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Effects of a single 30 minute walk on peripheral arterial stiffness in overweight adults

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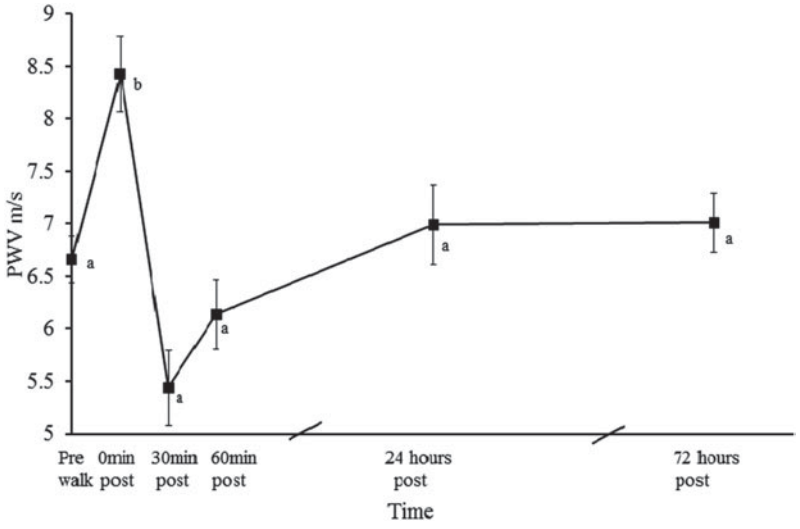
Many of the favourable changes in cardiovascular disease (CVD) risk factors previously thought to require prolonged increases in physical activity, have now been shown in response to acute exercise[(1)]. Such 'last bout' effects may underlie some of the health benefits of regular physical activity. The aim of this study was to measure the effect of a single 30 minute bout of brisk walking on peripheral arterial stiffness, measured via pulse wave velocity (PWV) between the brachial and radial artery, over a 72 hr period.

17 overweight sedentary individuals (5 males, 12 females; mean age 40 (SD 10.6) years, BMI 33.0 (SD 2.9) kg/m^2) completed a 30 minute treadmill walk at 65% of their age predicted maximum heart rate. Percentage body fat (Tanita scales), BMI (kg/m^2), blood pressure and PWV were measured prior to the walk and PWV and blood pressure measures were then repeated at immediately post walk, and 30 mins, 60 mins, 24 hrs and 72 hrs post walk. PWV was measured using a sensor based device as described by McLaughlin *et al.*[(2)]. Data were analysed using a one-way ANOVA with *posteriori* Tukey Honestly Significant Difference (HSD) test.

There were no significant changes to the blood pressure over the 72 hours from baseline ($P>0.05$). However the PWV increased significantly by 26% ($P<0.004$) immediately post-walk and declined (n.s.) by 18% ($P>0.10$) at 30 mins post-walk compared with pre-exercise reading. At 60 mins post-walk the PWV began to rise, and had returned to baseline values at 24 hr post-walk (Figure).



Values represent mean (with SEM) Different superscripts (a, b) indicate significant differences

The increase in PWV immediately post-walk was unexpected, however since, PWV was measured within 30 sec of the participants disembarking from the treadmill; it is possible that the vasculature in the arm, where the recordings were made, was still constricted due to a redistribution of blood flow to accommodate exercising muscle. An increased cardiac output combined with vasoconstriction of the vessels in the non-exercising tissues would be required to facilitate the increased demand for oxygen in the exercising muscles of the legs[(3)]. Although the drop in PWV at 30 mins post walk was not significant, it is possible that had the walking been at a higher intensity, the observed drop in PWV would have been greater.

The results suggest that walking at an intensity, greater than 65% of age predicted maximum heart rate may be required to elicit a significant drop in arterial stiffness in overweight individuals.

1. Thompson *et al*. (2001) *Med Sci Sports Exerc* **33(6Suppl)**: S438–S445.
2. McLaughlin *et al*. (2003) *Physiol Meas* **24**, 693–702.
3. MacDonald (2002) *J Hum Hypertens* **16**(4): 225–236.