



Metabolic Response to the IFlow Workout

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Introduction

Band and tubing exercises have been popularized over the last decade as a component of so-called “functional training” exercise routines. The band and tubing material, a reinforced latex, has unique material properties of increasing resistance with length, leading to dynamic tension through a training movement as joint centers of the involved limb change distance and angular relationship with the device point of attachment.

Functional training exercises are generally prescribed as a means of engaging the smaller joint-stabilizing musculature of the body, in movements specific to sport or lifestyle physical activity. Training stimuli may be applied in such a way as to promote greater muscular strength and joint stability over a specific range of motion at a single joint, or to integrate the strength of stabilizing muscle groups working together in complex movements. The tension/length property of the tubing material is particularly suited for both functional training and rehabilitation exercise methodologies; creativity in use of these tools, however, is the primary limiting factor to their application in the physical training setting.

The IFlow workout is an example of innovation in the use of very simple and portable exercise tubing, which draws on diverse movement patterns found in yoga, tai chi and traditional fitness training. Because the workout is performed as a series of guided movements in a continuous fashion for 20-25 minutes, it may be considered dynamic exercise with both aerobic and anaerobic metabolic requirements. The degree to which each component of metabolism is activated is unknown, as is the total energy cost and overall metabolic intensity of the workout. A second question is how the body compensates for isometric contraction of certain muscle groups (primarily upper-body) while performing dynamic movements in the larger muscle groups of the lower extremities.

Methods

10 healthy adult subjects provided informed consent to undergo metabolic analysis of the IFlow Workout. Each subject performed a submaximal treadmill exercise test with metabolic measurement via the PAS system (Medgraphics, St. Paul, MN), to 85% of age-predicted heart rate maximum. After a 5-minute standing rest break, while still wearing the metabolic system, the subject was fitted with a lightweight backpack upon which the metabolic sampling unit was mounted. An umbilical tether of approximately 8 feet was connected to a laptop (Dell 610) to transmit the sampling data, and was managed during the testing so as not to obstruct the subject’s movements. The IFlow workout was then led by the same instructor for each subject; three progressive-intensity sets of 5-6 minutes were performed with a 60-second break in between. Metabolic response was monitored in breath-by-breath mode, and reported over three-breath averages. Heart rate was recorded via polar rs800 set to record at 1-sec intervals.

Results

Observation indicated that the IFlow Workout consists of a progressive increase in metabolic intensity over a duration of approximately 20 minutes, beginning at a moderate level. For all subjects, pacing of the exercises by the instructor was consistent in timing and duration, leading to similar completion times of the workout for subjects. Despite this, a wide range of metabolic response was observed, as shown in Figure 1. The cyclical rise and fall in metabolic intensity over the duration of the workout is of note, and was seen in each subject. Figure 2, showing the mean (+/- 1 SD) metabolic response, captures this phenomenon despite the aggregation of data over all subjects. Mean energy expenditure during the workout was 8.3 +/- 1.5 kcal/min, equivalent to 6.0 +/- 0.9 METs.

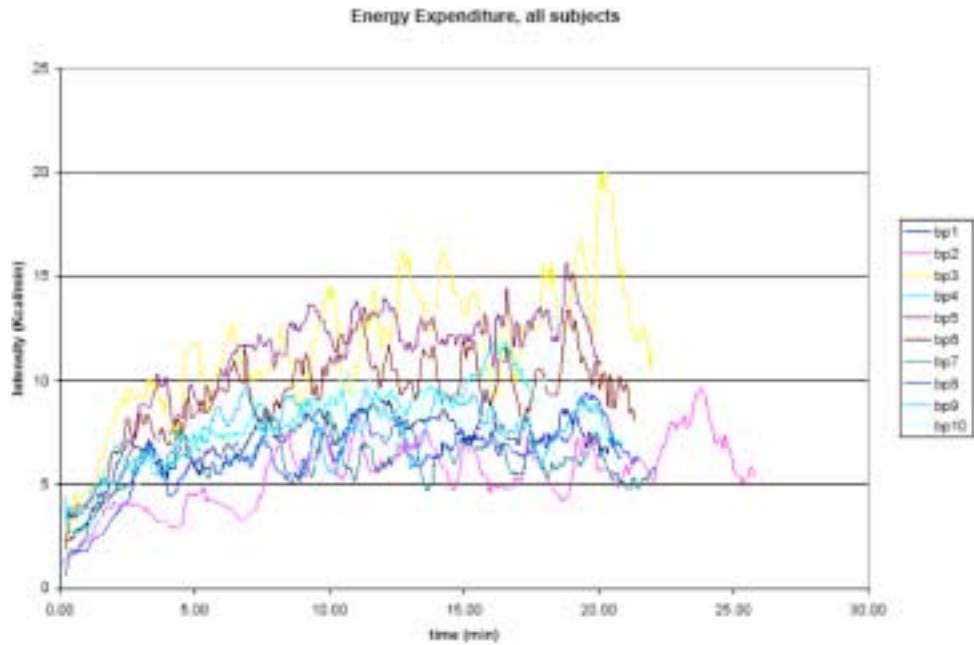


Figure 1. Metabolic response to the IFlow Workout, all subjects. Note the cyclical rise and fall of metabolic rate for each subject.

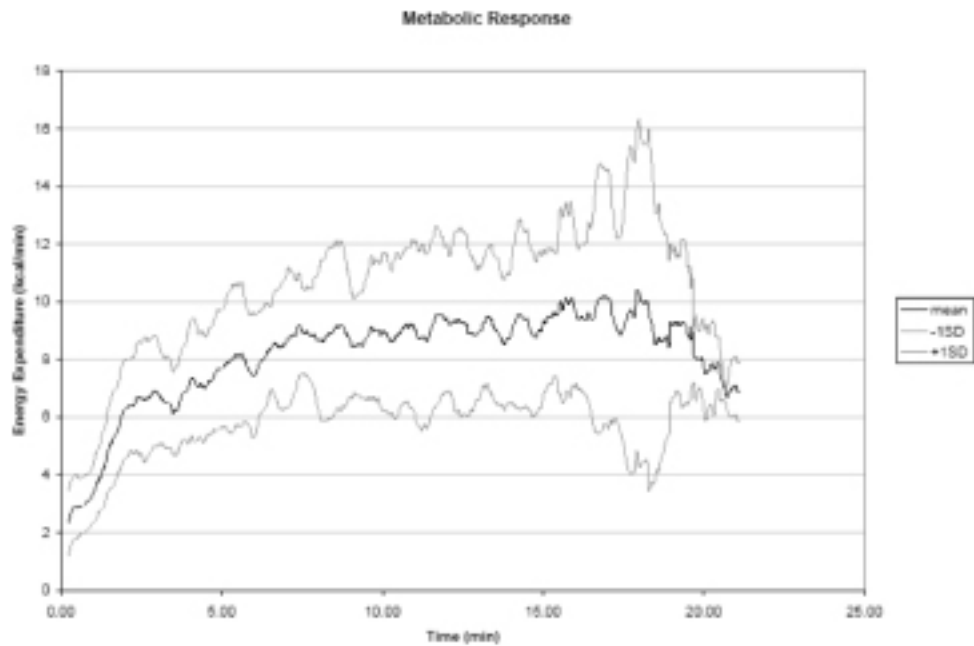


Figure 2. Mean (+/- 1 SD) metabolic response to the IFlow Workout.

Discussion

The cyclical metabolic response observed during the workout was due not only to the transition time between exercises, which was minimal, but also and primarily due to the steep rise in VO₂ as a component of excess post-exercise oxygen consumption (EPOC) following the completion of one exercise. EPOC is usually observed following dynamic exercise of significant anaerobic energy requirements, and suggests that the isometric contractions of small upper-body musculature may have the effect of requiring energy production from anaerobic pathways due to insufficiency of central oxygen supply capacity. During the transition from one exercise of the workout to the next, oxygen consumption diminished as the subjects recovered, but was not observed to return to baseline.

In conclusion, it can be reasonably stated that the IFlow Workout is a pre-formatted and guided exercise routine of dynamic nature lasting approximately 20 minutes, which significantly activates both the aerobic and anaerobic metabolic pathways of the participant. The movement patterns of the workout consist of large muscle group movements simultaneously to isometric contractions of smaller, joint-stability oriented musculature. The metabolic intensity of the workout approximates 6 METs and elicits an energy expenditure rate of approximately 8 kcal/min. Further research is needed to clarify the relationship between the isometric contractions observed and the cardiorespiratory response to the workout, as well as the adaptations that may result from long-term participation in a training program involving this unique modality of exercise.