

The never-ending search for the perfect acute:chronic workload ratio: what role injury definition?

Billy T Hulin

THE DEBATE ON THE ACUTE:CHRONIC WORKLOAD RATIO

The acute:chronic workload ratio is associated with injury risk in rugby league players.¹ Researchers and practitioners have discussed the most appropriate way in which acute and chronic workloads should be modelled and compared with injury. Menaspà² suggested that when workloads do not follow weekly patterns in team sport, rolling weekly averages may disregard variations in workload within the week and as such, are not ideal. However, Drew *et al*³ highlighted that evidence was required before an alternative method could be considered. Williams *et al*,⁴ suggested an exponentially weighted moving average calculation of acute and chronic workloads. To my knowledge, all this discussion has ignored definition of injury—this could influence the findings of any workload-injury analysis.

WE SHOULD NOT OVERLOOK INJURY DEFINITION

Relating the findings from multiple injury investigations in team sport can be difficult due to the use of inconsistent definitions of injury.⁵ Both Hulin *et al*¹ and Windt *et al*⁶ investigated the influence of the acute:chronic workload ratio on injury in professional rugby league players. Findings conflicted. Hulin *et al*¹ demonstrated that acute:chronic workload ratios >1.5 were associated with injury, while Windt *et al*⁶ did not find that relationship. However, Hulin *et al*¹ considered an injury to be ‘any time-loss injury that resulted in a player being unable to complete full training or missing match time’; Windt *et al*⁶ investigated injuries that resulted in ‘match time loss only’. Please note that previous workload-injury studies have included a broader injury definition that encompasses ‘any pain or disability suffered by a player during a match or training session and subsequently assessed during

or immediately after the match or training session’ (ie, ‘medical attention injuries’).⁷

Players missing match time may be the most severe outcome for a team’s performance and therefore, is arguably the most relevant definition of injury. However, the interaction between limited training workloads and increased match injury risk is also important. Specifically, injuries that result in players missing training sessions (but not matches), may result in low chronic workloads and less physical fitness, which have been associated with an increased injury risk during matches,¹ and ultimately, decreased team performance.

CALL TO ACTION—WHAT CAN WE DO?

Standardised injury definitions may allow better comparison among studies in workload injury.⁵ However, the interaction between modified training injuries—low chronic workloads—and missed-match injuries underscores that there must not be a single definition of injury. Researchers and practitioners should consider the multiple interactions between workload

and the probability of different types of injury. For example, figure 1 demonstrates the relationship between the acute:chronic workload ratio and (1) medical attention injuries, (2) time-loss injuries, and (3) missed-match injuries in professional rugby league players.

The risk of suffering a medical attention injury is always greater than the risk of time-loss injury and missed-match injury. Note that although acute:chronic workload ratios >2 are associated with the greatest risk of medical attention, and time-loss injury—no missed-match injuries occurred with an acute:chronic workload ratio >1.75. In this example, spikes in acute workloads were not associated with an increased risk of missed-match injury. Altering or selecting only one definition of injury when presenting this data may result in findings that conflict with other research.

The desired definition of injury may indeed only be relevant to the club, sport, practitioner or researcher conducting the investigation. For example, time-loss and/or missed-match injuries may vary between two teams (or studies) based merely on (1) the willingness of practitioners to ‘roll the dice’ when players sustain a medical attention injury, (2) the ability of the medical staff to return players to full fitness once sustaining a medical attention injury or (3) the playing schedule and recovery time provided between matches. Modelling acute:chronic workload ratios to predict injury can never be an exact science and

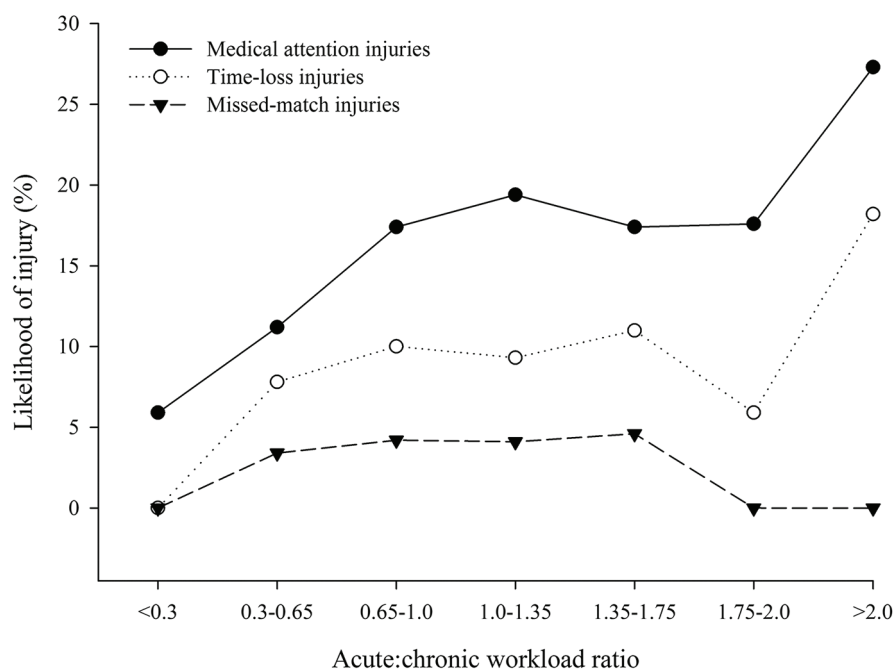


Figure 1 The relationship between the acute:chronic workload ratio and the risk of sustaining a medical attention injury, time-loss injury and missed-match injury in professional rugby league players.

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practitioners need to consider the multiple factors that are associated with injury and find a best fit for their environment.⁸ Teams that collect these data and develop their own algorithms will have an advantage in preventing injuries in their specific setting. Publishing and communicating the full range of methods (injury definitions, contextual factors such as calendar crowding) will allow practitioners to make informed decisions in professional team sport.

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