

13.1, followed by men's lacrosse at 6.80 and men's wrestling at 6.55. Seven-hundred-twenty-six injuries were reported by the ATCs of which the majority of injuries were to males (77.5%) with injuries largely to the head/face, ankles, and knees. The leading type of injury across sports was ligament sprain (27.7%), followed by concussion (23.2%), and muscle strain (11.6%). For all sports, boys had a significantly greater injury rate compared to girls and this was true across competitions and practices (Relative Risk (RR) = 2.79, Confidence Interval (CI): = 2.32–3.34; RR = 2.98, CI: = 2.28–3.88; RR = 2.88, CI: = 2.22–3.74, respectively).

Conclusions The results of this research confirm the important role of various sports injuries among high school athletes with an emerging role for high school lacrosse. The results of these findings will be used to develop targeted interventions to reduce sports injuries in these athletes.

972 THE EFFECTIVENESS OF INJURY PREVENTION PROGRAM ON REDUCING THE INCIDENCE OF LOWER LIMB INJURIES IN ADOLESCENT MALE SOCCER PLAYERS

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Background The highest incidence of injury is seen in adolescent playing pivoting sports such as soccer, basketball, and handball.

Objective: To examine the effectiveness of a neuromuscular prevention program in reducing knee and ankle injuries in adolescent male soccer players.

Methods Fifty Malaysian boys [25 experimental (EXP); or a 25 control (CON)] adolescent male soccer players (age 13.3 ± 0.4 yr; BMI 20.9 ± 1.5 kg/m²; stature: 160 ± 0.1 cm) from two sport schools, with 4.4 ± 0.5 years playing experience participated. The EXP group followed neuromuscular prevention program 5 days per week, for 12 weeks. The CON group was instructed to continue training and warm-up as usual. A neuromuscular exercise programme designed exclusively for adolescent soccer players was including jumping, eccentric strength, agility, balance, dynamic stretching and speed. Over 1 year all injuries were documented monthly by physiotherapist. Complete monthly injury reports were available for 50 players.

Results Eight lower limb injuries [Knee 3, (0.12 ± 0.32); Ankle 5, (0.19 ± 0.38)] occurred in the EXP group, and 11 lower limb injuries [Knee 1, (0.03 ± 0.12); Ankle 10, (0.40 ± 0.50)] occurred in the CON group. The incidence of injuries per 1000 player-hours of training and playing soccer was 1.7 in the EXP group, and in the CON group 2.4 injuries per 1000 player-hours, which equates to 29% fewer injuries in the EXP group. Significance of difference between the EXP and CON groups was $p < 0.05$.

Conclusions Effective implementation of neuromuscular injury prevention program can reduce lower extremity injury incidence in adolescent male soccer players. Adolescent players need better education regarding injury prevention strategies and should include such interventions as part of their regular training.

973 KNEE CONTROL AND JUMP-LANDING TECHNIQUE IN YOUNG BASKETBALL AND FLOORBALL PLAYERS

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Background Poor knee alignment is associated with increased loading of the joints, ligaments and tendons, and may increase the risk of injury. The study purpose was to compare differences in knee kinematics between basketball and floorball players during a vertical drop jump (VDJ) task. We wanted to investigate whether basketball players, whose sport includes frequent jump-landings, exhibited better knee control compared with floorball players, whose sport involves less jumping.

Methods Players (aged 12–21 years) were recruited from six basketball and floorball clubs of the Tampere City district, Finland. Complete data was obtained from 173 basketball and 141 floorball players. Peak knee valgus and flexion angles during the VDJ were analysed by 3 D motion analysis.

Results Larger knee valgus angles were observed among basketball players (-3.2° , 95% CI: -4.5 to -2.0) compared with floorball players (-0.9° , 95% CI: -2.3 to 0.6) ($P = 0.022$). Basketball players landed with a decreased peak knee flexion angle (83.1° , 95% CI: 81.4 to 84.8) compared with floorball players (86.5° , 95% CI: 84.6 to 88.4) ($P = 0.016$). There were no significant differences in height, weight or BMI between basketball and floorball players. The female athletes exhibited significantly ($P < 0.001$) larger peak knee valgus angles (-7.5° , 95% CI: -8.7 to -6.2) than the male athletes (3.4° , 95% CI: 2.1 to 4.6).

Conclusions This study revealed that proper knee control during jump-landing does not seem to develop in young athletes simply by playing the sport, despite the fact that jump-landings occur frequently in practice and games. Poor knee control was especially common among young female athletes. An important clinical implication of these findings is that young team sport athletes need to be taught a safer technique for landing and also need specific neuromuscular training in order to avoid potentially harmful movement patterns. (Int J Sports Med 2015, accepted for publication)

974 MX SAFETY MOVEMENT AND SAFETY PROJECT

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Background MX Safety campaign started 2014. Campaign is lead by Teija Piirto who's mission is very personal due to a loss of her own brother. MX Safety's aim is to create encouraging safety debate and advance safety at off road tracks with track users. Target is zero fatal accidents in basic training environment and national and club level races, worldwide. All the work is done through voluntary work. Project has a wide range of knowledge

and a large spectrum of track users involved. Finnish Rescue service has a major partnership project that enables a completely new way to co-operate on safety related matters national wide.

Methods Mx Safety will collect and share the information regarding safety issues and is also developing tools to promote safety. Mx Safety does involve track users to recognise risks and encourage them to make improvements towards safer training conditions.

The most visible project at the moment is basic safety sign standardisation for off road tracks.

National Rescue Service co-operation offers a great opportunity to get national wide risk management, rescue and emergency guidelines for all tracks.

Results An overview of MX Safety signs was first introduced at Motorcycle Show 2015 in Helsinki, in cooperation with the MX Safety project, the cooperative network of emergency services (Pelastuslaitosten Kumppanuusverkosto) and the Finnish Motorcycling Federation. The Finnish Motorcycling Federation (SML) motocross commission has confirmed that MX Safety signs will be introduced at all Finnish motocross tracks latest during 2016. By following common guidelines and best practices and deficiencies motorcycling clubs are able to prevent significant amount of accidents. All tracks users must commit to compliance with common rules. Signs has been translated already in English, Latvian and French languages.

Conclusions Each country is welcome to work together to promote safety.

975 GEOSPATIAL ANALYSIS OF SPORTS AND LEISURE INJURY HOSPITALISATIONS IN VICTORIA, AUSTRALIA

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Background Sports injuries are identified as a major public health problem in Australia and around the world. Sports injury prevention strategies and policy development relies on information about when, where, to whom and how sports injuries occur at a population level. The aim of this research is to investigate the geographical distribution of sports and leisure injuries and to identify populations who are at greatest risk of injury.

Methods Data on sports and leisure injury hospitalisations were obtained from the Victorian Injury Surveillance Unit for the years 2005–2011, inclusive. Population-standardised sports and leisure injury hospitalisation rates were calculated for each Local Government Area (LGA). The geographical distribution was investigated using Global Moran's I statistics. G_i^* statistics were used to identify statistically significant clustering of high and low values of hospitalisation rates, both overall and for specific activity groups.

Results Mapping by LGA showed a spatial variability in the distribution of injury hospitalisation rates. The Global Moran's I value suggested that hospitalisation rates in Victoria by LGA were spatially clustered. The G_i^* statistics showed a statistically significant clustering of high values for overall hospitalisation rates in the south-western region of Victoria. Similarly, clustering of high values for team ball sports and wheeled motor sports were identified in the western and south-east regions of Victoria, respectively.

Conclusions This study demonstrates that geospatial analysis can be used for better understanding of the population at risk of

sport and leisure injury. Findings suggest that priority geographical areas for sports injury prevention can differ depending on the type of sporting activity. These findings will provide a strong evidence base for the strategic planning, development and delivery of sports and leisure injury prevention programs.

976 MULTIPLE INJURIES IN TEAM BALL SPORTS – HOW ARE DATA COLLECTED AND ANALYSED? A SYSTEMATIC REVIEW

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Background A major challenge in sports injury research is that many athletes experience multiple injuries, therefore contributing more than once to the injury tally. Capturing this multiple individual contribution in estimates of sports injury incidence is difficult. The aim of this study is to report how >1 individual injury is defined and reported in prospective, long term, sports injury epidemiology studies in team ball sports.

Methods The review was performed and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement with a systematic search in 3 databases to August 2014. Studies were included if all types of injury were reported in team ball sport participants, with data collected prospectively over >1 calendar year or two consecutive sporting seasons. Details on injury definitions, with attention to multiple injuries, were independently extracted by two authors.

Results From 6518 studies, 54 met all inclusion criteria. Injuries or injured players tend to be pooled (grouped) over the whole time period and injury incidence reported as an overall total or annual counts/rates. Both options ignore the potential relationship between injuries sustained by the same individual, within or across seasons. Summarised injury data for the whole cohort was presented even though data collection was in individuals that could have facilitated a more detailed exploration of the relationships between subsequent injuries within those individuals.

Conclusions The way data have been reported in previous sports injury epidemiological studies significantly hinders the ability to provide robust evidence about subsequent injuries. Both an underreporting of new injury incidence and overestimation of injury recurrence can occur if there is no reporting of multiple/subsequent injuries. Ultimately, injury prevention efforts rely on accurate incidence estimates and ongoing developments in this area can only enhance the field.

977 SPORTS AND EXERCISE SAFETY IN FINLAND LIVE – AN IMPLEMENTATION PROGRAM TO SPORT CLUBS AND SCHOOLS

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Background Number of sports injuries has increased in Finland during the past decades. Today sports injuries are the most common injury type. Children, youth and especially young men are at high risk.

Objective The purpose of the LiVE program is to increase safety of sports and exercise in a nationwide setting.