

## 21. SWACSM Abstract

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### Short-Term Effects of Exercise on Grip and Pinch Strength

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#### ABSTRACT

**PURPOSE:** Occupations such as first responders and military may require use of hand and finger muscles after exercise, therefore changes in grip strength (GS) and pinch strength (PS) could affect task performance. While previous studies have shown decreases in GS with load carriage, others have shown increases in GS with other forms of exercise. The purpose of this study is to examine the short-term changes in GS and PS with exercise and load carriage. **METHODS:** Seven participants to date (5 male, 2 female; mean  $\pm$  SD of 25.1  $\pm$  4.5 yrs, 176.9  $\pm$  11.9 cm height; 80.6  $\pm$  15.7 kg mass, 5 right hand dominant) completed three exercise conditions each for 5 minutes: (1) no exercise (2) run with a 9.1 kg weight belt at 3.0 m/s on a treadmill and (3) run with no load at 3.0 m/s on a treadmill. Order of exercise conditions was randomized. Heart rate was measured using a chest strap sensor. GS and PS were assessed using dynamometers pre-exercise and again post-exercise with 3 repetitions on each hand alternating bilaterally. RMANOVA with Bonferroni post-hoc was used to compare among exercise conditions. **RESULTS:** Mean heart rate (HR) was 93 bpm in the no exercise condition, 152 bpm in the unloaded run, and 167 bpm in the loaded run. When measured pre-exercise, GS on the dominant hand was 46.0  $\pm$  14.7 kg and non-dominant hand was 45.0  $\pm$  15.1 kg. There was no statistically significant change in grip or pinch strength among exercise conditions. In the no exercise condition, GS on the dominant hand was 47.6  $\pm$  15.1 kg and non-dominant hand was 47.0  $\pm$  15.1 kg. After the unloaded run, GS on the dominant hand was 46.9  $\pm$  14.6 kg and non-dominant hand was 45.3  $\pm$  14.5 kg. After the loaded run, dominant hand GS averaged 46.6  $\pm$  14.4 kg and non-dominant hand 46.4  $\pm$  13.8 kg. When comparing PS, pre-exercise PS on the dominant hand measured 5.1  $\pm$  1.9 kg and non-dominant hand 5.0  $\pm$  2.4 kg. In the no exercise condition, dominant hand PS was 5.5  $\pm$  2.5 kg and non-dominant hand was 5.0  $\pm$  2.7 kg. After unloaded run PS averaged 5.4  $\pm$  2.3 kg on the dominant hand and 5.1  $\pm$  2.5 kg for non-dominant hand. In the loaded run, PS in the dominant hand was 5.7  $\pm$  2.5 (kg) and non-dominant hand 5.5  $\pm$  3.0 kg. **CONCLUSION:** Grip and pinch strength did not change significantly after exercise. The implication is that hand strength is maintained after short exercise bouts.