CYBEX RESEARCH INSTITUTE

ARM USE AND POSTURE ALTER METABOLIC COST DURING NON-IMPACT CARDIOVASCULAR CROSS TRAINING AT A CONSTANT MACHINE WORKLOAD

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INTRODUCTION

Non-impact cardiovascular cross trainers, such as the Cybex Arc Trainer, are a popular exercise choice for individuals looking to lose weight and increase endurance. Many of these devices display a 'calorie burned' number to inform users about the intensity of a workout. This number is an estimate based on the machine's settings (resistance, incline, speed), and does not take into account how the user is interacting with the device.

OBJECTIVE

To determine if an exercise's demand to an individual is altered by only changing how they interact with the machine, while keeping the machine settings constant.

METHODS

Fifteen healthy subjects were asked to exercise at a constant machine workload, which was equivalent to about 70% of their age-predicted heart rate maximum (%APmax). The subjects were instructed to perform one of three different conditions while exercising on the Arc Trainer. 1. Working upright and unsupported, 2. working upright while using the machine's moving handles, and 3. leaning forward and anchoring the upper body.

Figure 1: Three conditions tested: 1. Upright and unsupported (UR, left), 2. Using the mobile arms (ARM, center), 3. Leaning forward and anchoring the upper body (FWD, right).

In addition to heart rate, expired air was collected and analyzed to measure oxygen consumption. Energy expenditure (kcal/min) was estimated based on the expired air during exercise.

RESULTS

Subjects demonstrated the greatest heart rate and caloric expenditure (Figure 2) when leaning forward (9.826 kcal/min) compared to using the mobile arms (9.674 kcal/min) and the unsupported condition (9.126 kcal/min).

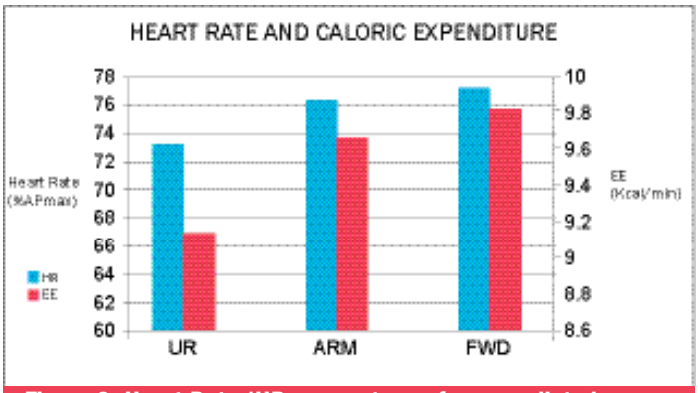

Figure 2: Heart Rate (HR, percentage of age predicted maximum) and Energy expended (EE, kcal/min) across the three experimental conditions.

CONCLUSION

Without increasing any of the machine's settings, one can influence their calorie burn based on how they interact with the Cybex Arc Trainer. Specifically, one can experience a 7.7% increase in calorie burn when leaning forward, or a 6.0% increase in calorie burn when using the handles compared to working upright and unsupported.

This study is available in its entirety at:

http://www.asep.org/asep/asep/JEPonlineOCTOBER2013.docx