

COMPARISON OF THE EFFECT OF LONG-BOUT EXERCISE WITH REPEATED SHORT-BOUT EXERCISE ON OXYGEN CONSUMPTION

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Short-bout intermittent exercise has recently become of interest due to it's possible improvement of exercise compliance and the subsequent implications on weight management and disease prevention. The purpose of this study was to compare the effect of low-moderate intensity long-bout exercise with repeated maximal intensity short-bout exercise on oxygen consumption (VO_2) using a portable stepping machine (The X-iser Machine™, X-iser Industries, Fort Collins, CO). Nine physically inactive (exercise less than 2 times per week) males participated in a 3x1-minute trial (three 1-minute maximal intensity bouts, each followed by one hour of seated recovery) and a 20-minute trial (20 minutes at 50-60% maximal heart rate followed by one hour of seated recovery). Net VO_2 for the 3x1-minute trial including recoveries (14.49 ± 1.13 liters) was significantly ($p < 0.02$) lower than the net VO_2 for the 20-minute trial including recovery (19.57 ± 1.22 liters), however, it amounted to 74.0% of the oxygen consumption of the 20-minute trial. Comparing trials with respect to oxygen consumption per minute of exercise, the 20-minute trial utilized 0.98 liters per minute of exercise and the 3x1-minute trial utilized 4.83 liters per minute of exercise. The duration of total Excess Post-exercise Oxygen Consumption (EPOC) was significantly ($p < 0.001$) longer for the 3x1-minute trial (59.89 ± 7.54 min) than the 20-minute trial (14.89 ± 6.28 min). Heart rate for the 3x1-minute trial (average peak of 146.0 ± 6.0 bpm) and the 20-minute trial (average 109.9 ± 1.0 bpm) followed oxygen consumption and decreased rapidly towards resting levels at the end of exercise. The estimated caloric expenditure for the 3x1-minute trial was 69.53 ± 5.44 kcal, 41.9% of the minimum recommended daily caloric expenditure due to exercise by the Cooper Institute for Aerobics Research, Dallas, Texas (2.0 kilocalories per kilogram of body weight per day). Based on this study the minimum caloric expenditure could be achieved in 6 one-minute high-intensity bouts spaced throughout an individual's day. Because one-minute bouts of exercise with prolonged recoveries do not require the need to change and shower, additional time constraints, it is concluded that short bout intermittent exercise may provide a means of achieving the activity goal of the Center for Disease Control and Prevention while potentially improving exercise compliance.