TACSM Abstract

Effect of Single vs Accumulated Bouts of Exercise on Body Composition, Fitness, and Resting Metabolic Rate

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ABSTRACT

PURPOSE: To examine how the effects of accumulated exercise compare to continuous exercise on body composition, VO$_2$max, and metabolic rate. METHODS: Mildly active males (n = 4) and females (n = 5) were randomly selected to perform either 1) continuous exercise consisting of one 30-minute bout of Tabata (1-bout), 2) accumulated exercise consisting of two 15-minute bouts of Tabata (2-bout), or 3) no exercise (control). Both exercise groups performed Tabata three times per week for 4 weeks. Each group had three participants (2 males and 1 female) with the exception of the 2-bout group which had 3 female participants. Changes in body composition (i.e., body mass (kg) and percent body fat (BF%)) were assessed using Dual-Energy X-Ray Absorptiometry (DXA) measurements taken at baseline and after 4 weeks of training. VO$_2$max (ml/kg/min) and resting metabolic rate (kcal/day) were assessed at baseline and after 4 weeks of training using open spirometry on a ParvoMedics True Max 2400 Oxygen Uptake system. For the female participants, both the baseline and 4-week measurements were assessed in the mid-follicular phase of the menstrual cycle. Participants maintained their normal diet throughout the study. Participants were provided with Fitbit watches to keep track of their activity (avg. heart rate & steps per day) during the study. Significant differences (p<.05) within each of the 3 groups were determined using a paired samples t-test based on the pre- and post-intervention values. Significant differences between the 3 groups were determined using a one-way ANOVA and Bonferroni post-hoc test. RESULTS: No significant changes in body mass were detected within the groups (p > .05) or between the groups (p =.72). No significant changes in fat mass were detected within the groups (p > .05) or between the groups (p =.22). With that being said, there was a trend towards a decrease in fat mass within the 2-bout group (1.2 ± .45 kg; p=.061; ES= -.22). No significant changes in BF% (p> .05) were detected within the control or 1-bout group. There was a significant reduction in BF% within the 2-bout group (1.43 ± 0.38%; p=.03; ES= -.63) and there was a significant difference in the change in BF% between the 3 groups (p=.048; ES= -1.2 and -1.8). No significant changes in muscle mass muscle (kg) were detected within the groups (p>.05) or between the groups (p = .17). With that being said, there was a trend towards an increase in muscle mass within the 2-bout group (.77 ± .27kg; p=.059; ES= -.14). No significant changes (p>.05) in resting metabolic rate or VO$_2$max were reported within the groups or between the groups. CONCLUSION: Four weeks of accumulated exercise reduced BF% when compared to no exercise and continuous exercise. Despite the absence of improvement in VO$_2$max and metabolic rate, accumulated exercise throughout the day may still be a valuable exercise mode as it could help people with busy schedules achieve minimum exercise recommendations. Future studies should include 1) a larger sample size, 2) a greater volume of exercise, or 3) a longer period of observation. These modifications may lead to a more valid evaluation of how metabolic health and fitness are influenced by accumulated and continuous exercise.