The Impact of Perceived and Reported Training Load Changes on Running-Related Injuries - Results from the Run Better Research Study

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Summary

The purpose of this study was to investigate the relationship between perceived and objectively reported training load changes and the onset of running-related injuries (RRI), considering potential injury latency. Logistic regression showed that an increased exponentially weighted moving average (EWMA) and low perceived training load (PTL) were linked to higher rates of RRI. These findings highlight the importance of both perceived and reported training load metrics in monitoring and mitigating RRI risk, particularly considering the delayed onset of overuse injuries.

Introduction

Training load management is a critical factor in reducing the risk of RRI. Previous studies have shown that changes in training volume derived from ACWR or EWMA are associated with RRI risk [1,2]. However, the current literature has not yet explored whether the onset of RRI always occurs immediately following training load changes or within a specific timeframe, and whether these changes could also be observed in PTL data.

Methods

In this 25-week prospective cohort study, 356 participants were monitored weekly via online questionnaires. Data included training and injury parameters. Training distance data was collected categorically and utilized to calculate the following parameters: ACWR and EWMA. Participants additionally reported PTL levels in comparison to their usual training loads. Spearman's correlation was conducted to explore the relationship between perceived and objectively reported (in levels of distance) training load metrics. Logistic regressions were used to identify associations between ACWR, EWMA, PTL, and RRI in the following week.

Results and Discussion

During weeks reporting RRI, ACWR values below 0.8 were linked to increased injury rates, likely attributable to reduced training loads from subjects being unable to train while injured. Accordingly, an elevated injury risk was observed after weeks of increased training loads, suggesting that training load spikes may contribute to increased RRI risk with delayed onset (Fig, 1). PTL correlated moderately with EWMA ($p < 0.001$) and strongly with ACWR ($p < 0.001$), highlighting the utility of PTL for monitoring training load. Logistic regression results showed an association between increased EWMA and RRI ($p = 0.034$, OR = 1.087 [1.006; 1.174]), suggesting that cumulative training load contributes to injury onset (Fig. 2). Further, high PTL was associated with increased RRI odds compared to normal PTL ($p = 0.006$, OR = 1.721 [1.171; 2.531]) emphasizing the importance of both perceived and objectively reported training load metrics in RRI accumulation.

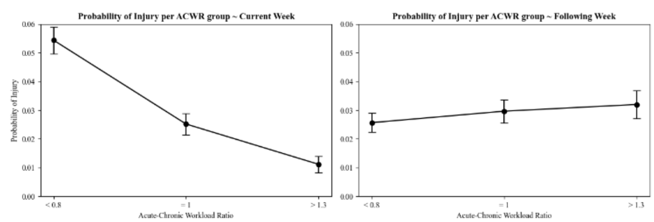

Figure 1: Probability plots for injury probability depending on ACWR group for injuries occurring in the current (left) and following (right) week.

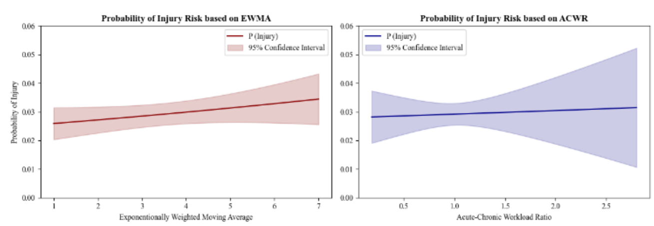

Figure 2: Conditional estimate plots for injury probability depending on EWMA and ACWR values showing injury probability and 95 % CI.

Conclusions

This study highlights the relationship between perceived and objectively reported training load changes and the onset of RRI, emphasizing the role of cumulative load and overuse-injury latency. Increased EWMA and PTL were associated with increased injury risk offering valuable insights for optimizing training strategies and monitoring acute and chronic training load metrics to reduce injury risk.

Acknowledgments

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References

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[2] Cloosterman et al. (2024). *Journal of Athletic Training*, **59**(10), 1028–1034