Validity and Reliability of Wahoo KICKR Cycle Ergometer

ZACHARY M. GIN, JONUS RODRIGUEZ, and DUSTIN P. JOUBERT

Human Performance Lab; Department of Kinesiology and Health Science; Stephen F. Austin State University; Nacogdoches, TX

Category: Undergraduate

Advisor / Mentor: Joubert, Dustin (joubertd@sfasu.edu)

ABSTRACT

Cycle ergometers (CE) allow for the measurement of work and power during exercise. The Wahoo KICKR is an electronically-braked CE commonly used by coaches and athletes for exercise testing and training. **PURPOSE**: The purpose of this study was to determine the validity and reliability of the Wahoo KICKR CE for the measurement of power. **METHODS**: 12 recreationally active college students completed 3 separate workout sessions with 2 sessions on the Wahoo CE and 1 session on a mechanically-braked Monark CE. The order of sessions was randomized and counter-balanced. Seat height, handlebar height, and handlebar reach were also matched across trials. During the exercise sessions oxygen consumption (VO_2) and heart rate (HR) were continuously measured. Following a 10-minute warmup, subjects completed an incremental exercise test consisting of 4, 5-minute stages starting at a work rate of 50 watts (W) and increasing by 50 W with each stage up to 200 W. Cadence was held at 71.5 revolutions per minute for all stages and trials. Validity was assessed by a dependent sample T-test comparing the first Wahoo session to the Monark trial. Reliability was assessed by a dependent sample T-test comparing the two Wahoo trials. **RESULTS**: HR and VO2 data across all trials and stages are displayed in the table. Both VO_2 and HR were slightly lower when comparing the Wahoo to the Monark, but VO_2 and HR were consistent when comparing the two Wahoo trials. **CONCLUSION**: This study showed that the Wahoo KICKR may slightly overestimate the work rate, particularly at higher workloads, but it is a consistent and reliable device. Based on these findings, coaches and athletes can have confidence incorporating the Wahoo CE into training programs and fitness testing.

	50 W (n=12)		100 W (n=12)		150 W (n=12)		200 W (n=7)	
	VO$_2$	HR	VO$_2$	HR	VO$_2$	HR	VO$_2$	HR
Wahoo 1	12.3 ± 1.4	101 ± 17	17.6 ± 2.3	118 ± 17	24.6 ± 3.5	145 ± 18	34.2 ± 5.2	160 ± 11
Monark	13.7 ± 1.6	102 ± 14	19.5 ± 2.0	122.8 ± 18	27.1 ± 3.4	152 ± 20	38.1 ± 6.9	167 ± 14
Wahoo 2	12.3 ± 1.5	98 ± 9	17.6 ± 2.6	118 ± 11	24.3 ± 3.4	144 ± 12	34.5 ± 4.6	161 ± 10
Validity P-value	0.004*	0.605	<0.001*	0.009*	<0.001*	0.028*	0.011*	0.140
Reliability P-value	0.886	0.848	0.990	0.131	0.434	0.317	0.472	0.886

*$p < 0.05$

All values represent mean ± SD