Accuracy of Wearable Technology During The 12-3-30 Workout and a Self-Paced Run

Alan V. Garcia, Bianca C. Weyers, Devin Green, Dr. James W. Navalta

Introduction

The 12-3-30 treadmill workout (12% incline, 3.0 miles per hour, 30 minutes) is currently trending among fitness enthusiasts of all levels. However, its effectiveness is unknown. Another trend over the past several years is the use of wearable fitness technology. **Purpose:** *To compare the validity of measures of caloric expenditure and ratio of carbohydrates to fats used in the 12-3-30 to that of a self-paced run using wearable devices.*

Methods

Five subjects (n=5; four males, one female; age (yrs): 33.4 ± 10.4; Height (cm): 179.8 ± 5.17; Weight (kg): 85.2 ± 17.6) were tested individually on two separate visits, with seven days of rest in between. On day one, the subject was set up on a treadmill to perform the 12-3-30 exercise. Calories and ratio of carbohydrate to fat were recorded on both days using a Parvo Medics TrueOne 2400 Metabolic Measurement System (criterion) and estimated using a Polar Vantage M wrist-watch. On day two, the subject was set up on the same treadmill, and walked or ran at a self-selected pace until the number of calories recorded on day one was met. Mean absolute percentage error (MAPE; <10%) and Lin's Concordance Correlation Coefficient (r ≥ 0.7) were calculated to determine accuracy.

Results and Conclusion

The only measure that was considered valid was caloric expenditure during the self-paced run (see table) While most of the data falls short of threshold values of validity, results may be inconclusive due to the small sample size (n=5).

	Calories		% Carbs		% Fats	
	MAPE (%)	**Lins (r)**	**MAPE (%)**	**Lins (r)**	**MAPE (%)**	**Lins (r)**
12-3-30 Exercise	15.42	0.662	33.50	0.031	39.52	0.043
Self-Paced Run	11.67	0.804	41.41	0.153	69.32	0.134

Practical Application

Those who wish to utilize wearable fitness technology while performing the popular 12-3-30 workout should realize that the estimated calories and the percent of fat and carbohydrate returned from the device is inaccurate based on the current results.