Independent and Combined Effects of Aerobic and Resistance Training on Blood Pressure (Art-B)

Elizabeth C. Schroeder, Warren D. Franke, Rick L. Sharp, Duck-chul Lee

Iowa State University, Ames, IA

Objective: To compare the effects of aerobic training only, resistance training only, and a combination of both on blood pressure (BP) and other cardiovascular disease risk factors compared with a non-exercising control group.

Methods: Pre-to-stage 1 hypertensive, overweight/obese, and sedentary adults (ages 58±7 years) were randomized to one of three 8-week exercise programs (aerobic only, resistance only, or a combination of both), or a non-exercise control group. Participants exercised 3 days/week for 60 minutes/session. BP was measured with the SphygmaCor device. Cardiovascular fitness, strength, and body composition were assessed using the Balke treadmill protocol; upper and lower body 1-repetition maximums; and bioelectrical impedance (InBody720), respectively.

Results: At baseline, the mean (SE) for systolic and diastolic BP was 131(13) mmHg and 91(9) mmHg, respectively. Eight weeks of exercise did not significantly change systolic BP in any of the groups ($p > 0.05$), and only the combination group had a significant decrease in diastolic BP (-3.7 mmHg, 95% CI -6.8, -0.6). Significant increases [mean (95% CI); p value] were reached in treadmill time at 85% age-predicted maximal HR for the aerobic [72 seconds (38, 107); $p <0.01$] and combination groups [51 seconds (17, 86); $p <0.01$], whereas lower body strength gains were observed in the resistance [29.4 lbs (9.1, 49.7); $p=0.01$] and combination groups [24.4 lbs (4.7, 44.2); $p=0.02$]. Improvements [mean (95% CI; p value)] in body composition were obtained for all three exercise groups: aerobic [weight: -1.0 kg (-1.9, -0.1; $p=0.03$) & fat mass -0.9 kg (-1.5, -0.2; $p=0.01$)], resistance [waist circumference: -1.7 cm (-3.3, -0.1; $p=0.04$)], and combination [weight 0.9 kg (0.02, 1.8; $p=0.04$) & lean body mass 0.8 kg (0.0, 1.5; $p=0.04$)].

Conclusion: The combination of aerobic and resistance exercise training was the most effective in improving blood pressure and other cardiovascular disease risk factors.