

The Effects of Different Prolonged Aerobic Exercise Modalities on Physiological Components of Cardiovascular Drift

RICARDO TORRES¹, LEROY BOLDEN¹, TOMAS CHAPMAN-LOPEZ¹, JORDAN LEDINGTON¹, MEENA MEIYYAPPAN¹, KAITLYN GINGELL¹, ADAM CRONE¹, BRIAN LEUHOLTZ, AND JEFFREY S. FORSSE¹

¹ Integrated Laboratory of Exercise, Nutrition, and Renal Vascular Research, Department of Health, Human Performance, and Recreation, Baylor University; Waco, TX

Category: Doctoral

Advisor / Mentor: Forsse, Jeffrey (Jeff_Forsse@baylor.edu)

ABSTRACT

Cardiovascular Drift (CD) is a physiological phenomenon in which heart rate and VO_2 increase in order to maintain cardiac output as the exercise intensity remains the same. Current understanding of CD indicates that CD is caused by a loss of fluids in combination with a reduced ventricular filling time. Different exercise modalities, such as steady state exercise (SSE) and high intensity interval exercise (HIIE) stress the cardiovascular system differently and cause different adaptations. Currently, no research has been conducted observing components (VO_2 , HR, and RER) of CD in SSE and HIIE. **PURPOSE:** To determine if HIIE or SSE alters physiological components of CD in healthy aerobically fit individuals. **METHODS:** Seven aerobically fit individuals (Age 38.14 ± 16.9 yrs.; Ht 172.21 ± 10.1 cm.; Wt 72 ± 12.9 kg.; BF% 20.7 ± 7.4 ; VO_2 38.79 ± 10.6 ml/kg/min⁻¹) completed a randomized crossover design which consisted of 45 minutes of SSE and HIIE treadmill running to observe differences in VO_2 , HR, and RER. Participants completed a single VO_2 max ramp protocol treadmill test, which was used to calculate 70%, 90%, and 40% of VO_2 reserve (VO_2R). The SSE session consisted of 45 minutes of treadmill running at 70% VO_2R . The HIIE session consisted of nine 5-minute stages of 3 minutes at 90% VO_2R and 2 minutes at 40% VO_2R . Data was analyzed via 2 (condition) \times 10 (time) repeated measures ANOVA and paired sample t-tests to determine changes in VO_2 , heart rate (HR), and respiratory exchange ratio (RER). All analyses were performed using SPSS (v.29.01). **RESULTS:** Significant differences were observed for VO_2 between conditions ($p = .005$), time ($p < .001$), and condition by time ($p < .001$). Additionally, HR demonstrated significance between time ($p < .001$). RER did not have any significant differences between conditions. **CONCLUSION:** There are significant differences in VO_2 values between exercise modalities. Subsequently, as time progressed there were significant differences in VO_2 and HR between exercise conditions. Only VO_2 had significant differences in time and condition. These differences indicate that different exercise modalities of equal workload elicit varying oxygen utilization, resulting in a drift in oxygen consumption.