of wet, muddy conditions on the use of fundamental equipment, such as balance cushions, wobble boards and mini trampolines, was not anticipated. Solutions to the interface of the equipment with the various ground surfaces had to be addressed during the implementation of the program. Furthermore, some adaptations to the program were also required with cancellations of training sessions due to inclement weather.

**Conclusions:** Maintaining the fidelity of sports injury interventions relies on smooth delivery. Many of the issues presented could be experienced in the delivery of an intervention in any team sport. It is anticipated that increased awareness of these issues could be used to inform the development and delivery of similar interventions in the future.

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### The Athlete's Foot Supported Session

#### Evaluation of foot posture using the Microsoft Kinect



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**Introduction:** Prospective studies using the Foot Posture Index (FPI) in athletic and military populations have demonstrated that abnormal foot posture increases the risk of lower extremity injury. However, other research has shown that the FPI has reduced validity and inter-rater reliability. With recent studies demonstrating that the Microsoft Kinect can obtain some biomechanical data with similar accuracy to 3D motion analysis (3DMA) and scanning systems, the Kinect has the potential to evaluate static foot posture with more accuracy than subjective tools such as the FPI. Therefore, the aim of this study was to evaluate whether the Kinect is able to accurately and reliably evaluate static foot posture, compared to visual and 3DMA assessments of the FPI.

**Methods:** The static foot posture of 30 males was assessed over two sessions using three methods; a traditional visual assessment, a 3DMA system and the Kinect. Spearman's rho was used to assess the intra-rater reliability of the three methods and to evaluate the concurrent validity of each. Linear regression was used to examine the Kinect's ability to predict total visual FPI score.

**Results:** Four Kinect FPI items demonstrated moderate to good intra-rater reliability ( $\rho=0.62-0.78$ ) whereas all visual FPI items demonstrated poor to moderate intra-rater reliability ( $\rho=0.17-0.63$ ). Comparison to FPI items obtained using the 3DMA system revealed four Kinect FPI items possessed moderate to good validity ( $\rho=0.51-0.85$ ) whereas all visual FPI items showed poor correlations with both the 3DMA and Kinect (absolute  $\rho=0.01-0.44$ ). The Kinect items that demonstrated moderate to good reliability were able to predict 61% of the variance in the total visual FPI score.