

TITLE: The Metabolic Cost of a Commercialized Video Fitness Program

AUTHOR INFORMATION: Michele S. Olson, PhD, FACSM, CSCS. Department of Physical Education and Exercise Science. Auburn University Montgomery, Montgomery, Alabama

INTRODUCTION: Numerous fitness products and programs are promoted in mainstream society to the general public for the purposes of developing various aspects of physical fitness especially weight loss. However, there is often little information regarding these products and programs including the energy, or, caloric cost of the workout(s). Therefore, the purpose of this study was to determine the mean energy cost of a popular commercialized video exercise program titled, “The FIRM Express.”

METHODS:

Participants: Apparently healthy active women (n = 10) between the ages of 19-39 years (mean = 26.4) were recruited to participate in the study (mean weight = 65.8 kg). Only those who met the study criteria and screened out as being at low-risk were allowed to serve as subjects. Each participant was familiarized with the exercise testing protocol and video workouts. The subjects were also provided with practice sessions to minimize threats to validity such as unfamiliarity with oxygen consumption testing. Each subject provided informed consent in writing prior to undergoing any exercise in the laboratory.

Protocol: The subjects performed the exercise videos in random order while being measured for oxygen consumption via indirect calorimetry with open-circuit spirometry (ParvoMedics TrueOne[®] 2400 metabolic cart, ParvoMedics Inc., Sandy, UT). Prior to the exercise trials, the metabolic measurement system was calibrated with known gases. Each exercise video was 20 minutes in length and included aerobics’ exercise moves and resistance training exercises using 1.97 to 5.44 kg dumbbells. Forty-eight hours of rest was provided to each subject between testing sessions.

Statistical Analysis: Means (M) and standard deviations (SD) were calculated for each variable of interest including serial 30 second oxygen consumption values. The following equation was used to estimate caloric cost of the workouts: 1 L of O₂ consumed = 5 kcal·min⁻¹.

RESULTS:

The energy cost of the workout system ranged from 24.6 to 37.6 ml·kg⁻¹·min⁻¹. The overall mean energy cost was 31.1 ml·kg⁻¹·min⁻¹ (SD = 2.9 ml·kg⁻¹·min⁻¹), which represents an intensity of 8.9 METS. In terms of the rate of caloric expenditure, the workouts ranged from 8.1 to 12.4 kcal·min⁻¹ with the overall mean rate of caloric expenditure at 10.2 kcal·min⁻¹. Thus, at 10.2 kcal·min⁻¹, the 20 minute workouts comprising this exercise program, elicit a mean expenditure of approximately 204 kcal. When considering the rate of energy expenditure per kg of body weight, the caloric cost is 0.16 kcal·kg⁻¹·min⁻¹.

DISCUSSION:

Few exercise products and programs have been tested in exercise physiology research laboratories yet the fitness industry produces numerous items, including exercise video

systems, each year. This study determined the energy cost of a newer and popular commercialized video exercise program. Based on the mean MET value, the present workouts exceed the 6.0 MET threshold for “vigorous” physical activity according to ACSM/AHA physical activity and public health recommendations (1). These recommendations state that physical activities that are “vigorous” can be performed at a lower exercise frequency i.e., 3-days per week (versus 5-days per week for moderate physical activities) to improve physical fitness and general health. More specifically, the 7 to 10.7 MET range elicited by these workouts approximates the “Vigorous” intensity classification for 28-39 year old healthy adults, according to the ACSM Position Stand regarding exercise for developing and maintaining fitness (2). This workout program included segments of interval exercise during each 20 minute routine, which may explain its relatively high energy cost. Furthermore, interval training has been shown to increase fitness and promote weight loss with shorter, 20 to 30 minutes exercise durations (e.g., 3, 4). One highly commercialized exercise program known as “Step Aerobics,” which has been shown to be an activity that is of sufficient intensity to promote physical fitness, elicits a similar $0.16 \text{ kcal} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ energy cost when done on 25.4 cm benches (5). Additionally, the ACSM Position Stand (2) notes that an energy expenditure of 200 kcal per session can promote weight loss when done at a frequency of 4-days per week. Therefore, based on the foregoing, the “FIRM Express” video exercise system appears to exceed established energy cost criteria for promoting physical fitness in younger, healthy adults. Though the workout videos show modifications for newer and/or less fit consumers, it should also be noted that higher intensity nature of this exercise system might make it more appropriate for individuals with a more moderate level of initial physical fitness.

REFERENCES:

1. Haskell WL, Lee I, Pate RR et al. Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci in Sports Exer* 39 (8): 1423-1434, 2007.
2. Garber CE, Blissmer B, Deschenes MR et al. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Med Sci in Sports Exer* 43 (7): 1334-1359, 2011.
3. Tremblay, A, Simoneau, JA, Bouchard C. Impact of exercise intensity on body fatness and skeletal muscle metabolism. *Metabolism* 43 (7): 814-818, 1994.
4. Trapp EC, Chisholm DJ, Freund J. The effects of high-intensity intermittent exercise training on fat loss and fasting insulin levels of young women. *Int J of Obes* 32 (4): 684-691.
5. Olson MS, Williford HN, Blessing DL et al. The cardiovascular and metabolic effects of bench stepping exercise in females. *Med Sci in Sports Exer* 23 (11): 1311-1317, 1991.

