

Effectiveness of Blood Flow Restriction Training on Aerobic Performance During Cycling Exercise in Healthy Adults.

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ABSTRACT

Blood flow restriction (BFR) has emerged as an alternate rehabilitation modality, intending to enhance muscular strength, hypertrophy, metabolic response, and functional outcomes in various populations. However, there is a lack of research evidence on the efficacy of BFR during aerobic exercise. **PURPOSE:** To compare aerobic capacity following a cycling protocol with BFR at 60% (BFR-60) 80% (BFR-80) occlusion. **METHODS:** Ten healthy participants (26 ± 3.0 years; 6 males; 4 females) were randomly assigned to either: BFR-60 or BFR-80. Aerobic Capacity was measured at baseline, and three weeks during a sub-maximal stationary cycle ergometer protocol connected to a metabolic analyzer for the assessment of peak oxygen consumption (VO_2 peak). Aerobic testing consisted of performing the YMCA protocol which consisted of pedaling at 70 rev/min with a load of 25-watts. Heart Rate (HR) was monitored continuously at the end of the first 3 minutes and used to determine the load increase. Subjects cycled for 15 minutes at which point a 25-watt increase occurred every 3 minutes until the participant reached one or more of the following criteria: 80% of their predicted HR (T_{80}) using the HR reserve formula, an $\text{RER} > 1.0$, or a leveling of the oxygen curve. BFR cuffs were applied between baseline and 3-week reassessment of aerobic capacity at the appropriate level of occlusion and a cycling protocol was performed (15 minutes; 3d/wk.). Given the small sample size and the non-normal data distribution for the variable of T_{80} , a Mann-Whitney and Wilcoxon tests were used to evaluate between and within (time) groups differences, respectively. For the between-group comparison, a composite score for T_{80} based on the pre-post difference was calculated for both groups. Then this calculated difference was used to compare both groups. Peak VO_2 was normally distributed, therefore, a 2x2 (group by time) ANOVA was used to perform between and within-group comparisons. Statistical significance was at an alpha of 0.05 for all analyses. **RESULTS:** The between group comparisons of the T_{80} was not statistically significant. The within group comparison for T_{80} for the BFR-60 group approached significance ($p = 0.08$) while the BFR-80 group was not significant ($p = 0.89$). The within time ANOVA approached significance ($p = 0.09$) while there were no between group differences ($p = 0.99$). **CONCLUSION:** Aerobic performance over time was seen to improve primarily in the 60% occlusion BFR group. The sample size or short intervention duration might have affected the effectiveness of this intervention.