Injury Predictability of Acute:Chronic Workload Ratios: A Systematic Review and Meta-Analysis

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Introduction

- Low injury rates have previously been correlated with sporting team success, highlighting the importance of injury mitigation programs.
- The use of monitoring and optimizing training load has increased in elite sport as an effective tool to reduce injury risk while ensuring improvements in fitness.
- One particular method, Acute:Chronic Workload Ratios (ACWR), has been used to monitor an athlete’s level of preparedness. ACWR can be calculated via a rolling average of exponentially weighted moving averages (EWMA).
- It has previously been theorized that ratios between 0.80-1.30 will provide the lowest risk of injury.
- The use of monitoring and optimizing training load has increased in elite sport as an effective tool to reduce injury risk while ensuring improvements in fitness.

Methods

- Pubmed, Embase, CINAHL, and Sports Discuss databases were searched using key search terms, developed through a preliminary review of the literature and using subject matter experts.
- Duplicates were removed, and articles were screened using inclusion and exclusion criteria established prior to screening.
- The Downs and Black checklist was used to critically appraise included studies and provide a strength of evidence for this method of injury risk prediction.
- A Kappa analysis was performed to investigate the level of agreement between raters (DM & BS) with the final score settled by consensus (RO).
- Almost perfect interrater agreement (κ = 0.954) existed between raters on the Downs and Black.
- There was a high variety between studies with different variables studied (total distance versus high speed running), as well as differences between ratios analyzed (1.50-1.80 versus ≤0.85), and reference groups (0.80 to 1.20 versus ≤0.85).

Results

- Almost perfect interrater agreement (κ = 0.954) existed between raters on the Downs and Black.
- There was a high variety between studies with different variables studied (total distance versus high speed running), as well as differences between ratios analyzed (1.50-1.80 versus ≤0.85), and reference groups (0.80 to 1.20 versus ≤0.85).

Discussion and Conclusion

- This review supports ACWR as a tool to predict injury risk, while the utilization of EWMA may be a sensitive measure.
- Ratios between 0.80 to 1.30 appear to result in the lowest injury risk. Sporting clinicians may wish to utilize higher loads for greater increases in fitness, though this review did not examine ACWR and its effect on fitness.

Recommendations

- Further research should attempt to use more standardized measures to allow for more objective results, though this will always be impacted by differences in sports.
- Further research on the effects of ACWR on fitness is needed to further guide clinicians.
- Utilizing ACWR is an effective tool to predict injury risk, but other methods of monitoring training load should not be ignored.

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References


Figure 1: ACWR Injury Predictability Forest Plot

Figure 2: ACWR Injury Predictability Forest Plot

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References