

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

ALEX ALVARA, DAVID J. BUCKLEY, 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: Compare the postprandial response following: 1) rest, 2) high-intensity interval running (HIIR), and 3) Tabata. **METHODS:** Recreationally active males ($n = 7$; age = 24.3 ± 4.8 yrs; body mass = 86.9 ± 20.1 kg; body fat% = 23.6 ± 6.2) performed each of the 3 bouts (in a randomized order) on 3 separate mornings with at least 7 days in between each bout. All participants were fasted for 10 hours prior to each bout. Rest was sitting for 25 minutes. Tabata was 25 minutes of repeated cycles of body calisthenics at maximal effort for 20 seconds followed with 10 seconds of rest. HIIR was performed the same as Tabata except the mode of exercise was treadmill running. Heart rate (HR) was monitored during both exercise bouts. The energy expenditure (kcal) from each exercise bout was estimated using the exercise HR and a regression equation. Thirty minutes following the completion of each bout, participants ingested a 75g oral glucose solution (OGS). At 2 hours following each bout, a high-fat meal (HFM) was ingested. Blood samples were acquired just prior to each bout and at 0, 0.5, 1, 2, 4, and 6 hours following the OGS. Postprandial blood samples were analyzed for glucose, insulin, and triglyceride (TG) concentration. The postprandial response was quantified via the incremental area under the curve (AUC_i) using the trapezoidal method. Significant differences ($p < .05$) in the postprandial response between the 3 bouts were determined using a one-way, repeated measures ANOVA and Bonferroni post-hoc test. **RESULTS:** Average HR (bpm) during Tabata (167.6 ± 7.1) was significantly lower ($p = .04$, $ES = -.49$) compared to HIIR (171.4 ± 8.2). Energy expenditure was similar during Tabata (384.4 ± 35.5 kcal) and HIIR (404.5 ± 42.9 kcal) ($p = .06$, $ES = .51$). No statistically significant difference was found in the TG AUC_i between rest (175.7 ± 102.6 $\text{mg} \cdot \text{dl}^{-1} \cdot 6\text{hr}^{-1}$) and Tabata (161.5 ± 86.8 $\text{mg} \cdot \text{dl}^{-1} \cdot 6\text{hr}^{-1}$) ($p = .73$, $ES = .14$) or between rest and HIIR (126.7 ± 74.6 $\text{mg} \cdot \text{dl}^{-1} \cdot 6\text{hr}^{-1}$) ($p = .14$, $ES = .48$). No statistically significant difference was found in the glucose AUC_i between rest (80.8 ± 61.7 $\text{mg} \cdot \text{dl}^{-1} \cdot 6\text{hr}^{-1}$) and Tabata (41 ± 48.3 $\text{mg} \cdot \text{dl}^{-1} \cdot 6\text{hr}^{-1}$) ($p = .29$, $ES = .65$) or between rest and HIIR (51 ± 32.1 $\text{mg} \cdot \text{dl}^{-1} \cdot 6\text{hr}^{-1}$) ($p = .13$, $ES = .48$). No statistically significant difference was found in the insulin AUC_i between rest (126.8 ± 55.8 $\mu\text{IU}^{-1} \cdot \text{ml} \cdot 6\text{hr}^{-1}$) and Tabata (74.5 ± 50 $\mu\text{IU}^{-1} \cdot \text{ml} \cdot 6\text{hr}^{-1}$) ($p = .07$, $ES = .94$) or between rest and HIIR (75.5 ± 33.3 $\mu\text{IU}^{-1} \cdot \text{ml} \cdot 6\text{hr}^{-1}$) ($p = .13$, $ES = .92$). **CONCLUSION:** Neither exercise regimen significantly reduced the postprandial TG response. The inability of either exercise bout to lower the TG response might be due to the consumption of the oral glucose solution post-exercise resulting in partial replacement of the expended energy. Previous studies have reported that partial or complete replacement of expended energy inhibits the ability of the exercise to lower the postprandial TG concentration. Despite no statistical difference, the postprandial glucose and insulin response following the exercise bouts might have been meaningful. HIIR lowered the glucose response in 6 of 7 participants by 3.5 to 71.7%. Tabata lowered the glucose response in 5 of 7 participants by 27.1 to 92.9%. HIIR lowered the insulin response in 5 of 7 participants by 10.9 to 77%. Tabata lowered the insulin response in 5 of 7 participants by 36.6 to 77.9%. The small sample size used in this study might also explain why no statistical difference was found. Previous studies evaluating Tabata-like exercises with a larger sample size have reported conflicting postprandial results. Using a larger sample size in the current study might have clarified the effectiveness of the exercises.