‘Priming’ exercise and O_2 uptake kinetics during treadmill running

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Abstract

We tested the hypothesis that priming exercise would speed $\dot{V}O_2$kinetics during treadmill running. Eight subjects completed a square-wave protocol, involving two bouts of treadmill running at 70% of the difference between the running speeds at lactate threshold (LT) and $\dot{V}O_2$max, separated by 6-min of walking at 4 km h^{-1}, on two occasions. Oxygen uptake was measured breath-by-breath and subsequently modelled using non-linear regression techniques. Heart rate and blood lactate concentration were significantly elevated prior to the second exercise bout compared to the first. However, $\dot{V}O_2$kinetics was not significantly different between the first and second exercise bouts (mean ± S.D., phase II time constant, Bout 1: 16 ± 3 s *vs*. Bout 2: 16 ± 4 s; $\dot{V}O_2$slow component amplitude, Bout 1: 0.24 ± 0.10 L min^{-1} *vs*. Bout 2: 0.20 ± 0.12 L min^{-1}; mean response time, Bout 1: 34 ± 4 s *vs*. Bout 2: 34 ± 6 s; $P > 0.05$ for all comparisons). These results indicate that, contrary to previous findings with other exercise modalities, priming exercise does not alter $\dot{V}O_2$kinetics during high-intensity treadmill running, at least in physically active young subjects. We speculate that the relatively fast $\dot{V}O_2$kinetics and the relatively small $\dot{V}O_2$slow component in the control (‘un-primed’) condition negated any enhancement of $\dot{V}O_2$kinetics by priming exercise in this exercise modality.

Keywords: $\dot{V}O_2$dynamics; $\dot{V}O_2$slow component; Phase II time constant; Exercise modality; O_2 deficit; Warm-up