

Comparison of Portable Metabolic Analyzers during Walking, Jogging, and Running

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ABSTRACT

Oxygen uptake measurements enable performance professionals, clinicians, and scientists to quantify energy expenditure and aerobic work capacity for various purposes. Devices that accurately detect the composition of expired gases and changes in oxygen uptake, open new possibilities in research methodology and accessibility. **PURPOSE:** The purpose of this study was to compare the O₂ uptake measurements of the VO₂ Master Pro (VM) to the Cosmed K5 (K5) during walking, jogging, and running in field and lab conditions. **METHODS:** Twelve proficient runners, with a current 10k pace < 5:19 min/km, performed 3 matched intervals at 3 different speeds (4.82, 8.05, 11.27 kph) on a treadmill and on an outdoor track while expired gasses were measured. Each interval was 10 minutes and data from minutes 6-9 were averaged for comparisons. An airflow test was performed on both devices by forcing air through the devices using a 3 L syringe timed to a metronome at 15, 25, and 35 strokes/min. **RESULTS:** During walking intervals, the VM did not report data for the majority of participants, and therefore were excluded from analysis. Jogging and running measurements were analyzed using a repeated measures ANOVA and Tukey multiple comparison test to analyze pairwise comparisons. The indoor running analysis revealed significant differences in VO₂ (3017 vs. 1880 ml/min), V_E (71 vs 57 ml/min), and TV (1.89 vs 1.56 L) between the K5 and VM respectively (p < .023). Outdoor analysis revealed a significant difference between devices in VO₂, V_E, and TV (p < .035). The airflow test also demonstrated significant differences between the devices in V_E and TV (p < .001). Neither the jogging nor running analysis showed a significant difference in FeO₂ or HR (p > .16). **CONCLUSION:** We concluded that there were significant discrepancies between the K5 and the VM due to differences in TV measurement.