The effects of exercise mode and intensity on energy expenditure during and after exercise in resistance-trained males

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Abstract:

**Purpose:** The purpose of these studies was to examine the effects of exercise mode and intensity on energy expenditure (EE) during and after five time-matched aerobic and resistance exercise protocols in resistance trained (RT) males.

**Methods:** 14 RT males (mean ± SD; age = 24.2 ± 4.0 yr; body mass = 84.7 ± 13.3 kg; height = 181.2 ± 8.8 cm; and body fat = 15.9 ± 4.6%) completed five separate protocols: continuous aerobic (continuous), high intensity interval aerobic (HIIT), strength endurance (2x20) traditional resistance (3x10), and high intensity resistance (4x6). EE was measured before, during, immediately post- (0-30 minutes), and delayed post-exercise (60-90 minutes).

**Results:** No significant differences in exercise EE were seen between aerobic protocols. Both aerobic protocols were significantly greater (p<0.0001) than all three resistance protocols. 4x6 was significantly greater than 3x10 and 2x20 by 38 ± 10 kcal (p=0.04) and 67 ± 8 kcal (p<0.001), respectively. In the 0-30 minutes following exercise, a 6.2% mean increase in EE was seen following the 2x20 protocol (p<0.05) as compared to baseline. In the 60-90 minutes post exercise, the 3x10, 4x6, and HIIT protocols showed significant average reductions in EE of 10.7%, 8.7%, 7.1% (p<0.05) as compared to baseline, respectively. The combined EE from during and after exercise resulted in the same rank order as during exercise (least to greatest: 2x20, 3x10, 4x6, continuous, and HIIT).
**Conclusion:** Continuous and HIIT were responsible for the greatest EE during exercise when compared to the resistance protocols. Despite the reductions in EE 60-90 minutes post exercise that were seen in the 3x10, 4x6, and HIIT protocols, exercise EE was the greatest contributor to total EE. These results should be considered when designing exercise training programs in order to monitor EE and avoid negative effects of potential energy deficits.