A Comparison of High-Intensity Interval Running and TABATA on Post-Exercise Metabolism: A Pilot Analysis

Lauren Pate, David J. Buckley, B.S., Henry Gebhardt, B.S., Tyler McHenry B.S., and James Rove, Ph.D.

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

**Introduction**

- It is well established that energy expenditure following exercise (EPOC) remains elevated above resting values for a period of time (3).
- The magnitude and duration of this elevation may be primarily dependent on exercise intensity, with exercise duration and expenditure having a smaller influence (3, 6).
- Short durations (<30 minutes) of high-intensity interval exercise (HIIE) is becoming a popular alternative for individuals who have limited time to exercise (5).
- When compared to rest, short-duration HIIE has been reported to elicit similar elevations in EPOC when compared to longer bouts of moderate-intensity continuous exercise (MICFE) (1).
- HIIE is type of HIIE that consists of 7–8 exhaustive sets of 20 seconds of high-intensity exercise with a 10-second rest between the exercise bouts and can last between 4–30 minutes (1, 4).
- HIIE has traditionally been performed on stationary bicycles but recent Tabata regimens have started to utilize total body calisthenics without the use of any equipment (2).
- It is unclear how Tabata performed using body calisthenics would influence EPOC when compared to performing HIIE using equipment.
- The purpose of this study was to compare EPOC following a bout of total body Tabata and a bout of high-intensity interval running (HIIR) of similar intensity and duration.

**Methods**

- Participants were recreationally active individuals (n = 7 [6F; 1M]; age = 22.2 ± 2.1 yrs; body mass = 64.2 ± 12.0 kg; body fat% = 26.2±3.1).
- Each participant completed 1) a rest bout, 2) a Tabata bout using only body calisthenics exercises, and 3) a bout of high-intensity interval running (HIIR) on a motorized treadmill.
- Each participant performed each of the 3 bouts on separate days with at least 7 days in between bouts.
- Two weeks prior to their first bout, each participant completed a graded maximal running test on the treadmill to determine the participants maximum heart rate.
- The running test began at 6.0 mph with a 2% incline. The speed was increased by 0.5 mph every 2 minutes until the participant reached volitional fatigue. The 2% incline was maintained during the entire test.
- One week following the running test, participants returned to the lab (on 2 separate days) to be familiarized with the Tabata and HIIR bouts prior to beginning the study.

**Results**

**Conclusions**

- Despite the significant differences in heart rate between HIIR and Tabata both exercise bouts elicited similar changes in post-exercise metabolism when compared to rest.
- The increased rate of fat oxidation and the increased energy expenditure following exercise was comparable between HIIR and Tabata.
- Both HIIR and Tabata might be lifestyle practices that promote healthy weight management and may minimize the risk of obesity.
- The small sample size and short metabolic assessment period limits the application of our results.
- A larger sample size and an expanded assessment period could better clarify the effectiveness of these exercises.

**Methods Continued**

- Once the study began, each participant abstained from exercise and replicated their dietary intake 24 hours before each bout.
- Each bout was performed in the morning and was conducted 1–2 hours after the participants had completed their breakfast. The breakfast and the time between the completion of the breakfast and the start of each bout was replicated for all three bouts.
- The Tabata protocol was performed before the HIIR protocol because these two protocols were set up to be performed at the same intensity. The participants’ average heart rate (HR) from their Tabata bout was used to estimate the speed required to achieve the same average HR during the HIIR.
- Therefore, the order of this study was randomly assigned in sequence as Tabata→HIIR→CS, Tabata→CS→HIIR, or CS→Tabata→HIIR.
- All bouts (Rest, Tabata, and HIIR) were performed for 25 minutes.
- HIIR involved performing repeated bouts of total body calisthenics at maximal effort for 20 seconds followed with 10 seconds of rest.
- Tabata involved performing repeated bouts of running exercise at maximal effort for 20 seconds followed with 10 seconds of rest.
- HR-HIIR was significantly different from Rest (p<.001; ES=1.3). *
- VO2 Tabata was significantly different from HIIR (p<.001; ES=1.9).
- Values are reported as mean ± standard deviation.

**Statistical Design**

- Significant differences (p<.05) between sessions were determined using a one-way, repeated measures ANOVA and Bonferroni post-hoc test.
- Significant differences (p<.05) in the heart rate (beats per min) between the Tabata and HIIR were determined using a student’s paired t-test.

**Literature Cited**