The Influence of TABATA and Energy Replenishment on Post-Exercise Metabolic Recovery: A Pilot Analysis

TIFFANI NEUVILLE, VIVYAN GONZALEZ, AND JAMES ROWE

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

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

ABSTRACT

PURPOSE: Compare post-exercise metabolic recovery of individuals who, to recover from Tabata, drink 1) water (W), 2) 100% carbohydrate (CHO), or 3) 65% - 35% protein-carbohydrate (PRO-CHO). **METHODS**: Participants were recreationally active individuals (n = 21) who performed Tabata (TB) in the form of 1) full body calisthenics (FB) and 2) treadmill running (TR). Participants were randomly assigned to complete TB either with W (n=7), CHO (n=7), or PRO-CHO (n=7). Participants completed each of the three bouts in randomized order on three separate days. One bout involved sitting with no energy replenishment (rest). A second bout had the participants consume their assigned drink (W, CHO, or PRO-CHO) while performing TB (as either FB or TR). For the third bout, participants performed the other version of TB (not performed previously) but consumed the same drink as the previous TB bout. Both modes of TB were performed as repeated cycles of vigorous effort for 20 seconds followed with 10 seconds of rest for a total time of 25 minutes. Participants performed the FB and TR at the same relative intensity (~85% of HRmax). The energy content of the CHO and PRO-CHO drink was designed to match the energy expended during FB and TR. Immediately following the completion of each bout, the participants' metabolic rate (MR) was assessed in 10-minute intervals over the next hour using a Parvo metabolic analyzer. The MR assessment included the participants' estimated energy expenditure (EE), fat oxidation (total grams), and carbohydrate (CHO) oxidation (total grams). Significant differences ($p<.05$) between bouts were determined using a one-way, repeated measures ANOVA and Bonferroni post-hoc test. **RESULTS:** Compared to rest, EE was unchanged with TB (FB or TR) regardless of the energy replenishment used ($p>.05$). In the W group, fat oxidation was increased, compared to rest (3.8±1.6), following FB (7.1±1.4; $p=.0006$) and TR (6.3±1.4; $p=.0005$). In addition, fat oxidation was greater following FB compared to TR ($p=.004$). In the PRO-CHO group, fat oxidation was increased, compared to rest (2.7±1.0), following FB (6.2±2.0; $p=.002$) and TR (4.8±1.3; $p=.002$). In addition, fat oxidation was greater following FB compared to TR ($p=.006$). In the CHO group, fat oxidation was unchanged ($p>.05$) with FB (3.3±1.8) or TR (1.7±0.8) compared to rest (2.2±1.4). In the W group, CHO oxidation was significantly reduced, compared to rest (7.5±2.7), following FB (1.5±1.6; $p=.0008$) and TR (2.8±1.9; $p=.0005$) with no difference between FB and TR ($p=.14$). In the CHO group, CHO oxidation was unchanged ($p>.05$) with FB (9.6±2.6) or TR (12.9±2.4) compared to rest (9.6±3.2). In the PRO-CHO group, CHO oxidation was unchanged ($p>.05$) with FB (6.1±3.1) or TR (9.8±3.3) compared to rest (9.5±4.3). **CONCLUSION:** Tabata (FB or TR) increases fat oxidation during recovery, with greater rates of fat oxidation following FB. Higher use of fat following FB vs. TR might be due to 1) more muscle use during FB and 2) the vigorous nature of Tabata requiring more CHO use during exercise resulting in more fat use during recovery to help replenish glycogen stores. The increased rate of fat oxidation during recovery from TB is nullified when the expended energy is replenished with CHO supporting the notion that increased fat oxidation during recovery is predicated on the magnitude of glycogen depletion post-exercise. The effectiveness of Tabata, or any exercise regimen, on increased fat oxidation maybe, in part, based on the nutrients being consuming during and/or after exercise.