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COMPARISON OF SPRINT INTERVAL TRAINING AND MODERATE INTENSITY CONTINUOUS TRAINING TO MAXIMIZE NEUROMUSCULAR ADAPTATIONS

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Sprint interval training (SIT) refers to a group of sprint bouts separated by rest periods. SIT is a time-efficient strategy to improve aerobic performance similar to moderate intensity continuous training (MICT). There has been a relative absence of studies on neuromuscular adaptations of SIT. **PURPOSE:** To compare the effects of stationary air biking, utilizing high-volume MICT and low-volume SIT (i.e., ultrashort-SIT [US], short-SIT [SS]) on neuromuscular system. **METHODS:** Thirty recreationally active females were randomly assigned to MICT (n = 10), US (n = 10), and SS (n = 10) groups. The intervention consisted of 3 d/wk for 4 wks. MICT was performed by 30 min of cycling at 75% of maximal heart rate reserve, while SIT (i.e., US, SS) consisted of 3 sets of 8 intervals at maximal effort intensity. SS and US were performed with 20s:10s and 10s:5s work-to-rest ratios and provided with 5- and 2.5-min recovery periods between sets, respectively. Muscle cross-sectional area (mCSA) and echo intensity (EI) of rectus femoris (RF) and vastus lateralis (VL) were measured by ultrasound system. Isometric strength testing protocol consisted of 3 maximal voluntary isometric contractions (MVIC). During each contraction, surface electromyography (sEMG) and torque signals were recorded to assess sEMG amplitude (RMS) of RF and VL as well as peak torque (PT). All variables were measured before and after intervention and were analyzed with 2-way mixed factorial ANOVAs. Moreover, average total work (TW) during 12 sessions was recorded and analyzed with one-way ANOVA. **RESULTS:** There were significant ($p < 0.05$) differences in TW (MICT: 142.7 ± 31.5 cal., US: 52.6 ± 10.0 cal., SS: 92.3 ± 7.8 cal.) between groups. All groups significantly ($p < 0.05$) improved mCSA of RF (MICT: 9.0 ± 1.0 to 9.5 ± 1.1 cm^2, US: 9.9 ± 3.5 to 10.6 ± 3.6 cm^2, SS: 9.0 ± 1.9 to 9.7 ± 1.5 cm^2) and VL (MICT: 20.0 ± 2.3 to 20.6 ± 2.1 cm^2, US: 20.8 ± 5.1 to 22.5 ± 5.2 cm^2, SS: 19.6 ± 2.6 to 21.4 ± 3.8 cm^2). No significant ($p > 0.05$) differences observed in EI values as well as RMS and PT during MVIC. **CONCLUSION:** Despite no significant improvements in neural activation and isometric strength, all groups similarly improved muscular morphology of RF and VL by performing SIT on a stationary air bike. These findings suggest that SIT can elicit muscular morphological adaptations with a shorter time commitment.