The Influence of Eccentric and Concentric Resistance Exercise on Post Exercise Blood Pressure and Arterial Stiffness.

Samantha Anderson¹, Lisa Stout¹, Jon Stavres¹, Stephen Fischer¹, Amber Finnin¹, Kelly Taylor¹, John McDaniel¹,²

¹Exercise Science, Kent State University, Kent Ohio
²Primary Advisor

Abstract

The greater metabolic cost associated with concentric muscle contractions, compared to eccentric muscle contractions, is well known. However, the influence this metabolic cost difference has on post exercise hypotension and arterial stiffness is unknown. Thus the purpose of this investigation was to determine changes in blood pressure and arterial stiffness following a session of concentric only and eccentric only resistance exercise. Twelve subjects performed 2 exercise training sessions that consisted of 6 separate lower and upper body resistance exercises that were comprised of either eccentric only or concentric only muscle contractions. Mean arterial pressure, pulse wave velocity, heart rate and blood lactate were assessed at baseline as well as immediately, 30 and 90 minutes post. The VO2 requirement across the whole concentric exercise session was 50.0% greater than eccentric exercise. MAP following the bout of eccentric exercise was elevated by 5% (p<0.003) which lasted for 120 minutes. However, following the bout of concentric exercise there was a drop in MAP by 4% (P<0.018) which lasted for 60 minutes. Likewise, pulse wave velocity was reduced (p<0.03) following concentric contractions but was unaltered following the eccentric exercise. Despite the lower MAP, HR was at least 14% greater (p<0.001) for 120 minutes following the concentric compared to eccentric session. In conclusion these data indicate that the greater metabolic cost associated with concentric muscle contractions results in greater post exercise hypotension and reduced vessel stiffness. These
results have exercise prescription implications for those with hypertension or autonomic dysfunction.