



## 1st World Congress of Sports Injury Prevention

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(return rate of 50%). In the absence of a known validated instrument for our purpose, we had developed a specific questionnaire based on restrict rules, validated by handball, traumatology, and gynaecology specialists.

**Results:** Over 80% of the players have had, in their handball career, at least one severe injury. In 2003–04 we found 42 injuries in 37 athletes (an incidence of 2.6 injuries per 1000 player hours), with a significantly higher incidence in game (16 injuries per 1000 game hours) compared with practice (0.9 per 1000 practice hours). The oral contraceptive pill and menstrual cycle regularity do not seem to be related with injury occurrence. Ankle sprains (33%), knee sprains (24%), and chronic shoulder pain (19%) were the most prevalent incidences and sites of severe injury. Playing in a game, being in the offensive situation (70%), previous injuries in the same body place (30% of recidivist injuries), and a lower handball skill level (ratio 2:3 of first to second division) seem to be risk factors for injuries. Knee injuries mostly occur in cut movement situations (33%). In this joint, anterior Cruciate ligament injury was observed at higher occurrence (50% of knee joint injuries), and we noticed an elevated incidence (50%) of severe knee injuries until the age of 19 years.

### 027 ROUTINE INJURY SURVEILLANCE IN CLUB RUGBY: IS IT FEASIBLE?

D. Chalmers, S. Stephenson, P. Gulliver, B. McNoe. *Injury Prevention Research Unit, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand*

**Background:** A substantial effort has been made to promote injury prevention in New Zealand club (community) rugby. Since 2001, the main thrust of this effort has been implementation by the New Zealand Rugby Union (NZRU) of RugbySmart, a national injury prevention programme. To monitor the effectiveness of this programme, valid and reliable methods were required for recording the incidence, nature and circumstances of injury, and the injury prevention behaviour of players.

**Purpose:** To develop a system for undertaking routine surveillance in club rugby.

**Methods:** A cohort design, with exposure measurement, was used, involving the sampling of players from the NZRU's player database, and weekly follow up throughout the competitive season. Data collection was by telephone interview, with interviewers entering data directly into an electronic database. At the conclusion of the season, incidence rates were calculated by position, grade, and division, and the nature and circumstances of injury and the injury prevention behaviour of players were described. The system was piloted in 2002 and implemented in 2003 and 2004. In 2004, 836 players were recruited prior to commencement of the season and of these, 704 played at least one game during the season.

**Results:** Data were collected on 6266 player games and on 621 injury events, giving an incidence rate of 9.9 injury events per 100 player games (95% CI 9.2 to 10.7) or 93 injury events per 1000 player hours. The most common injury localisation was the shoulder (14%), followed by the head (11%) and knee (11%). The most common injury type was sprain/strain (40%), followed by haematoma (21%) and laceration (8%). Players warmed up before 97% and cooled down after 46% of player games. Mouthguards were worn in 94% of player games. Routine surveillance using this system is feasible but there are challenges to its long term implementation, not the least of which is cost.

### 028 REDUCING THE RISK OF HAMSTRING INJURY WHILE ENHANCING ATHLETIC PERFORMANCE: IS ECCENTRIC TRAINING THE KEY?

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**Background:** Although previous research has shown that the length-tension relationship during eccentric contraction plays a role in hamstring injury, training methods to promote beneficial adaptations are still unclear.

**Purpose:** To determine whether an eccentric hamstring specific training programme would result in favourable adaptations for both performance and injury prevention.

**Methods:** The training intervention consisted of an eccentric hamstring exercise performed twice a week during a four week cycle. Pre- and post-training isokinetic strength testing and vertical jump was assessed as a measure of lower body performance. Nine athletic men with no previous strength training experience participated in the study.

**Results:** There was a significant increase in vertical jump, a significant decrease in hamstring position of peak torque (POS) from full extension and a significant hamstring POS difference between limbs.

**Conclusions:** Nordic hamstring training produces favourable neuromuscular adaptations for the possible prevention of hamstring injuries while enhancing lower body power performance in untrained men.

### 029 PRE-SEASON ISOKINETIC INTERVENTION AS A PREVENTIVE STRATEGY FOR HAMSTRING INJURY IN PROFESSIONAL SOCCER PLAYERS

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**Purpose:** To verify whether pre-season isokinetic muscle strength testing could identify soccer players at risk of subsequent hamstring muscle strain.

**Methods:** In total, 617 soccer players (mean (SD) age 26 (5) years, weight 77 (6) kg, height 181 (5) cm) from professional teams in France, Belgium, and Brazil benefited from preseason isokinetic testing. The standardised protocol consisted of concentric exertions (60 and 240° per second) of both knee flexor and quadriceps muscles; flexors were also subjected to eccentric exercises (30 and 120° per second). Muscle disorders were determined using statistically selected cutoffs for bilateral differences and flexors/quadriceps (F/Q) ratios. Thereafter, players were followed for 9 months throughout the subsequent competitive season and hamstring muscle injuries were recorded.

**Results:** Of the 435 players who benefited from a complete follow up, 37 sustained a hamstring injury causing them to miss more than 4 weeks of playing time. The risk factor of hamstring injury for one season significantly differed according to the preseason isokinetic profile and the presence or absence of strength disorder management. This risk factor was set at 4.1% in the context of a normal isokinetic profile, 16.5% in the presence of strength imbalance without any compensative treatment, and 6.3% in the presence of strength imbalance that had been successfully treated.

**Conclusions:** The risk of hamstring injury appeared significantly increased (four times higher) in players with untreated strength disorders. Correction of preseason muscle imbalance allowed for a significant reduction in the risk of subsequent muscle strain. We concluded that isokinetic intervention, as a preseason screening tool in professional soccer players, contributes to a preventive strategy for the hamstring muscle group.

### 030 PREVENTION OF ANKLE SPRAINS IN BASKETBALL: EFFECTIVENESS OF A 22 WEEK SPORTS SPECIFIC BALANCE TRAINING PROGRAMME ON THE INCIDENCE OF ANKLE SPRAINS

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**Purpose:** To investigate whether a prescribed in season balance training programme of 22 weeks, based on basketball skills, is sufficient in the prevention of ankle sprains in basketball players in that particular season.

**Methods:** A clinical trial was set up with both a intervention and a control group of basketball players. In total, 34 men (19 intervention and 15 control) and 15 women (7 intervention and 8 control) participated for 22 weeks of the 2003–2004 basketball season. Both groups matched (independent *t* test;  $p < 0.05$ ) for age, weight, body mass index and level of competition (elite). There were five dropouts, who all ceased playing basketball because of problems with their coach. The intervention group (three teams: two male, one female) performed a prescribed sports specific balance training programme with balance semi-globes for 22 weeks, with three sessions a week for 5–10 minutes during the warm up. The control group (three teams: two male, one female) followed their normal training routine. Exposure sheets were completed individually and gathered at the end of each week. All injuries were entered in the Blits® Online Injury Diary in a prospective manner.

**Results:** Statistical analysis revealed a significant difference (0.30; 95% CI 0.84 to 0.11) in the incidence of ankle sprains between the intervention and control groups, with the intervention group at lower risk. No significant differences were found for ankle re-injuries or new ankle injuries, but both control groups showed higher risks per 1000 playing hours.

**Conclusions:** We have developed a balance training programme that (a) is sports specific by inclusion of basketball skills, (b) takes in account