
Do Elliptical Trainers Accurately Estimate Energy Expenditure?

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ABSTRACT

Life Fitness and Precor elliptical exercise trainers are very popular in fitness centers because of the reduced impact on joints as compared to running on a treadmill. Modern elliptical trainers measure heart rate, distance traveled, and provide an estimated amount of calories expended during the exercise bout. Each piece of equipment uses an internal algorithm to estimate energy expenditure based upon resistance and pedal rate. The purpose of this study was to determine if the PRECOR model EFX 556i and Life Fitness model 95X elliptical trainers accurately estimated energy expenditure. Three men and three women performed exercise sessions on each elliptical trainer on 3 separate occasions (2 bouts per day). The order of the machines used for each exercise session was randomized. Each exercise bout lasted 12 minutes (2-min warmup at a resistance of 3, rpm of 70; 10-min measure period at a resistance of 10, rpm of 70). During the test V_O2 was measured using a Medical Graphics Ultima metabolic cart; heart rate was measured using a Polar heart rate monitor and energy expenditure calculated by the metabolic cart. HR, V_O2, and energy expenditure data were recorded each minute of the 10 minute exercise session. The results are shown in the table below.

Brand	Elliptical Mean (Kcal)	MC Mean (Kcal)	% Error	P Value
LF	91 (13.98)	93.54 (14.13)	-2.72	0.024
PC	122.93 (12.74)	98.58 (12.68)	24.70	<0.0001

LF = Life Fitness, PC = Precor, MC = Medical Graphics Ultima metabolic cart

We conclude that the Life Fitness EFX 556i slightly underestimates, while the Precor model EFX 556i overestimates exercise energy expenditure.