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CROSS SYSTEM RELIABILITY OF COSMED K4b2 vs. PARVO 2400 TRUE ONE METABOLIC SYSTEMS

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CROSS SYSTEM RELIABILITY OF COSMED K4b2 vs. PARVO 2400 TRUE ONE METABOLIC SYSTEMS

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The measure of oxygen consumption (VO_2) via indirect calorimetry is used to evaluate energy expenditure in laboratory and field settings. During the development of a new fitness test for Wildland Firefighting, we needed to compare laboratory VO_2 testing using a Parvo medics 2400 True One metabolic cart with field data collected with a Cosmed K4b2 system. The field test VO_2 data were consistently slightly higher than the lab data at identical work rates during 20 kg load carriage. **PURPOSE:** To examine the validity of the Cosmed with the Parvo metabolic system and the ASCM equations. **METHODS:** Thirty subjects (17 male; 13 female) participated in the study. Upon arrival to the lab, subjects were outfitted with a 20kg. backpack and performed a five-minute warm up at a self-selected intensity. Subjects then completed two identical five-minute steady state stages while wearing the backpack. Each stage was randomly selected for monitoring order with the Cosmed and Parvo system. Subjects walked on a treadmill at an assigned speed between 2-3.5 MPH (mean=3.1 ± 0.4 MPH) and grade between 3-9% (mean=6.0 ± 2.5%). VO_2, V_e and O_2 extraction data using the Cosmed or Parvo metabolic systems and estimated VO_2 (ACSM prediction equations) were analyzed using a one-way repeated measures ANOVA or dependent t-tests (for comparisons of V_e and O_2 extraction). Significance was established at $p < 0.05$. **RESULTS:** The Cosmed measured a higher VO_2 compared to the Parvo and ACSM equations (27.5 ± 5.7, 25.4 ± 5.6, and 25.5 ± 5.5 ml•kg^{-1}•min^{-1}, respectively, $p < 0.05$). The V_e for Cosmed was higher compared to the Parvo (44.4 ± 14.3 vs. 40.6 ± 13.4 L•min^{-1}, respectively, $p < 0.05$). There was no difference between the Cosmed or Parvo for percent expired 0_2. **CONCLUSION:** Although the Cosmed VO_2 and V_e values were slightly higher than the Parvo values, the differences were small and within a reasonable range for energy expenditure estimation in a field vs. laboratory setting. We are currently validating V_e in the two systems.

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