The Effects of High-Intensity Aerobic Interval versus Moderate-Intensity Continuous Aerobic Exercise on Post-Exercise Cardiovascular Responses

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Objectives: After an acute bout of moderate-intensity continuous aerobic exercise (CAE), leg blood flow (LBF) and vascular conductance (LVC) remain elevated contributing to a corresponding decrease in arterial blood pressure (ABP). However, little is known about the vascular and ABP response following high-intensity interval aerobic exercise (HIAE). The current study tested the hypothesis that HIAE, matched for total work to CAE, would elicit greater post-exercise reductions in ABP and larger increases in LBF and LVC.

Methods: Heart rate (HR), ABP, blood lactate and LBF (popliteal artery, Doppler) were measured in 10 healthy participants (7M/3F, 20.2 ± 1.6 years) in a side-lying position before and every 5 minutes for 1 hour following CAE and HIAE treadmill protocols. LVC was calculated as LBF divided by mean ABP. The HIAE consisted of four, 4-minute intervals at 85%VO₂peak separated by 3-minute active recovery intervals at 55% VO₂peak. The CAE protocol consisted of treadmill running at ~55% VO₂peak for a duration that produced the same total oxygen consumption as HIAE.

Results: Compared to pre-exercise values, peak decreases in mean ABP (-6 ± 1 mmHg vs. 0 ± 1 mmHg) and diastolic ABP (-5 ± 2 mmHg vs. -1 ± 1 mmHg), as well as, increases in blood lactate (10.5 ± 3.2 mmol/L vs. 3.4 ± 1.4 mmol/L), HR (37 ± 10 beats/minute vs. 21 ± 6 beats/minute) and leg vascular conductance (8 ± 5 mL/min/mmHg vs. 5 ± 4 mL/min/mmHg) were greater during the passive post-exercise recovery period following HIAE than CAE (all, p<0.05).

Conclusions: These results highlight that a matched-work HIAE treadmill protocol resulted in greater skeletal muscle vasodilation during a 1 hour passive post-exercise recovery period than CAE. These data suggest that HIAE may prove to be more beneficial as a therapeutic strategy for patient populations with peripheral blood flow limitations (e.g., peripheral arterial disease).

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