‘Priming’ exercise and \( \text{O}_2 \) uptake kinetics during treadmill running

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Abstract

We tested the hypothesis that priming exercise would speed \( \dot{\text{V}}_\text{O}_2 \) 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 \( \dot{\text{V}}_\text{O}_2 \)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, \( \dot{\text{V}}_\text{O}_2 \) 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; \( \dot{\text{V}}_\text{O}_2 \)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 \( \dot{\text{V}}_\text{O}_2 \) kinetics during high-intensity treadmill running, at least in physically active young subjects. We speculate that the relatively fast \( \dot{\text{V}}_\text{O}_2 \) kinetics and the relatively small \( \dot{\text{V}}_\text{O}_2 \)slow component in the control (‘un-primed’) condition negated any enhancement of \( \dot{\text{V}}_\text{O}_2 \) kinetics by priming exercise in this exercise modality.

Keywords: \( \dot{\text{V}}_\text{O}_2 \) dynamics; \( \dot{\text{V}}_\text{O}_2 \)slow component; Phase II time constant; Exercise modality; \( \text{O}_2 \) deficit; Warm-up