CALORIC CONSUMPTION AND METABOLIC CHANGES DURING FITWALL EXERCISE

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1. INTRODUCTION

Caloric consumption is one of the foremost topics of exercise research, as athletes strive to burn more calories and trainers search for exercises that increase caloric burn. This article will evaluate the metabolic effects (caloric consumption) of a new mode of exercise called Fitwall. The studies mentioned in this article were conducted using O_2 and CO_2 gas analysis equipment, blood lactate measurement devices and heart rate monitors on each subject in the Welltec Human Performance Lab in Albuquerque, NM and in the Fitwall studio in La Jolla, CA.

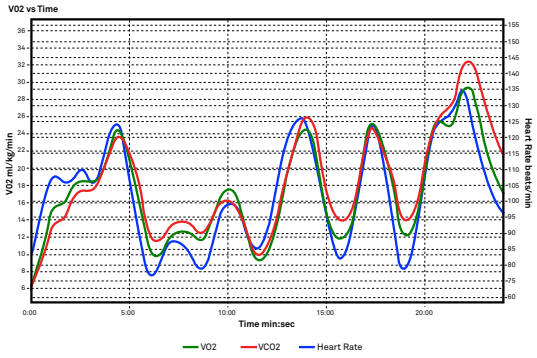
2. PRINCIPLES OF CALORIC BURN

In general, there are two ways to increase the amount of calories burned: to increase the number of calories consumed during exercise or to increase one's metabolic rate, i.e. the number of calories consumed while not exercising. This article will first discuss caloric consumption during a Fitwall exercise, and will then focus on the effects of a Fitwall workout on metabolic rate.

3. CALORIC BURN DURING FITWALL SESSION

To maximize the number of calories burned during a short exercise period, it is necessary to optimize the work/recovery period. Optimizing the work/recovery periods by focusing on heart rate allows the body to recover just enough to do high levels of work repeatedly in the shortest amount of time. Such a workout is called High Intensity Interval Training (HIIT) and recent research on this topic has challenged the belief that long, slow exercise is the only way to increase VO_2 max[4]. These studies have found that HIIT is a potent time-efficient strategy to induce numerous metabolic adaptations usually associated with traditional endurance training. In fact, six sessions of HIIT over 2 weeks can increase skeletal muscle oxidative capacity and endurance performance, as well as alter metabolic control during aerobic-based exercise.[4]

Figure 1 graphs heart rate, O2 and CO2 as measured during a Fitwall test session. The heart rate and an estimated number of calories burned are monitored during each Fitwall class. The high amount of calories burned during a Fitwall class occurs due to Fitwall's optimized work/recovery methods. This method of exercising also elicits an optimal gain in VO_2 max[1,2,4].



4. EPOC

Excess Post Oxygen Consumption (EPOC) is an effect commonly known as "after burn". EPOC is the continued consumption of calories after exercise, and can last up to 72 hours post-exercise. Figure 2 illustrates how increased caloric consumption continues immediately after exercise and tapers off over time. This tapering off effect changes based on the type of activity, VO^2 max, age, gender and weight. Sustained EPOC over weeks or months helps to increase ones resting metabolic rate (RMR).

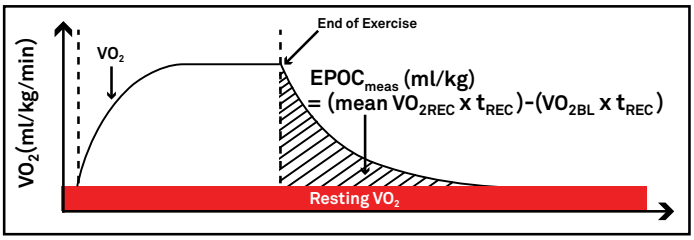


Figure 2: EPOC Diagram[3]

High levels of EPOC are generated from high intensity work[2,3]. Research has shown that repeated intervals of duration and intensity based on heart rate allows for more work over the same amount of time than continuous exercise allows. Part of Fitwall's increased caloric consumption over a short workout duration is attributable to its use of heart rate monitors to guide its interval training.

4.1 EPOC RESULTS

The average increase in metabolic rate within the first hour following a Fitwall workout for male subjects was 1,152 Kcals, or a 57% increase. 24 hours after exercise, male subjects displayed a continued increase in metabolic rate of 489, or a 24% increase in Kcals burned when compared to their fasting baseline (as measured by gas analysis). In addition, a strong correlation between F-factor and EPOC was found, as discussed in my white paper on efficiency.

$Description_S$	$Description_L$	$Kcal_{AVG}$	%Change
RMR_1	Fasting, pre-exercise	2009 Kcal	baseline
RMR_2	Within 1-hour post-Exercise	3161 Kcal	57%
RMR_3	24 hours post exercise	2498 Kcal	24%

Table 1: Resting Metabolic Rate (RMR) Results

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4.2 CONFIRMING RESULTS

Continued research was conducted to determine why such a dramatic increase in EPOC/Metabolic Rate was found following these short (40 minute) exercise classes. Since previous research has shown that certain levels of lactate can predict EPOC4, lactate measurements were taken immediately after the workout. While the Anaerobic threshold (AT) for lactate levels averages around 4.0 mmol/l for most individuals, the average lactate levels post Fitwall session were 12.9 mmol/l. These increased average lactate levels partly explain the very high increase in EPOC.

5. CONCLUSION

Caloric consumption is another way to express the amount of work a body does. Using a larger number of muscles allows one to do more total work over a given time. Our research found Fitwall workouts burn an unusually high amount of calories during the exercise session. This is likely attributable to the high number of muscles recruited, the high intensity interval training method, and the optimization of work/recovery periods using real time heart rate monitoring.

In addition to the number of calories burned during Fitwall exercise, we have a continued caloric consumption for 24 or more hours following class. This was a 57% average increase within an hour following exercise and a continued 24% average 24 hours later.

Based on these results, 3 Fitwall sessions per week can burn an additional 3300kcal/week. Combined with the caloric consumption during the exercise class, this would result in a 5100kcal/week deficit.

To further validate these results, further studies to explain the high metabolic increase due to vertical exercise should be conducted.

6. REFERENCES

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