Variations of Pacing in Simulated Rowing - Effects on Physiological and Performance Variables

A thesis presented for the degree of Master of Science (Sport and Exercise Science)

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Abstract

Background: Observation of pacing strategies in competitive rowing show that a parabolic-shaped strategy of a fast-starting 500 m, a slowing over the middle 1000 m and an increase of pace in the final 500 m, is the common self-selected strategy. This typical pacing strategy is influenced by the tactical need for the rower or crew to row in water free of wake and to be in a position where competitors can be observed. Previous work has suggested however that the fast start is also physiologically beneficial in causing a faster oxygen uptake ($\dot{V}O_2$) kinetic response, thereby reducing the initial oxygen deficit and the concomitant accumulation of fatiguing by-products.

Objective: The purpose of this study was to investigate the influence of starting strategy on $\dot{V}O_2$ kinetics and performance during 2000 m simulated rowing.

Methods: Six (*n*) trained rowers ($\dot{V}O_{2peak}$ 61.9 ± 4.2 $ml \cdot kg^{-1} \cdot min^{-1}$) performed a baseline 2000 m ergometer rowing trial using a Concept II rowing ergometer. From the baseline data, starting strategies were developed for the first 500 m. A fast-start (107% ± 3.27% mean overall velocity) and an even start strategy (100% ± 1.78% mean overall velocity) were developed. Rowers then completed trials using these starting strategies. All trials were carried out in a counterbalanced order. Performance variables and heart rate were downloaded from the ergometer. Physiological measures of $\dot{V}O_2$ were measured throughout exercise. Post-trial blood lactate was also measured. A general linear model with repeated measures was used to determine the effects on the relevant physiological and performance variables elicited by the starting strategy permutations across 100 m and 500 m sectors. A one-way ANOVA was used

to determine the effect on overall time and overall power as well as post-trial blood lactate values. Effect size was also determined by use of Cohens *d* values.

Results: No significant differences were found between trials for overall finishing time (mean ± SD; baseline 409.5 ± 26.5 s, fast start 406.4 ± 32.7 s, even start 406.4 ± 27.1 s), mean work across 2000 m (baseline 329.1 ± 53.0 W, fast start 343.0 ± 68.0 W, even start 340.3 ± 57.9 W) or post-trial lactate (baseline 12.4 ± 3.7 mmol·L^{-1}, fast start 12.2 ± 3.1 mmol·L^{-1}, even start 14.0 ± 1.1 mmol·L^{-1}). No significant differences were found in the $\dot{V}O_2$ response in the first and last quarter of the 2000 m trials but results show $\dot{V}O_2$ response was significantly greater for a fast start when compared to baseline for the second (Wilks' Lambda =.104, $F_{(2, 3)}$ =12.923, $p<.05$, multivariate eta squared=.896) and third quarters (Wilks' Lambda=.063, $F_{(2, 3)}$ = 22.378, $p<.05$, multivariate eta squared=.937), respectively.

Conclusions: Whilst data indicate that variation on the starting strategy had relatively small effect on performance outcomes it did indicate that the rate at which $\dot{V}O_2$ increases is sensitive to the pattern of work rate imposition. The duration of rowing can vary between 5.8–7.4 min and $\dot{V}O_{2max}$ is normally attained within the event therefore any benefit from the faster $\dot{V}O_2$ kinetic response in the second and third quarters is unlikely to have significant impact on performance outcomes.

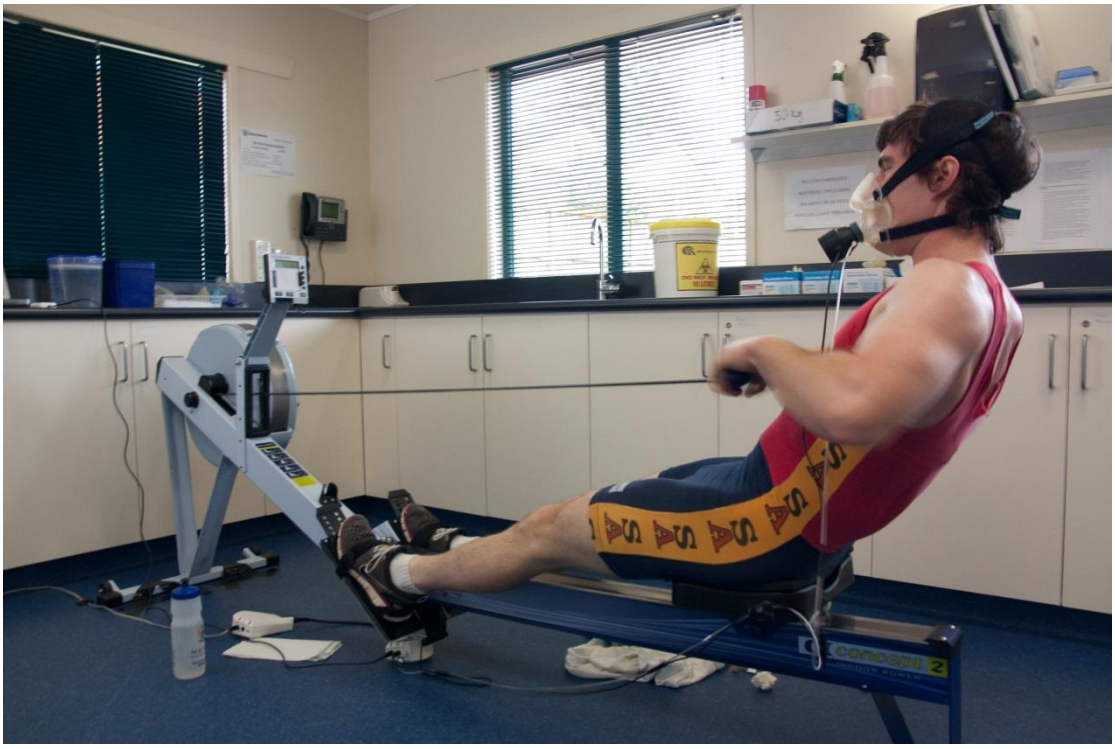
Keywords: Pacing, pacing strategy, rowing, starting strategy

Declaration

This dissertation constitutes my own work and all material that is not my own is fully acknowledged. No part of this work has been submitted for assessment elsewhere.

Signed

Date 16th July 2012



Acknowledgements/Dedications

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