

Conclusions Hamstring strength endurance and fatigability were both justified as potential risk factors of re-injury and should be integral parts of future rehabilitation programmes and prognostic screening.

159 HAOS OR CHAOS? THE PROGNOSTIC VALUE OF THE HAMSTRING OUTCOME SCORE (HAOS) TO PREDICT THE RISK OF HAMSTRING INJURY

¹Sander van de Hoef, ²Michel S Brink, ³Nick van der Horst, ⁴Maarten van Smeden, ¹Frank Backx. ¹Utrecht University, University Medical Center, Division Brain, Department Rehabilitation, Physical Therapy Science and Sports, Utrecht, Netherlands; ²University of Groningen, University Medical Center Groningen, Center for Human Movement Sciences, Groningen, Netherlands; ³FIFA Medical Center, Royal Netherlands Football Association, Zeist, Netherlands; ⁴Leiden University Medical Center, Department of Clinical Epidemiology, Leiden, Netherlands

10.1136/bjsports-2021-IOC.147

Background Hamstring injury incidence remains high among male soccer players. One of the reasons is low adherence for effective hamstring injury prevention programs. Insight in injury risk can contribute to better adherence for injury prevention measures. The hamstring outcome score (HaOS) might provide an insight in injury risk.

Objective To determine the relation between the HaOS and both previous and new hamstring injuries in male amateur soccer players, and to determine the prognostic value of the HaOS to predict the risk of hamstring injuries.

Design Data was collected during a large cluster-RCT investigating a hamstring injury prevention program.

Setting This study was executed during one competition (2016–2017) in 32 first class amateur soccer teams.

Participants 400 adult male amateur soccer players started the study.

Assessment of risk factors The participants filled in a baseline-questionnaire consisting of injury history and the HaOS. During one full competition hamstring injuries were registered prospectively.

Main outcome measurements Previous hamstring injuries, new hamstring injuries and the HaOS (total score and subdomains) were considered in this study.

Results In 356 players, a significant relation was found between the HaOS (total score and all HaOS subdomain scores) and previous and new hamstring injury ($F=17.4$; $p<0.0001$ and $T=3.59$, $p=0.001$, respectively). This indicated that more hamstring injuries during the previous season was related to lower scores on the HaOS and lower HaOS scores correspond with more new hamstring injuries. With a cut-off score of 80% on the HaOS, logistic regression models showed a probability of 11%, 18% and 28% on a new hamstring injury in players with 0, 1 or 2 previous injuries, respectively.

Conclusion The HaOS is significantly associated with both previous and new hamstring injury and might be a useful tool to provide insight in players' hamstring injury risk when used in combination with injury history.

160 ECCENTRIC HAMSTRING STRENGTH AND SPRINTING PERFORMANCE CHANGES DURING THE OFF-SEASON IN SPANISH FOOTBALLERS

^{1,2,3,4}Jordi Vicens-Bordas, ^{2,3}Ernest Esteve, ⁵Azahara Fort-Vanmeerhaeghe, ^{1,3,6,7}Martí Casals, ⁸Thomas Bandholm, ⁹Lasse Ishoi, ¹⁰David Opar, ^{11,12}Anthony Shield, ^{8,9}Kristian Thorborg. ¹Sport and Physical Activity Studies Centre (CEEAF), University of Vic – Central University of Catalonia (UVic-UCC), Vic, Spain; ²Sportclinic. Physiotherapy and Sports Training Centre, Girona, Spain; ³School of Health and Sport Sciences (EUSES), Universitat de Girona, Salt, Spain; ⁴Department of Medical Sciences, Universitat de Girona, Girona, Spain; ⁵Department of Sports Sciences, Ramon Llull University, FPCEE and FCS Blanquerna, Barcelona, Spain; ⁶Sport Performance Analysis Research Group, University of Vic, Vic, Spain; ⁷Medical Department, Futbol Club Barcelona, Barça Innovation Hub, Barcelona, Spain; ⁸Physical Medicine and Rehabilitation Research – Copenhagen (PMR-C), Department of Physical and Occupational Therapy, Department of Orthopedic Surgery, Clinical Research Center, Amager-Hvidovre Hospital, Copenhagen University, Hvidovre, Denmark; ⁹Sports Orthopedic Research Center – Copenhagen (SORC-C), Department of Orthopedic Surgery, Copenhagen University Hospital, Hvidovre, Denmark; ¹⁰School of Behavioural and Health Sciences, Australian Catholic University, Melbourne, Australia; ¹¹Faculty of Health, School of Exercise and Nutrition Science, Queensland University of Technology, Brisbane, Australia; ¹²Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, Australia

10.1136/bjsports-2021-IOC.148

Background Low eccentric hamstring strength and sprinting performance are associated with hamstring injury (HI) in football; however, the off-season effects on both qualities are unknown.

Objective The aim of the study was to investigate eccentric hamstring strength and sprinting performance changes during the off-season period in football players.

Design Prospective cohort study.

Setting Semi-professional (3rd-4th tier) and amateur (5th-8th tier) Spanish footballers.

Patients (or Participants) Male footballers ($n=107$) were contacted to participate. Seventy-four footballers (25 ± 4 years, 178.0 ± 6.6 cm, 74.9 ± 8.1 kg) were included in final analyses.

Interventions (or Assessment of Risk Factors) Eccentric hamstring strength (Nordbord) and sprint performance (30m sprint and V-Cut test) were assessed at the beginning (May-June 2017) and end of the off-season (July-August 2017). Previous HI, age and off-season length were considered the independent variables.

Main Outcome Measurements Eccentric hamstring strength (N ; $N\cdot kg^{-1}$), 30m sprint (5–10m splits (s)) and change-of-direction performance (s). All outcomes were proposed before any data collection. Data was analysed using paired t-tests and linear mixed models.

Results No changes in eccentric hamstring strength were found at follow-up. Large (2%, $d=0.96$; $p<0.001$) and small (1%, $d=0.46$; $p<0.001$) decrements in performance were found for 30m sprint and 10m split time at follow-up, respectively. Previous HI, age or off-season length had no effect on any of the outcomes.

Conclusions Footballers showed no reduction in eccentric hamstring strength but impaired sprint performance after the off-season period, independent of age, previous HI and length of off-season. This may suggest the risk of sustaining a HI during the pre-season is lowered, as a result of decreased maximal

sprinting capacity. This implicates that introducing eccentric hamstring strengthening during pre/early season seems relevant as this may both increase sprinting performance and mitigate the risk of HI during the in-season.

161 HIGH CONCUSSION RATE AMONGST SOUTH AFRICAN UNIVERSITY RUGBY STUDENT TOURNAMENT

^{1,2}James Craig Brown, ^{1,2}Lindsay Starling, ^{3,4}Keith Stokes, ^{1,2}Pierre Viviers, ^{1,2,7}Sean Surmon, ^{1,2}Keith Derman. ¹Institute of Sport and Exercise Medicine, Division of Orthopaedics, Department of Surgical Sciences, Stellenbosch University, Cape Town, South Africa; ²IOC Research Centre, South Africa, Cape Town, South Africa; ³Department for Health, University of Bath, Bath, UK; ⁴Rugby Football Union, London, UK; ⁷Maties Sport, Stellenbosch University, Stellenbosch, South Africa

10.1136/bjsports-2021-IOC.149

Background Of all injuries common to collision sports, concussions have received the most attention due to the potentially negative cognitive effects in the short- and long- term. Stellenbosch Rugby Football Club ('Maties'), the official rugby club of Stellenbosch University, represents one of the world's largest non-professional Rugby clubs, making this an ideal cohort for community level injury surveillance.

Objective To describe the incidence and events associated with concussion in this large non-professional homogenous cohort.

Design A one-season prospective cohort injury surveillance study.

Setting Students (young adults) athletes competing in the internal ('Koshuis') tournament of the Maties Rugby Club in 2018

Patients (or Participants) All 807 male players registered for the Koshuis tournament in 2018, which was comprised of 101 matches and 2,915 of exposure hours. The average age, height and weight of this cohort was 20±2 years, 182±7 cm and 88±14 kg, respectively.

Interventions (or Assessment of Risk Factors) Recording of all injuries, and factors associated with injury, according to the consensus statement for injury recording in rugby.

Main Outcome Measurements Overall, there were 89 time-loss injuries, which equated to an injury rate of 31 per 1000 match hours (95% confidence intervals [CIs]: 24–37), or about one injury per match. The most common injury diagnosis was 'concussion' (n=27 out of 90 injuries, 30%), at a rate of 9 per 1000 match hours (95% CIs: 6–12).

Results The three most common mechanisms of concussion in the present study were performing a tackle (33%), accidental collision (30%) and being tackled (11%).

Conclusions Concussion was the most common injury in this population, at a rate that was six times higher than a comparable cohort in the UK. Future studies should try to explain this higher rate and subsequently reduce these concussions.

162 ABSTRACT WITHDRAWN

163 GENDER DIFFERENCES IN HEAD IMPACT RATE AND MECHANISM IN HIGH SCHOOL LACROSSE

¹Dedan Patton, ^{1,2}Colin Huber, ^{1,3}Valerie Lallo, ^{1,4}Catherine McDonald, ^{1,5}Kristy Arbogast. ¹Center for Injury Research and Prevention, Children's Hospital of Philadelphia, Philadelphia, PA, USA; ²Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, USA; ³Department of Biomedical Engineering, Widener University, Chester, PA, USA; ⁴School of Nursing, University of Pennsylvania, Philadelphia, PA, USA; ⁵Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

10.1136/bjsports-2021-IOC.150

Background There is debate as to whether protective headwear should be mandated in female lacrosse; however, a lack of quantitative evidence exists regarding the effectiveness of, and case for, protective headwear in female lacrosse.

Objective To compare head impacts in male and female lacrosse in terms of rate recorded by headband-mounted sensors and mechanism determined by video analysis.

Design Prospective observational study.

Setting One season of suburban high school female (12 games) and male (15 games) lacrosse competition.

Participants Adolescent female (n=15) and male (n=33) lacrosse players.

Main Outcome Measurements Head impact rate as calculated by the number of video-confirmed head impacts above 16 g recorded by SIM-G (Triax Technologies) headband-mounted impact sensors divided by the number of player-games during one season. Mechanism of impact (i.e. player contact, fall, stick-to-head or ball-to-head) determined by detailed video analysis of sensor-recorded events.

Results For male lacrosse, 226 head impacts were recorded during 272 player-games for an impact rate of 0.83 impacts per player-game. The most common mechanism for head impacts to male lacrosse players was player contact (57%) followed by stick-to-head (27%), falls (15%) and ball-to-head (2%). For female lacrosse, 7 head impacts were recording during 109 player-games for an impact rate of 0.06 impacts per player-game. Of the seven head impacts to female lacrosse players, three were player contact (43%), three were stick-to-head (43%) and one was a fall (14%).

Conclusions The impact rate for female lacrosse players is less than 8% of the rate for male lacrosse players, which suggests that head impacts in female high school lacrosse are rare. However, nearly half of the head impacts in female lacrosse were stick-to-head, for which protective headwear may reduce the risk of injury. Therefore, further investigation of the association between head impact mechanism and injury in female lacrosse is required.

164 NORMATIVE BASELINE SCAT5 SCORES IN A POPULATION OF UNITED STATES OLYMPIC ATHLETES

^{1,5}Lauren Pierpoint, ^{2,5}Laura Zdziarski, ^{3,5}David Taylor, ⁴William Moreau, ^{3,5}Dustin Nabhan. ¹Steadman Philippon Research Institute, Vail, USA; ²University of Utah, Department of Orthopaedics, Salt Lake City, USA; ³USA Olympic and Paralympic Committee, Colorado Springs, USA; ⁴Southern California University of Health Sciences, Whittier, USA; ⁵USA Coalition for the Prevention of Illness and Injury in Sport, Colorado Springs, USA

10.1136/bjsports-2021-IOC.151

Background The Sport Concussion Assessment Tool 5th Edition (SCAT5) is the most recent version of the concussion