

**Modificado** em 23 Fevereiro 2012

64 abstracts

### **Non-avalanche-related snow immersion deaths: tree well and deep snow immersion asphyxiation.**

Van Tilburg C, Wilderness & environmental Medicine, 2010, 21(3):257,- Mountain Medical Clinic, Providence Hood River Memorial Hospital, Hood River, OR, USA.

Non-avalanche-related snow immersion death (NARSID), or snow immersion asphyxiation, is a significant winter mountain hazard for skiers and snowboarders. This phenomenon occurs predominately in western North America, where large tree wells and deep snowpacks develop. Although statistics are difficult to procure, snow immersion asphyxiation has resulted in more than 70 documented deaths in the past 2 decades. The primary purpose of this review is to examine the existing literature on NARSID to help prevent such dangerous accidents through educating wilderness medicine professionals and fostering public awareness. The exact duration of burial to time of death and the cause of death are not precisely known but can be postulated from accident reports, experimental snow burial studies, and avalanche literature. In most cases, death probably occurs within 15 to 30 minutes from the time of burial. However, survival after prolonged burial in a tree well and deep snow is possible. The cause of death is asphyxiation, probably due to one of the mechanisms that produce asphyxia in avalanche burial victims: positional asphyxia, airway obstruction, or carbon dioxide displacement asphyxia. Prevention of snow immersion asphyxiation begins with skiers and snowboarders staying within the limits of their skills, using the proper tools for deep powder, staying in control at all times, and employing a buddy system. A skier or snowboarder who falls near or into a tree well should tuck, roll, and try to land upright, grab the tree trunk or a branch, and yell or blow a whistle to alert partners. If buried upside down, the person should stay calm and create an air pocket, which is probably of paramount importance. Skiers and snowboarders should use avalanche safety equipment to lessen the risk of snow submersion asphyxiation.

## **Injury incidence and predictors on a multiday recreational bicycle tour: The Register's Annual Great Bike Ride Across Iowa, 2004 to 2008.**

Boeke PS, House HR, Graber MA, Wilderness & environmental Medicine, 2010 21(3):202-7. Department of Emergency Medicine, University of Iowa Hospitals and Clinics, Iowa City, IA, USA.

**OBJECTIVE:** The "Register's Annual Great Bike Ride Across Iowa" (RAGBRAI) is a 7-day recreational bicycle ride with more than 10,000 participants covering 500 miles. The heat and humidity of late July in Iowa, the prevalence of amateur riders, and the consumption of alcohol can combine creating the potential for a significant number of injuries. The purpose of this study is to determine the type, quantity, and severity of injuries on RAGBRAI and gather data on the factors related to these incidents. **METHODS:** This retrospective chart review examined ambulance "run sheets" for patients requiring transport to the hospital from the bike route between 2004 and 2008. These run sheets included name, age, chief complaint, anatomic location of injuries, medications administered, procedures performed, and a full narrative describing the initial scene, patient's account of the incident, services provided, and ongoing condition of the patient while en route to the hospital. Chi-square tests, Pearson's correlation tests, and t tests were applied to determine significant statistical outcomes. **RESULTS:** From 2004 to 2008, Care Ambulance Inc provided on-route medical services for 419 RAGBRAI participants. Of these participants, 190 (45.3%) required transport to a local hospital by Care Ambulance Inc. Females were more likely to require transport, as they comprised 46.3% of transported patients while only representing 35% of all RAGBRAI participants ( $P = .001$ ). For men, increasing age was a significant predictor of transport, particularly males between the ages of 60 and 69 years old ( $P = .01$ ). Of the 148 run sheets where mechanism of incident was documented, 114 incidents were caused by rider factors (77.0%), 29 by road factors (19.6%), and 5 by bicycle factors (3.4%). Higher heat indexes were correlated with an increased number of dehydration cases ( $r = 0.979$ ,  $P = .02$ ). Of participants who reported with minor injuries to a mobile first aid station and did not require transport, 90.1% had not imbibed any alcohol. Bony injuries were more common above the waistline as 39/45 (86.7%) fractures occurred to the clavicle, shoulder/proximal humerus, hand, or head. The most common bony injury each year of RAGBRAI was a clavicle fracture, which represented 44.4% of all recorded fractures from 2004 to 2008. Lacerations and abrasions were also more common above the waist, as 63.5% (127/200) of soft tissue injuries requiring treatment were either to the head or upper extremities. No specific event day showed any correlation with increased injury ( $P > .05$ ). **CONCLUSIONS:** This study suggests that females and older males are more likely to require transport for injuries sustained on RAGBRAI, the majority of injuries occur around the head and upper extremities, dehydration case load is correlated with heat index, and that incidents are usually caused by rider factors. This research could be used by multiday recreational bicycle tour organizers to continue educating riders on riding carelessness and etiquette and prepare medical services for certain quantities and types of injuries.

## **The development and application of an injury prediction model for noncontact, soft-tissue injuries in elite collision sport athletes.**

Gabbett TJ.: Journal of strength and conditioning research / National Strength & Conditioning Association , 2010, 24(10):2593-603, Brisbane Broncos Rugby League Club, Brisbane, Australia.

Limited information exists on the training dose-response relationship in elite collision sport athletes. In addition, no study has developed an injury prediction model for collision sport athletes. The purpose of this study was to develop an injury prediction model for noncontact, soft-tissue injuries in elite collision sport athletes. Ninety-one professional rugby league players participated in this 4-year prospective study. This study was conducted in 2 phases. Firstly, training load and injury data were prospectively recorded over 2 competitive seasons in elite collision sport athletes. Training load and injury data were modeled using a logistic regression model with a binomial distribution (injury vs. no injury) and logit link function. Secondly, training load and injury data were prospectively recorded over a further 2 competitive seasons in the same cohort of elite collision sport athletes. An injury prediction model based on planned and actual training loads was developed and implemented to determine if noncontact, soft-tissue injuries could be predicted and therefore prevented in elite collision sport athletes. Players were 50-80% likely to sustain a preseason injury within the training load range of 3,000-5,000 units. These training load 'thresholds' were considerably reduced (1,700-3,000 units) in the late-competition phase of the season. A total of 159 noncontact, soft-tissue injuries were sustained over the latter 2 seasons. The percentage of true positive predictions was 62.3% (n = 121), whereas the total number of false positive and false negative predictions was 20 and 18, respectively. Players that exceeded the training load threshold were 70 times more likely to test positive for noncontact, soft-tissue injury, whereas players that did not exceed the training load threshold were injured 1/10 as often. These findings provide information on the training dose-response relationship and a scientific method of monitoring and regulating training load in elite collision sport athletes.

Injury risk factors in junior tennis players: a prospective 2-year study. Hjelm N, Werner S, Renstrom P

Scandinavian journal of medicine & science in sports

22(1):40-8, 2012 The aim was to investigate injury risk factors in junior tennis players. Fifty-five players, 35 boys and 20 girls, answered a questionnaire about training habits, time of exposure, previous injuries and equipment factors. A battery of clinical tests and functional performance tests were also carried out. All tennis-related injuries that occurred during a 2-year period were identified and recorded. An injury was defined as an injury if it was impossible to participate in regular tennis training or playing matches during at least one occasion, a time loss injury. Potential injury risk factors were tested in a forward stepwise logistic regression model for injury. Thirty-nine players sustained totally 100 new and recurrent injuries. Injuries to the lower extremity were the most common ones (51%) followed by the upper extremity (24%) and the trunk (24%). Injured players performed more singles per week (P28 days). In freestyle skiing, alpine skiing and snowboarding, there were 27.6, 29.8 and 37.8 time-loss and 14.4, 11.3 and 13.8 severe injuries per 100 athletes per season, respectively. In Nordic combined, ski jumping and cross country skiing, there were 15.8, 13.6 and 6.3 time-loss and 3.3, 5.6 and 0.7 severe injuries per 100 athletes per season, respectively. In conclusion about 1/3 of the World Cup alpine, freestyle and snowboard athletes sustain a time-loss injury each season, while the risk is low in the Nordic disciplines. A particular concern was the high proportion of severe injuries observed among alpine, freestyle and snowboard athletes, which is in contrast to most other sports.

The practice of physical activity of the Portuguese adults and fulfilment of physical activity recommendations. Carvalho JP, Andr   J, Raia L, Martins J, Marques A, Carreiro da Costa F

British journal of sports medicine 45(15):A18, 2011 Dez The aim of the study was to analyse (by sex and age) the practice of physical activity (PA) in Portuguese adults according to the recommendation for PA. The sample consisted of 2657 adults (1130 male, 1527 female) age 20 to 60 y ( $43\pm7$  y). PA was assessed by a questionnaire about leisure time activities and PA participation. The number of PA sessions per week and their intensity were taken into account to determine the meeting of the recommendations (moderate-intensity aerobic PA for a minimum of 30 min. 5 days/week, or vigorous PA for a minimum of 20 min 3 days/week). The data were analysed separating age, by brackets of 10 years, and sex. Statistical analyses were performed using chi-square and t-test. For the entire sample, only 32% (men 32%, women 31%) met the guidelines of PA. While the percentage of male that met the recommendation was higher among youngsters (43%), among women the oldest were the most active (33%). In general, there was no significant differences between sexes and the meeting of the recommendations ( $p=0.636$ ). Within adults, both male and female, age-groups were not different ( $p=0.860$ ,  $p=0.932$ ). Analysing each age-group, the percentage of males that meet the recommendation was higher than female at age of 20-30 (43% vs 30%) and 41-50 (33 vs 31%). On the other hand, the opposite was observed at age of 31-40 (30% vs 32%) and 51-60 (32%

vs 33%). Although the percentage of men and women that meet the recommendation were different in all age-groups, it was observed that the meeting of the PA guidelines were independent of the sex - 20-30 ( $p=0.181$ ), 31-40 ( $p=0.513$ ), 41-50 ( $p=0.398$ ) and 51-60 ( $p=0.912$ ). Most of the participants did not practise enough PA to meet the recommendations. Both sexes have similar results in each age-group, demonstrating that both sex and age have no relationship with the meeting of PA guidelines.

The epidemiology of cross country skiing injuries. [Howes J](#), Droog SJ, Evans J, Wood IM, Wood AM

British journal of sports medicine 45(15):A20, 2011 Dez There is little literature about the epidemiology of injuries sustained while conducting cross country skiing due to the disparate nature of these athletes. The Royal Marines regularly deploys to Norway to conduct cross country ski-training and cold weather warfare training which presents a unique opportunity to analyse injuries sustained while conducting this sport. A total of 1200 personnel deployed to Norway in 2010 over a 14 week period. Patients who sustained injuries who were unable to continue training were returned to the UK. All data on personnel returned to the UK due to injury or illness was prospectively collected and basic epidemiology recorded. 53 patients (incidence 44/1000 personnel) were returned to the UK 20/53 (38%) of all cases were musculoskeletal injuries (incidence 17/1000 personnel). 15/20 musculoskeletal injuries were sustained while conducting cross country ski training (incidence 13/1000). Injuries sustained while skiing: 5/15 sustained anterior shoulders dislocation, 5/15 Grade 1-3 MCL/LCL tears, 2/15 sustained ACJ injuries, 1/15 crush fracture T11/T12, 1/15 tibial plateau fracture and 1/15 significant ankle sprain. The most common injury regardless of cause was anterior shoulder dislocation 6/20 (incidence 5/1000). Our results suggest that cross country ski training has a high injury rate requiring evacuation back to the UK. In our study group the high injury rate is possibly due to the rapid transition from non-skier to skiing with a bergen and weapon. Doctors covering Royal Marine training should have appropriate sports and exercise medical training, and rehabilitation units supporting the Royal Marines should expect sudden increases in referrals when large-scale cross country ski training is being conducted.

Injury surveillance during the 2010 IRB Women's Rugby World Cup. Taylor AE, Fuller CW, Molloy MG

British journal of sports medicine 45(15):1243-5, 2011 Dez Centre for Sports Medicine, University of Nottingham, Queen's Medical Centre, C Floor, West Block, Nottingham NG7 2UH, UK. aileentaylor68@hotmail.com.

**Objective** To assess and evaluate injuries sustained during the 2010 Women's Rugby World Cup. **Design** Prospective, cohort. **Participants** 285 women rugby players. **Results** Incidence of match injury was 35.5/1000 player-hours; mean severity was 55.0 days and median severity 9 days. Only one training injury was reported. Knee-ligament injuries were the most common (15%) and resulted in most days lost (43%). The tackle was the cause of most injuries. **Conclusions** The risk of injury in international rugby is significantly lower for women than for men. Further research is required to assess knee-ligament injuries in women's rugby.

Football injuries on synthetic turf fields. Akkaya S, Serinken M, Akkaya N, Tamer I, Uyanik E

Eklemler hastalıkları ve cerrahisi = Joint diseases & related surgery 22(3):155-9, 2011 dez Department of Orthopedics and Traumatology, Medical Faculty of Pamukkale University, 20070 Kinikli, Denizli, Turkey. semihakkaya@yahoo.com.

**OBJECTIVES:** Football injuries that occur during football matches played on synthetic fields and the features of these injuries were investigated and the data was pursued for the prevention and reduction of these injuries.

**PATIENTS AND METHODS:** All adolescent and adult trauma cases who admitted to the Emergency Department with football injuries on synthetic fields were retrospectively investigated. Nine hundred and eighty-five male cases were detected with a mean age of  $30.1 \pm 4.2$  years (range 15-57 years). Age, gender, times of admittance to the Emergency Department, site of injury, type of injury, and clinical result data of the cases were examined.

**RESULTS:** 19:00 to 24:00 hours (n=852, 86.5%) and weekdays were the most frequent admittance times. It was detected that lower-extremities (n=583, 59.2%) were the most commonly affected body parts and the upper-extremity injuries (n=281, 28.6%) and the head and neck injuries (n=75, 7.6%) were the second and third most commonly seen injuries, respectively. The most frequently observed injury types were contusions, abrasions and hematomas in all cases (n=364, 37.0%). Sprains/strains were the second most common types of injuries (n=343, 34.8%). When the final diagnoses of all cases were examined, it was determined that the anterior talofibular ligament injuries were the second most frequent after soft-tissue injuries (n=217, 22%).

**CONCLUSION:** Football matches on synthetic fields can lead to serious orthopedic injuries. Investigation of the mechanisms of these injuries, which cause workday and economic losses, will be a guide for the future studies on the prevention of these injuries.

[The epidemiology of cross country skiing injuries.](#) Br J Sports Med  
Issue: 15, A20, 2011 Howes J et, al.

Soccer injuries in female youth players: comparison of injury surveillance by certified athletic trainers and internet. Schiff MA, Mack CD, Polissar NL, Levy MR, Dow SP, O'Kane JW.: Journal of athletic training, 2010 May-Jun, 45(3):238-42.

[Design of a protocol for large-scale epidemiological studies in individual sports: the Swedish Athletics injury study \(Dez 2010\)](#)

[Occurrence of injuries and illnesses during the 2009 IAAF World Athletics Championships \(Dez 2010\)](#)

### **Rugby league injuries in New Zealand: a review of 8 years of Accident Compensation Corporation injury entitlement claims and costs**

King DA, Hume PA, Milburn P, Gianotti S.: British Journal of Sports Medicine, 2009, 43(8):595-602.  
Emergency Department, Hutt Valley District Health Board, Lower Hutt, New Zealand.

AIM: This paper provides an overview of the epidemiology of rugby league injuries and associated costs in New Zealand requiring medical treatment. METHOD: New Zealand national



Accident Compensation Corporation injury data for the period 1999 to 2007 were searched for rugby league injury cases. Data were analysed by demographics, body region, nature/severity of injury, and medical procedure and costs. **RESULTS:** A total of 5941 injury entitlement claims were recorded over the study period with a significant decrease observed in the injury rate between the 1999-2000 and 2002-2003 reporting years. The total cost of the injuries for the study period was \$42,822,048 (equivalent to pound15,916,072). The mean (SD) number of injury entitlement claims per year was 743 (271) and yearly cost was \$5,352,760 (pound1,989,880) (\$2,485,535 (pound923,994)). The knee was the most commonly reported injury site (225 per 1000 entitlement claims; \$8,750,147 (pound3,252,020)) and soft tissue injuries were the most common injury types (474 per 1000 entitlement claims; \$17,324,214 (pound6,438,599)). Accounting for only 1.8% of total injury entitlement claims, concussion/brain injuries accounted for 6.3% of injury entitlement costs and had the highest mean cost per claim (\$25 347 (pound9420)). The upper and lower arm recorded the highest mean injury site claim cost of \$43,096 (pound16,016) per claim. The 25-29 age group recorded 27.7% of total injury entitlement claims and 29.6% of total injury entitlement costs, which was slightly more than the 20-24 age group (27.3% claims; 24.7% costs). Nearly 15% of total moderate to serious injury entitlement claims and 20% of total costs were recorded from participants 35 years or older. **DISCUSSION:** This study identified that the knee was the most common injury site and soft tissue injuries were the most common injury type requiring medical treatment, which is consistent with other international studies on rugby league epidemiology. This study also highlights that the rate of injury and the average age of injured rugby league players increased over time. The high cost of concussion/brain injuries is a cause for concern as it reflects the severity of the injuries. **CONCLUSION:** Injury prevention programmes for rugby league should focus on reducing the risk of concussion/brain injury and knee and soft tissue injury, and should target participants in the 20-30 years old age range. More longitudinal epidemiological studies with specific details on injury mechanisms and participation data are warranted to further identify the injury circumstances surrounding participation in rugby league activities.

## **Acute hamstring injuries in Danish elite football: a 12-month prospective registration study among 374 players**

Petersen J, Thorborg K, Nielsen MB, Højtmich P.: Scandinavian Journal of Medicine & Science in Sports, 2010, 20(4):588-92. Department of Orthopaedic Surgery, Amager Hospital, Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark.

The purpose of the present study was to examine the incidence rates of acute hamstring injuries in Danish elite football sustained during training or match play. Furthermore, it was our intention to document details about the recurrence, severity and the injury seasonal distribution. Hamstring injuries among 374 elite football players were registered prospectively during a 12-month period. A total of 46 first-time and eight recurrent hamstring injuries were registered. The incidence rates for incurring a first-time hamstring injury showed a significantly (P<0.05) higher rate in the first 2 months after a 3.5-month mid-season winter break.

### **Thumb injuries in intercollegiate men's lacrosse.**

Bowers AL, Horneff JG, Baldwin KD, Huffman GR, Sennett BJ.: The American Journal of Sports Medicine, 2010; 38(3):527-31. Department of Orthopaedic Surgery, Hospital of the University of Pennsylvania, Philadelphia, PA 19104, USA.

Background: Men's intercollegiate lacrosse is played at a fast pace and with significant force. Glove protection is required. However, the thumb is at risk because of contact with opponents' sticks, the ball, other players, and the ground or artificial surface.

Purpose: To characterize patterns of hand injuries in men's intercollegiate lacrosse and to compare them with those in similar intercollegiate stick-handling sports that require gloves.

Study design

: Descriptive epidemiology study.

#### Methods

: The National Collegiate Athletic Association (NCAA) Injury Surveillance System was utilized to evaluate thumb injuries in intercollegiate stick-handling sports (men's lacrosse, women's lacrosse, and men's ice hockey) during 16 intercollegiate seasons. Injuries were defined as events requiring an athlete to seek medical treatment and miss competition. Data were collected for injuries to the thumb, phalanges, and hand. Descriptive statistics were performed to calculate rates of injury per 1000 athlete-exposures and the relative exposure of the thumb with respect to total hand injuries.  $\chi^2$  testing with the Yates correction for continuity was performed to determine differences in proportions of injury among the 3 sports studied.

#### Results

: During 16 intercollegiate seasons, there were 692 thumb, finger, and hand injuries in 3 038 255 athlete-exposures. Total thumb injuries were significantly higher in men's lacrosse, accounting for 59.4% of total hand injuries, when compared with women's lacrosse (42%) and men's ice hockey (35.8%) ( $P < 0.05$ ). Time lost and medical disqualification were significantly higher in men's lacrosse (3 weeks' time lost and medical disqualification) than all other injuries combined. Fractures frequently required expensive medical diagnostic imaging examinations such as x-ray, computed tomographic scan, and magnetic resonance imaging. Additionally, 16.1% of fractures required surgical treatment, accounting for 26.9% of all injuries requiring surgery. Illegal activity was noted in 9.3% of all fractures with the highest proportion of fractures related to illegal activity in girls' soccer (27.9%). **CONCLUSIONS:** Fractures are a major concern for US high school athletes. They can severely affect the athlete's ability to continue sports participation and can impose substantial medical costs on the injured athletes' families. Targeted, evidence-based, effective fracture prevention programs are needed.

## **Basketball-related injuries in school-aged children and adolescents in 1997-2007.**

**Charles Randazzo, Nicolas G. Nelson, Lara B. McKenzie, MA.:** Pediatrics, 2010, 126(4):727-33. Center for Injury Research and Policy, Research Institute at Nationwide Children's Hospital, and Department of Pediatrics, College of Medicine, Ohio State University, 700 Children's Dr, Columbus, OH 43205, USA.

**OBJECTIVE:** The objective was to determine national patterns of basketball-related injuries treated in emergency departments in the United States among children and adolescents 30 days) are due to noncontact intrinsic mechanisms. Almost one-quarter of all injuries consist of exertion syndromes not yet correlated with certain seasonal periods.

## Training injuries in professional rugby league

Gabbett TJ, Godbolt RJ.: Journal of Strength and Conditioning Research / National Strength & Conditioning Association, 2010, 24(7):1948-53. Brisbane Broncos Rugby League Football Club, Queensland, Australia.

This study investigated the incidence of training injuries in professional rugby league players and identified the training activities that were associated with the highest rates of injury in these athletes. The incidence of training injuries was prospectively studied in 35 professional rugby league players (mean  $\pm$  SD age 23.7  $\pm$  3.8 years) over an entire season. Injury data were collected from 216 training sessions, which included all strength, conditioning, and game-based training sessions. During the season, a total of 126 training injuries were recorded, giving an overall incidence of injury of 20.7 per 1,000 training hours. The thigh was the most common site of injury, with twice as many posterior thigh injuries (19.8%) as anterior thigh injuries (9.5%). Hematomas (31.8%) and muscular strains (22.2%) were the most common types of injury. The majority of injuries (35.7%) were sustained in traditional conditioning activities that involved no skill component (i.e., running without the ball). In contrast, the incidence of injuries sustained while participating in strength (7.1%) and game-based training activities (14.3%) was low. Of the injuries that resulted in lost training time, one-third were sustained in traditional conditioning activities. Given the low incidence of injury in game-based activities, and the added skill and physical benefits associated with this form of training, strength and conditioning coaches should

consider using appropriately designed game-based training activities as a physical conditioning tool in professional rugby league players.

### **Prospective study on injuries of the German national ice hockey teams in more than 1000 games**

Gröger A, Kuropkat C, Mang A, Gradinger R.: Sportverletzung Sportschaden : Organ der Gesellschaft für Orthopädisch-Traumatologische Sportmedizin, 2010, 24(2):91-7. City Med. München.

Due to the fast and physical nature of the game, prevention of injuries is an important issue in ice hockey. The injuries of the German male senior and junior (U16, U17, U18, U19, U20) national ice hockey teams were documented and analyzed in 1006 games between 1986 and 2006. This unique long observation period over 20 years, as well as the standardized protocol of documentation provides reliable data concerning injury pattern in German international ice hockey. Overall 277 injuries were recorded. Comparing the first and the last ten years of observation, the number did not decline over the time, despite various national and international efforts of injury prevention. The majority of the injuries, almost 60%, were caused by body contact with increasing tendency. Remarkably, the injuries with no body or puck/stick contact more than doubled in the last ten years compared to the first ten years of observation. Most injuries happened to the extremities with decreasing tendency to lower body and increasing tendency to upper body injuries. The number of head injuries did not change significantly. More injuries occurred in the second and third period compared to the first period of the game. The data of this study indicate that many injuries might be due to insufficient physical condition with consecutive lack of concentration and coordination. Players do not seem to meet the increasing technical and athletic requirements of international ice-hockey. The increasing speed and physical energy in international ice-hockey make the game unique and fascinating. Therefore, the aim must be to decrease the number and above all the severity of injuries by further development and adjustment of the player's equipment. Also, a better cooperation of players, coaches, sports medicine and referees seems to be necessary for injury prevention in the future.

## **Prevalence of spondylolisthesis in a population of gymnasts.**

Toueg CW, Mac-Thiong JM, Grimard G, Parent S, Poitras B, Labelle H.: Studies in health technology and Informatics, 2010, 158:132-7. Dept of Orthopaedic Surgery, Sainte-Justine University Hospital, Montreal, Canada.

Spondylolysis occurs in 6 % of the general population. Of these, approximately 75% will develop spondylolisthesis. According to multiple studies, an increased prevalence of spondylolysis and spondylolisthesis exists in groups of athletes practicing certain Sports such as gymnastics. In the literature, prevalence of spondylolisthesis in gymnasts can reach up to 40 to 50 %. However, the specific risk factors associated with the development of spondylolisthesis in gymnasts are not known. The main purpose of this study was to evaluate the prevalence of spondylolysis and spondylolisthesis in a population of gymnasts, as well as the associated epidemiological characteristics. In order to achieve this goal, we presented our project to the two most renowned gymnastics centers in the city of Montreal, which allowed us to recruit a total of 93 gymnasts (19 males and 74 females). A radiological evaluation, with the low emission radiographic system, EOS, allowed us to identify the subjects that were affected by spondylolysis and spondylolisthesis. Additionally, standardized questionnaires allowed us to evaluate and compare different epidemiologic parameters such as age, height, weight, number of years of practice, number of hours of training per week. Of the 93 gymnasts evaluated clinically and radiographically, we identified 6 (1 male, 5 females) gymnasts presenting a spondylolysis and/or spondylolisthesis. This 6.5% prevalence found in our population is similar to the one reported in the general population. Gender did not seem to be a determinant factor. Also, gymnasts with and without spondylolysis and/or spondylolisthesis seemed to be similar in terms of height. However, gymnasts with spondylolysis and/or spondylolisthesis seemed to be heavier than gymnasts without one of these two affections, older and training with greater intensity. These Results suggest that the real prevalence rate of spondylolysis and spondylolisthesis in gymnasts may have been overestimated in previous studies. A selection bias, due to the high competitive level in the two gymnastics centers where our recruitment took place, could be involved. Our findings could also be the result of new or different training methods compared to those used in past studies. This might suggest that with intense training schedules, heavier individuals could potentially be prone to increased loads at the lumbosacral junction, thus favoring the development of spondylolysis and spondylolisthesis. These hypotheses should be explored in further details in the near future, especially with investigation of radiological parameters of the spine and pelvis.

## **Injury profile in junior tennis players: a prospective two year study.**

Hjelm N, Werner S, Renstrom P.: Knee surgery, Sports Traumatology, Arthroscopy, 2010, 18(6):845-50, Department of Molecular Medicine and Surgery, Stockholm Sports Trauma Research Center, Karolinska Institute, Stockholm, Sweden.

The aim of this study was to prospectively make a survey of injuries in junior players from a Swedish local tennis club during a 2-year period in relation to gender, anatomic location, month of the year when injured, injury type and injury severity. All 12-18 years old members in a tennis club playing more than twice weekly were asked to participate. Fifty-five junior tennis players, 35 boys and 20 girls accepted to participate. All tennis-related injuries were prospectively registered and evaluated. Time of exposure for playing tennis was recorded. Thirty-nine players sustained 100 injuries, 73 in boys and 27 in girls. Injury incidence for boys was 1.7 injuries/1000 h of tennis playing time and for girls 0.6 injuries/1000 h. Ankle sprains, low back pain and knee injuries were the most common ones. Sixty-five percent were new injuries, and the majority of these injuries were located at the knee joint followed by the ankle joint, while most of the recurrent injuries were found in the lumbar spine. Boys suffered mainly from low back pain and ankle injuries and girls from low back pain and knee injuries. Forty-three percent of the injuries caused absence from tennis for more than 4 weeks and 31% more than 1 week.

## **Epidemiology of ankle sprain at the United States Military Academy.**

Waterman BR, Belmont PJ,.William Beaumont Army Medical Center, El Paso, TX, USA.

**BACKGROUND:** Ankle sprain is a common injury in athletic populations that results in significant time lost to injury. **HYPOTHESIS:** The incidence rates (IRs) of ankle ligament sprains are influenced by gender, height, weight, body mass index (BMI), physical conditioning, level of competition, type of sport, and athlete exposure to sport. **STUDY DESIGN:** Cohort study; Level of evidence, 2. **METHODS:** A longitudinal cohort study was performed to determine the effect of risk factors for ankle sprain at the United States Military Academy between 2005 and 2007. **RESULTS:** A total 614 cadets sustained new ankle sprains during 10 511 person-years at risk, resulting in an overall IR of 58.4 per 1000 person-years. Women (96.4), compared with men (52.7), had a significantly increased rate ratio (IRR) for ankle sprain of 1.83 (95% confidence interval [CI], 1.52-2.20). Men with ankle sprains had higher mean height, weight, and BMI than uninjured men ( $P < 0.001$ ). **CONCLUSIONS:** The results suggest that the 11-15 years age period is critical for the occurrence of injury in acrobatic gymnasts. This is possibly due to the adolescent growth spurt which may create an increased vulnerability to injury if training volume during this time is above a certain threshold.

## **Epidemiological study of injuries in international Rugby Sevens.**

Fuller CW, Taylor A, Molloy MG.: Clinical Journal of Sport Medicine, 2010, 20(3):179-84. Centre for Sports Medicine, University of Nottingham, Nottingham NG7 2UH, United Kingdom.

**Objective:** To assess incidence, nature, and causes of injuries sustained in international Rugby Sevens. **Design:** Prospective cohort: definitions and procedures were compliant with the consensus statement for epidemiological studies in rugby union. **Setting:** S

: 2008/2009 International Rugby Board Sevens World Series (8 tournaments) and Rugby World Cup Sevens 2009.



**Participants**

: Two hundred ninety players, representing 12 countries.

**Assessment of risk factors**

: Injuries sustained as function of playing position and nature, cause, and time of onset.

**Main Outcome Measures**

: Number, location, diagnosis, severity, and cause of injuries: incidence (injuries/1000 player-hours) and severity (days absence from training/competition) of injuries.

**Results**

: One hundred four injuries were recorded during 578 team games (979.1 player-match hours), which equates to 0.18 injuries per team match, 0.96 injuries per team per tournament, or 106.2 injuries per 1000 player-hours (95% confidence interval, 87.8-128.9). These injuries had a mean severity of 45 days and a median severity of 24 days. The lower limb (70%) and joint (non-bone)/ligament (52%) were the most common site and type of injury. Most match injuries were acute (93%) and resulted from contact (78%) events; being tackled (34%) and running (22%) were the most common causes of injury.

**Conclusions**

: Results indicated that the risk of injury from international Rugby Sevens was higher than that reported for international 15-a-side rugby; in particular, the severity of injury was significantly higher. A need for further research into the reasons for the high average severity of injury and the development of injury prevention strategies for ankle and knee ligament injuries in Rugby Sevens were indicated.

## **Shoulder injuries in overhead Sports**

Wörtler K.: Der Radiologe, 2010, 50(5):453-9. Institut für Röntgendiagnostik, Klinikum rechts der Isar, Technische Universität München, Ismaninger Str.22, 81675, München.

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most common shoulder pathologies in overhead athletes, including biceps tendinopathy, superior labral anterior-posterior (SLAP) lesions, rotator cuff lesions, as well as extrinsic and intrinsic impingement syndromes.

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Institut za sudsku medicinu "Milovan Milovanovic", Medicinski fakultet Univerziteta u Beogradu.

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## **Injuries sustained at a temporary ice-skating rink: prospective study of the Winchester experience 2007-2008**

Kelsall NK, Bowyer GW.: Injury, 2009, 40(12):1276-8. Department of Trauma & Orthopaedics, Royal Hampshire County Hospital, Romsey Road, Winchester, Hampshire, SO22 5DG, United Kingdom.

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when the facility was reopened over Christmas 2007. All patients attending from the ice-rink were included and their injuries reviewed. Costs of care were calculated based on ED attendance, out-patient appointments (OPA's), radiography, plaster immobilisation and government tariffs for surgical procedures. The ice-rink was open for 39 days welcoming 43,000 skaters. Sixty-two accidents were recorded in the accident book, 43 attended the ED. Radiographic investigation was necessary for 31 patients. Nineteen had diagnoses of soft tissue injury, 3 of head/facial injuries. T&O received 23 referrals; all fractures were in the upper limb, 6 requiring admission and surgery. Fifty-eight ED, fracture clinic and physiotherapy OPA's were required. Additional costs to The Royal Hampshire County Hospital (RHCH) were calculated as 33,718.50 pounds. This temporary facility created a smaller than predicted burden for the ED and T&O service, however, sufficient consideration of OPA requirements should be made when planning service provision whilst temporary recreational facilities, such as this, are open.

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Citak M, Backhaus M, Seybold D, Muhr G, Roetman B.: Sportverletzung Sportschaden : Organ der Gesellschaft für Orthopädisch-Traumatologische Sportmedizin, 2010, 24(2):107-10.

Chirurgische Klinik und Poliklinik, Berufsgenossenschaftliches Universitätsklinikum Bergmannsheil GmbH, Bochum.

**INTRODUCTION:** Arm wrestling may cause severe injuries. Various injuries after arm wrestling have been reported in the literature, whereas the most common injury is the humeral shaft fracture. In this context we report on eleven cases with different injuries during arm wrestling. **MATERIAL AND METHODS:** All patients were analyzed using a standardized questionnaire. The effect of drugs, pre-existing conditions and injuries as well as sport activities were examined. Furthermore we report about a 24 year old patient who sustained a radial shaft fracture which has not been reported in the literature yet. **RESULTS:** 8 patients suffered from a fracture. The humerus was the most affected bone in 7 cases. 3 patients had a muscle strain, whereas in all 3 cases the patients were regularly sportive active and warmed-up before the injury. Ten patients were reintegrated into the previous job after an average time period of 6 weeks. One patient was out of work. **CONCLUSIONS:** Regular sport activity and the muscle

strength are important factors for the injury intensity. Further studies are necessary to confirm this theory.

**Intrinsic risk factors for hamstring injuries among male soccer players: a prospective cohort study.**

Engebretsen AH, Myklebust G, Holme I, Engebretsen L, Bahr R.: The American Journal of Sports Medicine, 2010, 38(6): 1147-53. Oslo Sports Trauma Research Center, Norwegian School of Sports Sciences, Ullevål Stadion, Oslo, Norway.

**BACKGROUND:** Strain injuries of the posterior thigh are common in soccer. It seems that previous injury and age are important risk factors, but the literature is limited. This study was conducted to see if we could identify intrinsic risk factors for hamstring injuries among male soccer players. **HYPOTHESIS:** We hypothesized that previous hamstring injuries, reduced function scores, abnormalities on a clinical examination, high maximum sprint speed, poor hamstring strength, or low hamstring/quadriceps ratio can predict increased risk of new hamstring injuries. **STUDY DESIGN:** Cohort study; Level of evidence, 2. **METHODS:** A total of 508 players representing 31 amateur teams were tested during the 2004 preseason for potential risk factors for hamstring injury through a questionnaire on previous injury and function score (Hamstring Outcome Score [HaOS]), a clinical examination of the hamstring, and specific hamstring relevant tests. Generalized estimating equations were used in univariate analyses to identify candidate risk factors, and factors with a P value of 3 weeks' time lost and medical disqualification than all other injuries combined. Fractures frequently required expensive medical diagnostic imaging examinations such as x-ray, computed tomographic scan, and

magnetic resonance imaging. Additionally, 16.1% of fractures required surgical treatment, accounting for 26.9% of all injuries requiring surgery. Illegal activity was noted in 9.3% of all fractures with the highest proportion of fractures related to illegal activity in girls' soccer (27.9%). **CONCLUSIONS:** Fractures are a major concern for US high school athletes. They can severely affect the athlete's ability to continue sports participation and can impose substantial medical costs on the injured athletes' families. Targeted, evidence-based, effective fracture prevention programs are needed.

## **Basketball-related injuries in school-aged children and adolescents in 1997-2007.**

**Charles Randazzo, Nicolas G. Nelson, Lara B. McKenzie, MA.:** Pediatrics, 2010, 126(4):72  
7-33. Cent

er for Injury Research and Policy, Research Institute at Nationwide Children's Hospital, and  
Department of Pediatrics, College of Medicine, Ohio State University, 700 Children's Dr,  
Columbus, OH 43205, USA.

**OBJECTIVE:** The objective was to determine national patterns of basketball-related injuries treated in emergency departments in the United States among children and adolescents 30 days) are due to noncontact intrinsic mechanisms. Almost one-quarter of all injuries consist of exertion syndromes not yet correlated with certain seasonal periods.

## **Training injuries in professional rugby league**

Gabbett TJ, Godbolt RJ.: Journal of strength and conditioning research / National Strength & Conditioning Association, 2010, 24(7):1948-53. Brisbane Broncos Rugby League Football Club, Queensland, Australia.

This study investigated the incidence of training injuries in professional rugby league players and identified the training activities that were associated with the highest rates of injury in these athletes. The incidence of training injuries was prospectively studied in 35 professional rugby league players (mean  $\pm$  SD age 23.7  $\pm$  3.8 years) over an entire season. Injury data were collected from 216 training sessions, which included all strength, conditioning, and game-based training sessions. During the season, a total of 126 training injuries were recorded, giving an overall incidence of injury of 20.7 per 1,000 training hours. The thigh was the most common site of injury, with twice as many posterior thigh injuries (19.8%) as anterior thigh injuries (9.5%). Hematomas (31.8%) and muscular strains (22.2%) were the most common types of injury. The majority of injuries (35.7%) were sustained in traditional conditioning activities that involved no skill component (i.e., running without the ball). In contrast, the incidence of injuries sustained while participating in strength (7.1%) and game-based training activities (14.3%) was low. Of the injuries that resulted in lost training time, one-third were sustained in traditional conditioning activities. Given the low incidence of injury in game-based activities, and the added skill and physical benefits associated with this form of training, strength and conditioning coaches should consider using appropriately designed game-based training activities as a physical conditioning tool in professional rugby league players.

## **Prospective study on injuries of the German national ice hockey teams in more than 1000 games**

Gröger A, Kuropkat C, Mang A, Gradinger R.: Sportverletzung Sportschaden : Organ der Gesellschaft für Orthopädisch-Traumatologische Sportmedizin, 2010, 24(2):91-7. City Med. München.

Due to the fast and physical nature of the game, prevention of injuries is an important issue in ice hockey. The injuries of the German male senior and junior (U16, U17, U18, U19, U20) national ice hockey teams were documented and analyzed in 1006 games between 1986 and 2006. This unique long observation period over 20 years, as well as the standardized protocol of documentation provides reliable data concerning injury pattern in German international ice hockey. Overall 277 injuries were recorded. Comparing the first and the last ten years of observation, the number did not decline over the time, despite various national and international efforts of injury prevention. The majority of the injuries, almost 60%, were caused by body contact with increasing tendency. Remarkably, the injuries with no body or puck/stick contact more than doubled in the last ten years compared to the first ten years of observation. Most injuries happened to the extremities with decreasing tendency to lower body and increasing tendency to upper body injuries. The number of head injuries did not change significantly. More injuries occurred in the second and third period compared to the first period of the game. The data of this study indicate that many injuries might be due to insufficient physical condition with consecutive lack of concentration and coordination. Players do not seem to meet the increasing technical and athletic requirements of international ice-hockey. The increasing speed and physical energy in international ice-hockey make the game unique and fascinating. Therefore, the aim must be to decrease the number and above all the severity of injuries by further development and adjustment of the player's equipment. Also, a better cooperation of players, coaches, sports medicine and referees seems to be necessary for injury prevention in the future.

### **Prevalence of spondylolisthesis in a population of gymnasts.**

Toueg CW, Mac-Thiong JM, Grimard G, Parent S, Poitras B, Labelle H.: Studies in health technology and Informatics, 2010, 158:132-7. Dept of Orthopaedic Surgery, Sainte-Justine University Hospital, Montreal, Canada.

Spondylolysis occurs in 6 % of the general population. Of these, approximately 75% will develop spondylolisthesis. According to multiple studies, an increased prevalence of spondylolysis and spondylolisthesis exists in groups of athletes practicing certain Sports such as gymnastics. In the literature, prevalence of spondylolisthesis in gymnasts can reach up to 40 to 50 %. However, the specific risk factors associated with the development of spondylolisthesis in gymnasts are not known. The main purpose of this study was to evaluate the prevalence of spondylolysis and spondylolisthesis in a population of gymnasts, as well as the associated



epidemiological characteristics. In order to achieve this goal, we presented our project to the two most renowned gymnastics centers in the city of Montreal, which allowed us to recruit a total of 93 gymnasts (19 males and 74 females). A radiological evaluation, with the low emission radiographic system, EOS, allowed us to identify the subjects that were affected by spondylolysis and spondylolisthesis. Additionally, standardized questionnaires allowed us to evaluate and compare different epidemiologic parameters such as age, height, weight, number of years of practice, number of hours of training per week. Of the 93 gymnasts evaluated clinically and radiographically, we identified 6 (1 male, 5 females) gymnasts presenting a spondylolysis and/or spondylolisthesis. This 6.5% prevalence found in our population is similar to the one reported in the general population. Gender did not seem to be a determinant factor. Also, gymnasts with and without spondylolysis and/or spondylolisthesis seemed to be similar in terms of height. However, gymnasts with spondylolysis and/or spondylolisthesis seemed to be heavier than gymnasts without one of these two affections, older and training with greater intensity. These Results suggest that the real prevalence rate of spondylolysis and spondylolisthesis in gymnasts may have been overestimated in previous studies. A selection bias, due to the high competitive level in the two gymnastics centers where our recruitment took place, could be involved. Our findings could also be the result of new or different training methods compared to those used in past studies. This might suggest that with intense training schedules, heavier individuals could potentially be prone to increased loads at the lumbosacral junction, thus favoring the development of spondylolysis and spondylolisthesis. These hypotheses should be explored in further details in the near future, especially with investigation of radiological parameters of the spine and pelvis.

### **Injury profile in junior tennis players: a prospective two year study.**

Hjelm N, Werner S, Renstrom P.: Knee surgery, Sports Traumatology, Arthroscopy, 2010, 18(6):845-50, Department of Molecular Medicine and Surgery, Stockholm Sports Trauma Research Center, Karolinska Institute, Stockholm, Sweden.

The aim of this study was to prospectively make a survey of injuries in junior players from a Swedish local tennis club during a 2-year period in relation to gender, anatomic location, month of the year when injured, injury type and injury severity. All 12-18 years old members in a tennis club playing more than twice weekly were asked to participate. Fifty-five junior tennis players, 35 boys and 20 girls accepted to participate. All tennis-related injuries were prospectively registered and evaluated. Time of exposure for playing tennis was recorded. Thirty-nine players

sustained 100 injuries, 73 in boys and 27 in girls. Injury incidence for boys was 1.7 injuries/1000 h of tennis playing time and for girls 0.6 injuries/1000 h. Ankle sprains, low back pain and knee injuries were the most common ones. Sixty-five percent were new injuries, and the majority of these injuries were located at the knee joint followed by the ankle joint, while most of the recurrent injuries were found in the lumbar spine. Boys suffered mainly from low back pain and ankle injuries and girls from low back pain and knee injuries. Forty-three percent of the injuries caused absence from tennis for more than 4 weeks and 31% more than 1 week.

## **Epidemiology of ankle sprain at the United States Military Academy.**

Waterman BR, Belmont PJ,.William Beaumont Army Medical Center, El Paso, TX, USA.

**BACKGROUND:** Ankle sprain is a common injury in athletic populations that results in significant time lost to injury. **HYPOTHESIS:** The incidence rates (IRs) of ankle ligament sprains are influenced by gender, height, weight, body mass index (BMI), physical conditioning, level of competition, type of sport, and athlete exposure to sport. **STUDY DESIGN:** Cohort study; Level of evidence, 2. **METHODS:** A longitudinal cohort study was performed to determine the effect of risk factors for ankle sprain at the United States Military Academy between 2005 and 2007. **RESULTS:** A total 614 cadets sustained new ankle sprains during 10 511 person-years at risk, resulting in an overall IR of 58.4 per 1000 person-years. Women (96.4), compared with men (52.7), had a significantly increased rate ratio (IRR) for ankle sprain of 1.83 (95% confidence interval [CI], 1.52-2.20). Men with ankle sprains had higher mean height, weight, and BMI than uninjured men ( $P < 0.05$ ). **CONCLUSIONS:** The results suggest that the 11-15 years age period is critical for the occurrence of injury in acrobatic gymnasts. This is possibly due to the adolescent growth spurt which may create an increased vulnerability to injury if training volume during this time is above a certain threshold.

## **Epidemiological study of injuries in international Rugby Sevens.**

Fuller CW, Taylor A, Molloy MG.: Clinical Journal of Sport Medicine, 2010, 20(3):179-84. Centre for Sports Medicine, University of Nottingham, Nottingham NG7 2UH, United Kingdom.

Objective: To assess incidence, nature, and causes of injuries sustained in international Rugby Sevens. Design: Prospective cohort: definitions and procedures were compliant with the consensus statement for epidemiological studies in rugby union. S

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: 2008/2009 International Rugby Board Sevens World Series (8 tournaments) and Rugby World Cup Sevens 2009.

Participants

: Two hundred ninety players, representing 12 countries.

Assessment of risk factors

: Injuries sustained as function of playing position and nature, cause, and time of onset.

Main Outcome Measures

: Number, location, diagnosis, severity, and cause of injuries: incidence (injuries/1000 player-hours) and severity (days absence from training/competition) of injuries.

Results

: One hundred four injuries were recorded during 578 team games (979.1 player-match hours), which equates to 0.18 injuries per team match, 0.96 injuries per team per tournament, or 106.2 injuries per 1000 player-hours (95% confidence interval, 87.8-128.9). These injuries had a mean severity of 45 days and a median severity of 24 days. The lower limb (70%) and joint (non-bone)/ligament (52%) were the most common site and type of injury. Most match injuries were acute (93%) and resulted from contact (78%) events; being tackled (34%) and running (22%) were the most common causes of injury.

**Conclusions**

: Results indicated that the risk of injury from international Rugby Sevens was higher than that reported for international 15-a-side rugby; in particular, the severity of injury was significantly higher. A need for further research into the reasons for the high average severity of injury and the development of injury prevention strategies for ankle and knee ligament injuries in Rugby Sevens were indicated.

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