

PHYSIOLOGICAL RESPONSES AT VARIOUS LACTATE MARKERS FOR RUNNING AT 4 AND 8 MINUTE TREADMILL INCREMENTS

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Abstract

We compared physiological responses corresponding to speeds at plasma lactate markers between incremental treadmill running of 4 and 8 min stages in fifteen healthy men (23 ± 4 yrs, 1.78 ± 0.49 m, 72.7 ± 10.8 kg). Treadmill speed, oxygen uptake ($\dot{V}O_2$), heart rate (HR), rating of perceived exertion (RPE) and plasma lactate were measured for each stage, and calculated at: fixed blood lactate accumulation (FBLA) 4.0 mmol/L, an initial 1 mmol/L rise, deviation maximum (D_{\max}), lactate threshold (LT) and log-log LT. There was no effect ($p > 0.05$) of stage duration on speed, $\dot{V}O_2$, HR and RPE at fixed markers. For 8 min stages, speed was lower at modelled markers: D_{\max} (-1.1 km/h; $p = 0.001$), LT (-0.9 km/h; $p = 0.008$) and log-log LT (-0.8 km/h; $p = 0.006$), yet RPE was higher and $\dot{V}O_2$ lower for LT (1.1, $p = 0.02$; -0.27 L/min, $p = 0.01$) and log-log LT (1.4, $p = 0.03$; -0.29 L/min, $p = 0.002$). Lactate and $\dot{V}O_2$ were greater at 8 km/h for 4 min ($p = 0.0001$), then similar until 11 km/h, with a trend towards elevated plasma lactate for 4 min thereafter. When applying lactate threshold markers to assess physiological responses to incremental running, protocols using prolonged stage durations may underestimate marker running speed.

Key words: Incremental exercise, Lactate markers, Oxygen uptake, Stage duration, Threshold.