

Aerobic exercise attenuates risk of coronary artery disease and improves mobility in SCI

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Coronary artery disease (CAD) risks are significantly greater in persons with SCI, largely due to neuromuscular paralysis and its subsequent impact on body composition, cardiometabolic profiles, and activity levels. Exercise is seldom prescribed for this population because appropriate dose parameters are not known. **PURPOSE:** To assess the effect of aerobic exercise using arm crank ergometry (ACE) in high motor complete (ISNCSCI A/B) SCI as CAD risk profiles, aerobic capacity, and functional abilities. **METHODS:** Ten previously untrained patients (M8/F2, Age 36.7 y) with high motor complete SCI (C7-T5; cervical=3; thoracic=7) underwent ACE exercise training 30 min/d x 3d/wk for 10wks at 70% VO_{2Peak} . Baseline and post-intervention aerobic capacity (VO_{2Peak} and peak power), body profile measurements (%body fat [%BF], %fat free mass [%FFM]), functional ADLs and community mobility (bed-to-wheelchair [WC], car transfer, time to traverse a 100ft-5° ramp, 12-minute WC propulsion test), serum lipid profiles (total cholesterol, HDL, LDL), oral glucose tolerance (insulin resistance and area under the curve of glucose), and resting plasma glucose and insulin were measured. Normality was assessed with Shapiro-Wilks and Wilcoxon signed rank tests were used to evaluate the effects of the intervention. $\alpha < 0.05$. **RESULTS:** Baseline to post-intervention relative VO_{2Peak} (12 ± 3 vs. 13 ± 3 ; $p = 0.027$); absolute VO_{2Peak} (831 ± 247 vs. 919 ± 256 ; $p = 0.028$), 12-minute WC propulsion (2061 ± 959 vs. 2397 ± 1053 ; $p = 0.028$), peak power (43 ± 15 vs. 54 ± 14 ; $p = 0.026$), respiratory quotient (0.95 ± 0.13 vs. 0.77 ± 0.02 ; $p = 0.028$), insulin resistance (13.0 ± 4.7 vs. 7.7 ± 1.8 ; $p = 0.028$), resting glucose-to-insulin ratio (9.13 ± 3.97 vs. 13.69 ± 2.49 ; $p = 0.028$), and abdominal skin folds (26.8 ± 9.0 vs. 23.8 ± 6.2 ; $p = 0.043$) all significantly improved. HDL ($p = 0.066$), %HDL ($p = 0.074$), and energy expenditure ($p = 0.074$) trended towards significance. There were no changes in %BF or %FFM ($P > 0.05$). **CONCLUSIONS:** Ten weeks of aerobic exercise at 70% VO_{2Peak} in high motor complete SCI using ACE demonstrated improvements in aerobic capacity, community mobility, and carbohydrate metabolism. This preliminary analysis emphasizes the importance of physical activity as a means to reduce obesity-related comorbidities and improve functional performance following SCI.

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