

Examination of the relationship between changes in workload and changes in loaded countermovement jump during a rugby union season



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1. Introduction

- ❖ The loaded countermovement jump (CMJ) is a vertical jump test used to monitor neuromuscular fatigue.
- ❖ Although commonplace in elite sport, loaded CMJ variables most sensitive to neuromuscular fatigue remain unclear.
- ❖ This is partly due to evidence in the literature that suggests neuromuscular fatigue may manifest as an alternative movement strategy rather than a deterioration in performance^[1].
- ❖ Loaded CMJ variables measuring task output and mechanics should both be investigated to identify neuromuscular fatigue^[2].

Take-home message

Loaded CMJ variables, FT-CT and TtPP, showed significant correlation with changes in workload lagged 2 weeks. They may prove a useful addition to any test battery attempting to monitor neuromuscular fatigue in rugby union players.

2. Purpose

- ❖ The aim of this study was to assess the change in 8 loaded CMJ variables in relation to changes in workload; and thereby determine the suitability of the loaded CMJ to detect neuromuscular fatigue.
- ❖ The secondary aim was to examine changes in loaded CMJ when workload was lagged by one and two weeks.

3. Methods

- ❖ 18 professional rugby union players performed loaded CMJ testing over a 13-week period.
- ❖ Eight CMJ variables were assessed; including both CMJ output and CMJ mechanics variables.
- ❖ Workload was assessed by GPS total distance in the previous week's training and match-play.
- ❖ Spearman's Correlations were conducted to identify the relationship between workload lagged 0 weeks, 1 week and 2 weeks and loaded CMJ variables.

Scatter Plots

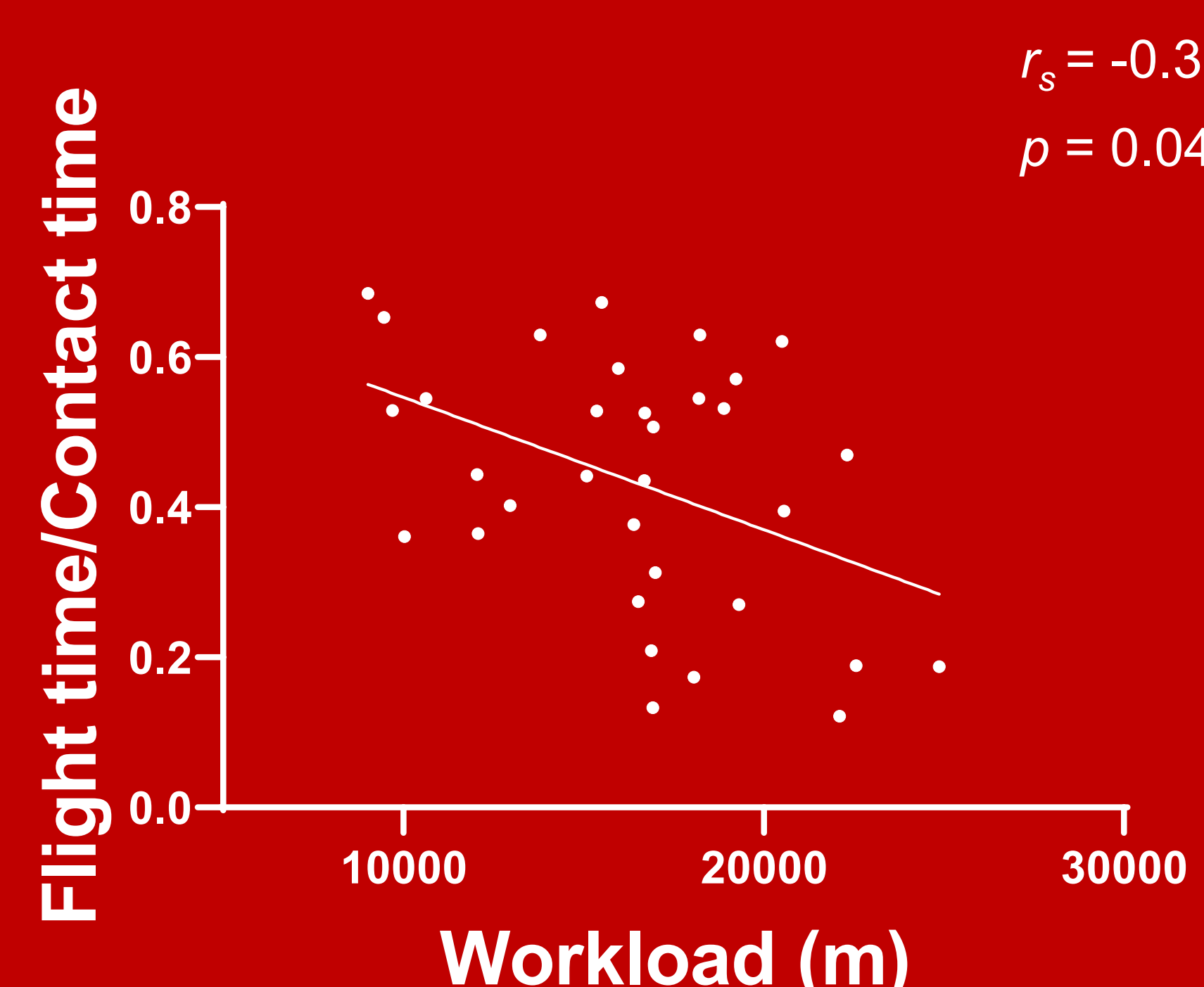
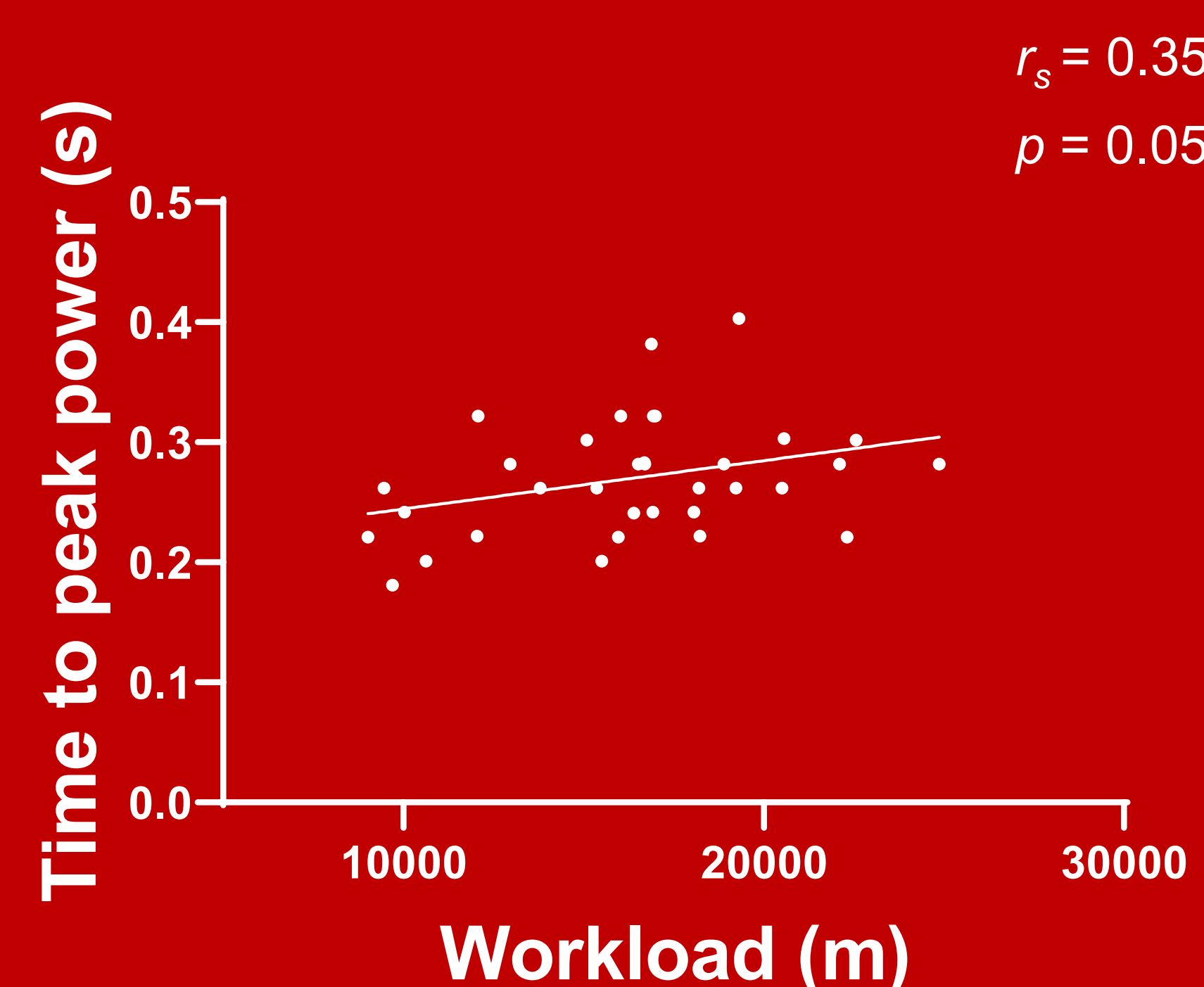


Figure 1. A scatter plot showing the correlation between workload lagged by 2 weeks (A) TtPP and (B) FT-CT.

4. Results

- ❖ No significant correlations were found between loaded CMJ variables and workload with no lag or lagged one week.
- ❖ Flight time/contact time (FT-CT) ($r_s = -0.35$) and time to peak power (TtPP) ($r_s = 0.35$) were moderately correlated with workload lagged by 2 weeks.

5. Conclusion

- ❖ The results suggest loaded CMJ is not a suitable test to monitor acute fatigue-induced changes in neuromuscular function.
- ❖ The results also indicate FT-CT and TtPP are correlated with workload lagged 2 weeks.
- ❖ FT-CT and TtPP are both measures of CMJ mechanics. This supports the suggestion that neuromuscular fatigue may present as an alternative movement strategy.
- ❖ Results of FT-CT should be used cautiously as it was not a very reliable measure (CV=20.5%).
- ❖ Both variables may be useful to help prescribe alterations to player training plans during periods of heavy loading.

Acknowledgements

I would like to thank Dr Daniel West and Joe Kupsarevic for their help and supervision throughout the project. I would also like to thank all staff and players at Newcastle Falcons for their time and effort and for making me feel welcome.

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2. Gathercole, R. *et al.* Alternative countermovement-jump analysis to quantify acute neuromuscular fatigue. *Int. J. Sports Physiol. Perform.* **10**, 84-92 (2015)