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Effects of Acute Aerobic and Resistance Exercise on Neuroplasticity- A Pilot Study

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Neuroplasticity takes place when acquiring new skills, after damage to the nervous system, and as a result of sensory deprivation. It can also take place due to exercise. Few studies exist that look at the effects of anaerobic/resistance training and its effects on neuroplasticity in humans, as the majority of existing research delves into how resistance training can help at the subcortical and spinal level of the body, not in the brain. **PURPOSE:** The aim of this study was to determine whether resistance training is as effective as aerobic training at improving neuroplasticity. **METHODS:** Five competitive weightlifters (3 females, 2 males, age 34±9yrs) were recruited to complete a control (20 minutes of quiet sitting), aerobic (5 minute warm up followed by 15 minutes of cycling at 60% age predicted heart rate max), and resistance protocol (10 minute warm up followed by 10 minutes of resistance intervals) on three separate occasions. Participants completed the Trail Making Test (TMT) before and immediately after the cessation of each 20-minute protocol separated by multiple days. **RESULTS:** A repeated measures ANOVA for part A revealed a significant effect of time ($p=0.004$) and condition ($p=0.004$), but there was not a statistically significant interaction between timepoint and condition ($PRE_{Control}$: 19.3±1.0s, $PRE_{Aerobic}$: 17.3±1.4s, $PRE_{Resistance}$: 16.2±1.5s versus $POST_{Control}$: 17.7±1.0s, $POST_{Aerobic}$: 15.2±1.4s, $POST_{Resistance}$: 12.9±2.8s, $p=0.429$). A separate ANOVA revealed a significant effect of time ($p=0.033$) but not condition ($p=0.054$) for part B, but there was not a statistically significant interaction between timepoint and condition ($PRE_{Control}$: 43.4±2.9s, $PRE_{Aerobic}$: 39.6±1.7s, $PRE_{Resistance}$: 36.5±3.4s versus $POST_{Control}$: 34.7±2.2s, $POST_{Aerobic}$: 34.2±3.6s, $POST_{Resistance}$: 28.6±3.4s, $p=0.164$). The percent change from pre to post test was not different between conditions for TMT part A or part B (A: Control, -7.5±6.6%, Aerobic, -11.8±1.9%, Resistance, -20.3±2.3%, $p=0.141$. B: Control, -7.9±3.5%, Aerobic, -3.3±6.4%, Resistance, -16.8±1.9%, $p=0.055$). **CONCLUSION:** Our results suggest that resistance exercise may be as beneficial as aerobic exercise for enhancing neuroplasticity.