TACSM Abstract

Aquatic Treadmill Training Reduces Blood Pressure Reactivity to Acute Graded Exercise in Previously Sedentary Adults

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ABSTRACT

Endurance exercise may reduce blood pressure and improve vasodilatory capacity thereby blunting the hypertensive response to stress. To test the efficacy of a novel model of low-impact endurance training, the aquatic-based treadmill (ATM), to improve blood pressure parameters, we recruited 60 sedentary adults and randomized to 12-weeks of either ATM (n = 36 [19 men, 17 women] , 41±2 yr, 173.58 ±1.58cm, 93.19 ±3.15kg) or land-based treadmill (LTM, n = 24 [11 men, 13 women], 42 ±2yr, 170.39 ±1.94cm, 88.14 ±3.6kg) training; 3sessions.wk-1, progressing to 500 kcal.session-1, 85% VO2max. The maximal Bruce treadmill test protocol was performed before and after training with blood pressures measured prior to, at the end of each stage, and for 5 minutes following exercise testing. Twelve subjects (5 ATM, 7 LTM) volunteered for biopsies of the vastus lateralis before and after training, and muscle samples were assessed for eNOS content. Blood pressure data were analyzed using group by training ANCOVA repeated across training, $\alpha = 0.05$. Data obtained from muscle sample analysis were analyzed using group by training ANOVA repeated across training $\alpha = 0.05$. Training reduced systolic blood pressure (9-18.2mmHg), diastolic blood pressure (3.2-8.1 mmHg), mean arterial pressure (4.8-8.3mmHg), pulse pressure (7.5-15mmHg), and rate pressure product (1.8-3.9 bpm.mm Hg.10^3) during exercise stress and recovery in the ATM group, but not in the LTM group. Additionally, the ATM group, but not the LTM group, displayed a 31% increase in skeletal muscle eNOS content following training. Both groups improved VO2max (+3.6mL O_2.kg^{-1}.min^{-1}), but resting blood pressure was not changed following training. These data support the use of ATM training as a novel therapeutic modality to combat hypertension.