

# The CYBEX ARC Trainer Burns More Calories than the Precor AMT and EFX

Relative Exercise Intensity, Heart Rate, Oxygen Consumption and Caloric Expenditure When Exercising on Various Non-Impact Cardio Trainers

Kirsten Hendrickson, B.S.,  
John P. Porcari, Ph.D.,  
Carl Foster, Ph.D.  
University of Wisconsin  
La Crosse



**Introduction:** Normally, people adjust the exercise intensity of cardio devices according to their heart rate, or more commonly, perceived exertion. Someone's physical sensation on an exercise device, however, may not be an accurate representation of the volume of oxygen they're consuming, or the calories that they're burning. This may be especially true when perceived exertion is used to establish exercise workloads on various non-impact machines with different movement patterns.

**Objectives:** Are there differences in perceived effort, heart rate, oxygen consumption, and caloric expenditure when subjects self-select a relatively high workload on a CYBEX ARC Trainer, Precor Adaptive Motion Trainer (AMT), or Precor Elliptical Trainer (EFX)?

**Methods:**

Sixteen subjects familiarized themselves with the ARC, AMT, and EFX, and then self-selected a relatively high workout intensity at which they exercised for 30 minutes. The subjects worked on a different device during each exercise session, and the order of the exercise devices was counterbalanced across all subjects.

The data collected at five minute intervals were rate of perceived exertion (RPE), heart rate, oxygen consumption and calories burned.

**Results:**

Perceived exertion (RPE) for all three machines was virtually identical for the self-selected workloads (figure 1).

Heart rate was similar for the ARC and AMT, but significantly lower on the EFX despite the same perceived effort (figure 2).

Oxygen consumption was significantly greater on the ARC than on the EFX and AMT at the same perceived exercise intensity (figure 2).

Over thirty minutes of exercise, the ARC burned 16% more total calories than the EFX and 9% more calories than the AMT at the same relative workout intensity (figure 3). These differences were highly significant.

**Conclusion:** Although subjects perceived that they were working at the same effort on the CYBEX ARC Trainer, Precor EFX, and AMT, exercise on the ARC Trainer actually resulted in greater oxygen consumption and calories burned.



Rate of Perceived Exertion

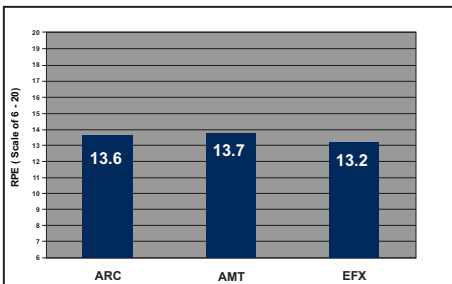


Figure 1. Rate of perceived exertion at self-selected exercise intensity.

Heart Rate and VO<sub>2</sub>

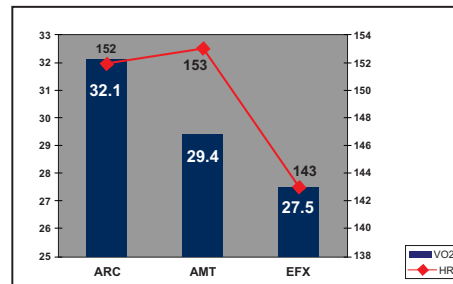


Figure 2. Heart rate and oxygen consumption at self-selected exercise intensity.

Caloric Expenditure

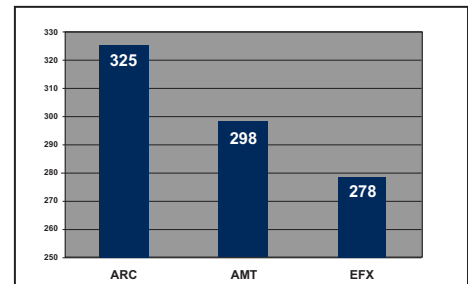


Figure 3. Caloric expenditure after 30 minutes of exercise at self-selected intensity.



This study is available in its entirety at [www.cybexinstitute.com](http://www.cybexinstitute.com).