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'Priming' exercise and O₂ 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_2max} , 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 \pm S.D., phase II time constant, Bout 1: 16 \pm 3 s vs. Bout 2: 16 \pm 4 s; \dot{V}_{O_2} slow component amplitude, Bout 1: 0.24 \pm 0.10 L min⁻¹ vs. Bout 2: 0.20 \pm 0.12 L min⁻¹; mean response time, Bout 1: 34 \pm 4 s vs. Bout 2: 34 \pm 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; O₂ deficit; Warm-up