

The influence of aerobic fitness on the oxygen uptake kinetics of trained cyclists

G Rose¹✉

Abstract

Introduction: The oxygen uptake kinetics of cyclists with $\dot{V}O_{2max}$ values associated with Elite standards has not been investigated. A hypothesis was tested stating that trained cyclists have faster oxygen uptake responses as aerobic fitness increases.

Methods: Participants (n = 16, combined group) completed a series of square wave 6-min exercises at moderate (80% LT), heavy (50%Δ between the power at LT and $\dot{V}O_{2max}$), and severe (power at $\dot{V}O_{2max}$) intensities. The $\dot{V}O_2$ response after the onset of exercise was described by a double exponential model. Participants were further assigned to a high fitness (HF, n = 8) group ($\dot{V}O_{2max}$ 65 ± 4.7 ml min⁻¹ kg⁻¹) and a moderate fitness (MF, n = 8) group ($\dot{V}O_{2max}$ 55.1 ± 4.8 ml min⁻¹ kg⁻¹).

Results: Results showed a significant slowing of phase II response time (t) above the LT (P < 0.05), and a reduction in gain (G) during severe intensity exercise (P < 0.05). During heavy intensity exercise, t was moderately correlated with $\dot{V}O_{2max}$ (r = -0.64, P < 0.1), and significant differences (P < 0.05) occurred between HF and MF groups. A significant difference also occurred in G between HF and MF groups (F = 5.6, P < 0.05) despite no change in the slow component.

Conclusion: It was concluded that during heavy intensity exercise, the speed of oxygen uptake kinetics continued to improve with increasing aerobic fitness. The mechanism responsible was hypothesised to be related to the percentage of type I muscle fibres.

✉ **Contact email:** george.rose@southwales.ac.uk (G. Rose)

¹School of Health, Sport & Professional Practice, University of South Wales, Newport, UK.

Received: 1 May 2014. Accepted: 1 June 2014.

