

409

DOES RUGBY NEED TO ADJUST ITS THRESHOLD FOR IN-MATCH OFF-FIELD HEAD INJURY ASSESSMENTS (HIAS)? A RETROSPECTIVE ANALYSIS OF CONCUSSIONS DIAGNOSED POST-MATCH, WHERE NO IN-MATCH OFF-FIELD HIA WAS PERFORMED

^{1,2}Steffan Griffin, ³Matt Cross, ⁴Geraint Ashton Jones, ^{1,5}Simon Kemp, ^{1,6}Keith Stokes. ¹Rugby Football Union, London, UK; ²University of Edinburgh, Edinburgh, UK; ³Premiership Rugby Limited, London, UK; ⁴Alligin Performance, Glasgow, UK; ⁵London School of Hygiene and Tropical Medicine, London, UK; ⁶University of Bath, Bath, UK

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Background Concussion is one of the key player welfare issues in rugby union. Independent Matchday Doctors (IMDDs), supported by live video feeds, were brought in to elite men's rugby union matches in England over the 2019–2020 season to support the in-match off-field head injury assessment (HIA) process.

Objectives To determine whether rugby union players diagnosed with a concussion post-match could have been removed for an in-match off-field HIA.

Design Prospective cohort study.

Setting Twelve professional rugby union clubs in the highest league in England.

Participants Professional male rugby union players.

Outcome measures 1) Number of concussions diagnosed post-match, where no in-match off-field HIA was performed.

2) The proportion of these that were 'tagged' in-match by the IMDD on the 'Hawkeye' live video system as events with the potential to result in concussion.

Main Results Twenty-five concussions were diagnosed post-match (21% of total concussions). In 20 instances, an IMDD report and match-specific Hawkeye library were available for analysis. Of these, the IMDD reported a potentially significant incident in 12 (60%) cases, and a potential incident was 'tagged' on Hawkeye in 13 (65%) of cases. In 6 cases (30%), nothing was highlighted in either the IMDD report or on Hawkeye, and in 9 cases (45%) there was an incident highlighted on both. Common features observed in the 'tagged' video clips include: players staying on the ground after contact for longer than other players; players steadying themselves on their knees before standing; subtle gait changes; and players grasping the face after contact.

Conclusions Over 20% of concussions were not diagnosed in-match, and over half of these were 'tagged' as events with potential to result in concussion. Governing bodies should consider these video features when setting the threshold for HIAs. Optimising this process could help minimise the risk of negative health outcomes in players.

410

A PROFILE OF ISOMETRIC CERVICAL STRENGTH IN ELITE PROFESSIONAL MALE RUGBY PLAYERS

^{1,3}Mairéad Liston, ⁶Darren Dahly, ¹Rod McLoughlin, ^{2,3,4}Éanna Falvey, ^{3,4}Colm Fuller, ⁵Deborah Falla, ^{1,7}Nicol van Dyk. ¹Irish Rugby Football Union, Dublin, Ireland; ²World Rugby, Dublin, Ireland; ³College of Medicine and Health, University College Cork, Cork, Ireland; ⁴Sports Surgery Clinic Santy, Dublin, Ireland; ⁵School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, Birmingham, UK; ⁶School of Public Health, University College Cork, Cork, Ireland; ⁷Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa

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Background Rugby Union, a popular full-contact sport played throughout the world, has one of the highest rates of concussion of all full-contact sports. Concussion is the most commonly reported injury in rugby matches with 17% of professional players sustaining a concussion in a given season. Cervical muscle strengthening is often included in concussion rehabilitation and/or prevention protocols however the cervical strength profiles of elite rugby players are currently unknown.

Objective To describe the preseason isometric cervical strength profiles of peak strength and endurance, in elite professional male rugby players, categorised by playing position.

Design Cross-sectional study measuring isometric peak and endurance cervical strength.

Setting Elite rugby players from four professional Irish teams that compete at the highest level of competition in Ireland and Europe.

Patients (or Participants) Elite male rugby players (n=136).

Interventions (or Assessment of Risk Factors) The association between isometric strength and playing position, age, height and weight was investigated.

Main Outcome Measurements Multidirectional cervical strength was measured using a standardised isometric endurance test and a novel isometric 'make' test.

Results In total, 136 players participated in this study, including front row forwards (27%), other forwards (28%) and backs (45%). The average time for the endurance tests were 55.7 seconds and 52.9 seconds for extension and flexion respectively, with no statistically significant differences between playing positions.

Peak isometric strength was significantly greater in extension (429N ± 104N) than side flexion (left, 306N ± 73N; right, 308 ± 70) across all position groups; isometric flexion (275N ± 65N) was the weakest. Age was associated with increased isometric strength.

Conclusions This study provides normative values for peak and endurance isometric strength in professional rugby players. Differences between playing positions for peak strength highlights the importance of stratifying scores in accordance to position. Pre-season testing of isometric cervical strength may aid in return to play decisions following concussion.

411

ACUTE CONCUSSION VERSUS POST-CONCUSSION SYNDROME (PCS): HOW CAN WE PREVENT PROGRESSION?

^{1,2}Sheharzad Mahmood, ^{1,3}Ann-Marie Przyslupski, ^{1,2,3}Teresa DeFreitas, ^{1,4}Martin Mrazik, ^{1,2,3}Constance Lebrun. ¹Glen Sather Sports Medicine Clinic, University of Alberta, Edmonton, Canada; ²Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Canada; ³Department of Family Medicine, University of Alberta, Edmonton, Canada; ⁴Department of Educational Psychology, University of Alberta, Edmonton, Canada

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Background Concussions can be classified as acute (<90 days to resolution) or post-concussion syndrome (PCS, ≥90 days to resolution). PCS poses a great burden to the individual and to public health.

Objective To contrast the presentation and recovery of acute concussion and PCS to identify potential factors for PCS prevention.

Design Retrospective chart review of concussion patients seen by Sports and Exercise Medicine physicians from 2015–2019.

Setting Glen Sather Sports Medicine Clinic, Edmonton, Alberta, Canada.

Patients 496 patients (289 male/207 female, 19.7±9.4 years) presented with 561 concussions in 1471 visits.

Assessment of Risk Factors Concussions were subdivided into acute and PCS by time from injury to first appointment.

Main Outcome Measurements Demographics, injury mechanisms, Standardized Concussion Assessment Tool (SCAT) scores, management, and recovery timelines.

Results Acute concussions accounted for 88% of injuries and 12% were PCS. Females (RR=1.4) and adults ≥ 25 years (RR=3.6) were more likely to be diagnosed with PCS. In both, injuries occurred most commonly in hockey, football, and soccer. Family physicians were the most frequent referral provider (58% acute, 76% PCS). Median injury-appointment time was 11.0 days (acute) compared to 182.0 days (PCS). Initial total SCAT symptom score was significantly greater ($p<0.001$) in PCS (56.0±33.0) compared to acute concussion (39.8±31.9). Therapies (i.e. referral, medication, intervention) were prescribed in 44% of acute injury visits compared to 73% of PCS visits ($\chi^2=88.6$, $p<0.00001$). Recovery timelines for return to work, school, and sport were significantly longer in PCS patients than in those with acute concussions ($p<0.05$).

Conclusions Athletes who are female and/or ≥25 years of age may be at greater risk for PCS progression, requiring closer monitoring and further injury prevention efforts. Considering the number of referrals from family physicians, further concussion education may better optimize initial management and shorten delays in seeking necessary sports medicine consultation.

412 ABSTRACT WITHDRAWN

413 METHODOLOGICAL CONSIDERATIONS FOR QUANTIFYING PRIOR INJURY HISTORY TO STUDY RISK OF INJURY RECURRENCE

^{1,2,3}Mackenzie Herzog, ^{2,3}Steve Marshall, ^{1,2}Nancy Dreyer, ^{1,2}Christina Mack. ¹IQVIA Injury Surveillance and Analytics, Durham, USA; ²University of North Carolina at Chapel Hill Department of Epidemiology, Chapel Hill, USA; ³University of North Carolina at Chapel Hill Department of Exercise and Sport Science, Chapel Hill, USA

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Background History of injury is an important predictor of future injury risk. Accurately assessing injury history can be challenging as it is influenced by the period of time used for the ‘lookback window’.

Objective Compare two lookback window definitions to quantify injury history and assess impact of this definition on the association between history of ankle sprain and incident game ankle sprain: 1) ‘1-year lookback period’ limited to a history of ankle sprain within the past year and requiring ≥1 year of NBA participation, and 2) ‘all-comers lookback period’ including any history of ankle sprain regardless of the timing of the prior sprain or the number of years of prior participation.

Design Retrospective Cohort Study

Setting U.S. National Basketball Association (NBA)

Participants All NBA players who participated in at least one game from 2013–14 through 2016–17.

Assessment of Risk Factors History of ankle sprain included prior game and non-game ankle sprains.

Main Outcome Measurements Game ankle sprains were obtained from the audited NBA electronic medical record, which is standardized across all 30 teams.

Results Across this 4-season study, 554 game ankle sprains were reported among 946 players and 122,010 player-games. Using the primary definition, players with a history of ankle sprain in the past year were 1.41 (95% CI 1.13, 1.74) times as likely to sustain an incident game ankle sprain, relative to players with no history of ankle sprain. These results are consistent with prior research and pathobiology of ankle sprain. In contrast, the ‘all-comers lookback period’ definition led to an entirely different conclusion with a null result (IRR=1.01, 95% CI 0.80, 1.27).

Conclusions In this analysis, accounting both for a defined exposure time via a fixed 1-year lookback period and for the recency of the prior sprain(s) yielded robust and interpretable results.

414 POPULATION TESTING FOR COVID-19: AN APPROACH FOR INFECTION PREVENTION

¹Christina Mack, ²Osterholm Michael, ¹Wasserman Erin, ³Anderson Deverick, ⁴Myers Emily, ⁵Walton Patti, ⁴Solomon Gary, ³Hostler Christopher, ⁶Mancell Jimmie, ⁷Singh Navdeep, ⁸Mayer Thom, ⁴Sills Allen. ¹IQVIA Real-World Solutions, Durham, USA; ²Center for Infectious Disease Research and Policy, Minneapolis, USA; ³Infection Control Education for Major Sports, LLC, Chapel Hill, USA; ⁴National Football League, New York, USA; ⁵Williamson Medical Center, Franklin, USA; ⁶University of Tennessee Health Science Center, Nashville, USA; ⁷Eden Medical Center, Castro Valley, USA; ⁸National Football League Players Association, Washington DC, USA

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Background Population screening with highly sensitive diagnostic tools, such as nucleic acid amplification testing (NAAT), can enable early identification and isolation of cases and reduce transmission of SARS-CoV-2.

Objective To describe the results of a rigorous, large-scale COVID-19 testing and monitoring program with confirmatory processes and adjudication of positive results.

Design Descriptive Epidemiology Study

Setting 32 U.S. National Football League (NFL) Clubs during the 2020 season

Participants NFL players and staff

Methods The NFL/NFL Players Association instituted a COVID-19 Testing and Surveillance Program for the 2020 Season, which included daily testing for players and staff, full medical follow-up and adjudication of cases. Clinical adjudication was based on subsequent daily testing, symptoms, and clinical history; persons remained in isolation during adjudication.

Results Between August 1 and November 14, 2020, a total of 632,370 RT-PCR tests were administered to 11,668 individuals; 270 (2.4%) confirmed cases were observed. PPVs of the initial positive result ranged from 73–82% across RT-PCR platforms. Initial positive results were positive on re-processing 61–79% of the time. PPV increased when both results were positive to >95%; however, initial positives that were negative on confirmatory processing resulted in true cases a portion of the time, depending on machine and population prevalence. High Ct values (33 to 37) could indicate onset of infection.