

(P100057)

Timing of contact and non-contact injuries across a season in amateur rugby: implications for injury prevention and return to playS. Snodgrass^{a,b}, J. Manvell^{a,c}, S. Macvean^{a,d}, R. Callister^{a,b}^a*Discipline of Physiotherapy, School of Health Sciences The University of Newcastle, Australia*^b*Active Living Research Group, Hunter Medical Research Institute, Australia*^c*Hunter New England Health Local Health District, Australia*^d*Wyong Hospital, Central Coast Local Health District, Australia*

Introduction: Injury risk may vary throughout the playing season. The rapid increase in exposure to matches or contact at the start of a season may increase injury risk; conversely, accumulation of training and match stress may increase risk towards the end of a season. The timing of injuries throughout the playing season has rarely been studied, with no identified studies on injury timing in amateur rugby players, where the majority of participation occurs. Understanding patterns in injury risk may assist in planning graded exposure, training periodisation, and injury prevention strategies. The aim of this study was to investigate the timing of contact and non-contact injuries in amateur male rugby union players.

Methods: Amateur male rugby union players participating in the highest amateur, non-representative, non-professional level from one club (four competition levels) in the Newcastle and Hunter region of NSW were followed over one season. The team physiotherapist recorded injuries according to the Rugby Injury Consensus Group guidelines, classifying injuries by body location, severity, new vs recurrent, and contact vs non-contact. For analysis, all injuries were included regardless of time-loss and the playing season was categorised into thirds: (1) pre-season and rounds 1-5, (2) rounds 6-11, and (3) rounds 12-17. Chi-square tests determined differences in the number and type of injuries occurring in each third of the playing season.

Results: Players (n=151) were aged 22.1±2.8y, height 182±6cm, weight 91±11kg, and body mass index 28.5±3.4kg.m⁻². Ninety-five (63%) players incurred 212 injuries: 187 (88%) during matches and 25 (12%) during training. The overall injury rate was 32/1000 player hours; 148/1000 player-match hours; and 5/1000 player-training hours. Injury incidence was highest in the first third of the season (n=96, 45%), declining through the season, with significantly fewer injuries in the last third (n=51, 24%; $\chi^2(2, 212)=15.0, p<0.001$). Contact injuries declined through the season: more in the first third (n=75, 54%) compared to the last third (n=19, 14%), but non-contact injuries increased: more in the last third (n=32, 44%) compared to the first third (n=21, 29%; $\chi^2(2, 212)=25.2, p<0.001$). New injuries decreased and recurrent injuries increased through the season ($\chi^2(2, 212)=22.8, p<0.001$). Body location and severity of injury did not differ ($p>.05$) across the season.

Discussion: Amateur rugby players had a high incidence of match injuries, and more injuries at the season start compared to the end. More contact injuries occurred early in the season whereas more non-contact injuries occurred towards the end of the season. These findings may inform player preparation, in-season training, controlled exposure or injury prevention programs in amateur rugby.

Impact and application to the field: High numbers of contact injuries early in the season in amateur rugby may suggest players are not prepared and may require more contact conditioning during pre-season training. Increasing numbers of non-contact and recurrent injuries later in the season may suggest that in-season training loads, playing exposures or return the play strategies could be investigated to reduce injuries.

Conflict of interest: We acknowledge we have no conflict of interest of relevance to the submission of this abstract.

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Risk factors for the development of glenohumeral dislocations in tactical populations: a systematic reviewP. Campbell^a, E. Canetti^{a,b}, V. Simas^a, B. Schram^{a,b}, R. Pope^{a,c}, R. Orr^{a,b}^a*Tactical Research Unit, Australia*^b*Bond Institute of Health and Sport, Australia*^c*Charles Sturt University, Australia*

Background: Joint dislocation injuries involve the complete loss of contact between the articulating surfaces of bones or internal joint prostheses, while joint subluxations involve the partial loss of contact. These injuries are associated with considerable economic costs, healthcare utilisation, and losses in occupational performance and availability. Currently, available evidence indicates military populations experience shoulder dislocations at a rate that may be 20 times higher than that reported for the general population. However, a comprehensive review of the incidence and associated occupational risk factors in tactical personnel is lacking. The identification and synthesis of evidence regarding rates of occurrence and risk factors for dislocations and subluxations in occupational settings, may provide subsequent opportunities for development of strategies to mitigate the initial injury risk (given high risks of re-dislocation once initial injury has occurred), leading to reduced ongoing individual and organisational costs. Therefore, this review aimed to identify and synthesise findings from studies which have reported on the occurrence rates and risk factors of glenohumeral dislocations in tactical populations.

Method: This review was conducted according to the PRIMSA-P guidelines and registered on the Open Science Framework. PubMed, EBSCO, CINAHL and ProQuest databases were systematically searched using key terms derived from the following concepts: 'dislocation', 'work' and 'risk'. Key findings from the included studies were extracted, including risk factors, prevalence or incidence and risk ratios (e.g., relative risk, hazard ratios, and incidence rate ratios). Each study included in the review was critically appraised to assess its methodological quality, using the Critical Appraisal Skills Programme (CASP) and AXIS toolkits.

Results: The methodological quality score of the included studies ranged from 66% to 90%. The incidence of glenohumeral dislocations ranged from 1.69 – 3.13, and 5.4 per 1,000 person-years, respectively, in active-duty military personnel, and in military cadets undergoing training. Identified risk factors for sustaining acute primary glenohumeral dislocations include Army and Marine Corps service, enlisted rank, younger age, male sex, sporting activities and military training. Regarding relative risks for shoulder dislocations associated with specific activities, it is notable the results indicated incidence rates associated with participation in military obstacle course sessions and the U.S. Army fitness test were 4 times as high and 1.4 times as high, respectively, as the incidence associated with participation in rugby, when expressed per 10,000 exposures.

Discussion: These findings demonstrate military populations are at a higher risk of glenohumeral dislocation than civilians. Further, the review showed that members of these tactical populations who are younger, and male, are at an increased risk of sustaining glenohumeral dislocations. Additionally, the evidence suggests some military activities may be particularly high-risk for shoulder dislocation events. It is also important to note, that many of the identified risk factors in this review (e.g., enlisted rank, military training, age, male sex etc.) may be proxies for the level of overall exposure to physical-based occupational tasks.

Impact: This review provides some clear insights to prevalence and incidence rates for shoulder dislocations, as well as key intrinsic and extrinsic risk factors.

Conflict of interest statement:

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Where are we headed? Evidence to inform future heading guidelines

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Introduction: Football is one of the few sports whereby the head is purposefully used as a key requirement of the game, with the skill of heading taught from a young playing age. There is current scientific and public concern over the uncertainty of short-, medium- and long-term consequences of heading on brain health. Hence, a precautionary approach to mitigate any possible risks is desirable whilst the evidence remains equivocal. One such approach is being proactive about developing and implementing strategies and guidelines that help reduce the burden (volume and intensity) of heading in young and beginner players, which requires integration of a multitude of topics to inform such strategies.

Objective: This narrative review explores the current evidence underpinning strategies that could be incorporated into future heading guidelines to reduce heading burden in players across all levels of football.

Methods: A four-step search strategy was utilised to identify all data-based papers related to heading in football. Eligibility criteria for inclusion: 1) original data; 2) study population included football players, 3) outcome measures included one or more of the following: number of headers, measurement of head acceleration during heading, or head injury incidence; and 4) published in English or an English translation available.

Results: In total, 62 papers were included. Evidence suggests that future heading guidelines should consider the following: 1) Developing a heading coaching framework which emphasises the technical proficiency of heading, 2) greater emphasis on small-sided games, particularly in young players, to limit the total number of headers per week. This is particularly focused on training for players who complete higher numbers of headers in games, whilst also reducing headers from goal kicks and punts. 3) Neuromuscular neck exercises integrated into general injury reduction exercise programs (such as FIFA 11+), 4) enforcement of rules related to deliberate head contact and 5) using lower-pressure match balls.

Conclusion: To mitigate the potential risk of heading on long term brain health, scientific evidence suggests that there are a number of pragmatic strategies that can be incorporated into future heading guidelines. It is also recommended that an implementation and evaluation plan which is co-designed by health professionals, researchers, coaches, players and other important stakeholders is developed in tandem to optimise the potential adherence to, and benefits from, any future heading guidelines.

Impact/Application to the field: This review is the first to outline the current evidence and make recommendations for the inclusion of different strategies into future heading guidelines to reduce heading burden in football players. These results can assist football governing bodies worldwide when drafting and standardising heading guidelines to protect the long-term brain health of current and future generations of players.

Conflict of Interest: The author team would like to declare affiliations with Football Australia.

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Occupational risk factors for the development of disc herniation in physically demanding occupations: a rapid review

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Introduction: Herniation, also known as prolapse, of the intervertebral discs is a common cause of back pain and sciatica. Risk factors include genetics, trauma, and repetitive activity arising from recreation or working in physically demanding occupations. Disc herniation can limit mobility and the ability to handle and move objects, reducing the capacity to work. The aim of this rapid review was to identify and review studies that reported occupational risk factors for the development of intervertebral disc herniation in physically demanding occupations.

Method: This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA), and methods were detailed in a protocol published in advance. PubMed, SPORTDiscus, CINAHL, and ProQuest databases were systematically searched using terms derived from four themes: 'disc', 'herniation', 'work', and 'risk'. Eligible studies were critically appraised with specific tools for each type of study design to assess their methodological quality, and a narrative synthesis of the findings was completed.

Results: Eleven articles were included that reported on physically demanding occupations and occupational tasks. Operators of earthmoving machines with high perceived workload, high vibration, and moderate spinal load were found to experience a greater 12-month incidence of lumbar disc herniation (9.6%) than drivers less exposed to these factors (2.3%; $p=0.012$). Results also revealed that retail workers exposed to biomechanical overload were at an increased risk of lumbar disc herniation compared to those not exposed (aOR=3.82; 95% CI 3.08-4.74). Truck drivers exposed to loading vehicles more than three times per day appear to have a higher prevalence of cervical disc herniation than those loading their trucks less than twice a day; however, this difference was not statistically significant (OR=9.0; 95% CI, 0.4-182.8). Occupational tasks including physical overload, handling heavy loads, self-reported hard work, and exposure to moderate and high levels of manual handling of loads were all associated with increased risk of lumbar disc herniation. Additionally, handling loads with trunk inclination appears to exacerbate the risk.

Discussion: Specific physically demanding occupations and tasks with a high physical workload, a high requirement for manual materials handling, and trunk inclination appear to place workers at increased risk of disc herniation. Occupations which are perceived as involving hard work also appear to increase the risk of disc herniation. Data reporting on cervical spine disc herniations is limited, with most of the research being on lumbar spine herniations.

Impact: The identified factors and tasks known to increase the risk of disc herniation must be carefully managed in staff with existing back pathologies and as part of return-to-work plans.

Conflict of interest statement:

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