

The Effect of Cardiovascular Drift on the Efficacy of Exercise Prescription

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ABSTRACT

Due to the difficulty in measuring metabolic cost in the field, heart rate (HR) is often used to prescribe exercise intensity. **Purpose:** To examine the effect of cardiovascular drift (CV_{drift}) on the efficacy of exercise prescription (ExRx). **Methods:** Eight women with a mean (sd) age 21.6(2.0) years, body mass 70.9(11.0) kg, height 163.7(6.0) cm, and $VO_2\text{max}$ of 33.7(4.2) mL/kg/min, each performed two cycling trials for 30 to 45min at work rates that elicited 50% and 70% of $VO_2\text{max}$. HR (bpm) and VO_2 (mL/kg/min) were recorded throughout each trial and values at the beginning, middle, and end of exercise across both intensities were compared using 3 x 2 two-way repeated measures ANOVAs. Repeated measures ANOVAs were used to compare responses across time within each exercise intensity. **Results:** Estimated work rates accurately elicited 50% and 70% of HR_{max} and $VO_2\text{max}$ at 5 min of exercise. For HR, there was a significant effect of both time ($F_{(1,2)} = 124.8, p < .001$) and intensity ($F_{(1,1)} = 312.0, p < .001$), and a significant interaction between time and intensity ($F_{(1,2)} = 6.14, p = 0.012$). There was a significant effect of time on HR at both the 50% intensity ($F_{(1,2)} = 40.74, p < .001$) and 70% intensity ($F_{(1,2)} = 101.9, p < .001$). VO_2 increased significantly due to both time ($F_{(1,2)} = 6.63, p = .009$) and intensity ($F_{(1,1)} = 312.0, p < .001$) but there was no interaction, and the significant effect of time was only at the 70% intensity ($F_{(1,2)} = 3.90, p = .05$). **Discussion:** The main finding of this study was that HR and metabolic demand became increasingly dissociated across time at both intensities. This dissociation was more pronounced at an intensity of 70% of $VO_2\text{max}$ than 50% of $VO_2\text{max}$. This finding implies that during prolonged exercise at a steady work rate, HR becomes increasingly less valid as a surrogate for metabolic demand of exercise.

