

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

KATHERINE JANKEVICIUS, ALEX ALVARA, AND JAMES R. ROWE

Human Performance Lab; Kinesiology & Health Science; Stephen F. Austin State University; Nacogdoches, TX

---

Category: Masters

Advisor/ Mentor: Rowe, James (rowej@sfasu.edu)

### ABSTRACT

**PURPOSE:** To examine how the effects of accumulated exercise compare to continuous exercise on body composition,  $VO_{2max}$ , 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.  $VO_{2max}$  (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 ( $1.2 \pm .45$  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 ( $1.43 \pm 0.38\%$ ;  $p = .03$ ;  $ES = -.63$ ) 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 (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 ( $.77 \pm .27$  kg;  $p = .059$ ;  $ES = -.14$ ). No significant changes ( $p > .05$ ) in resting metabolic rate or  $VO_{2max}$  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  $VO_{2max}$  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.