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Jeremy Ducharme

University of New Mexico

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Efficacy of a Regression Method to Confirm VO$_2$max in Middle-Aged and Older Adults: A Pilot Study
Jeremy B. Ducharme, doctoral student, exercise science, University of New Mexico
Zachary J. McKenna, University of New Mexico
Christine M. Mermier, University of New Mexico

Verification testing following a maximal graded exercise test (GXT) has been shown to be effective at indicating whether VO$_2$max was attained for middle-aged and older adults but performing two maximal efforts in a single day may not be practical or possible for certain individuals. **PURPOSE:** To evaluate the efficacy of a regression method for identifying a VO$_2$ plateau in order to confirm the attainment of VO$_2$max. **METHODS:** Twenty-one recreationally active (VO$_2$max: 21.8-50.3 ml/kg/min) middle-aged and older (46-76 yrs.) men (n=11) and women (n=10) completed an individualized ramp GXT on the cycle ergometer, and one hour later, a verification protocol at 105% of their maximal work rate (WR) achieved during the GXT. Verification criterion was met if the difference between the highest VO$_2$ during the verification was ≤2% greater than the VO$_2$max achieved during the GXT. VO$_2$ plateau was identified by least-squares regression analysis of the 4 minutes immediately prior to the last 2 minutes of the VO$_2$-WR curve. Modelled VO$_2$max was extrapolated using the VO$_2$-WR regression equation and the maximum WR achieved during the GXT. If the difference between modelled and actual VO$_2$max was >50% of the slope for the linear portion of the VO$_2$-WR relationship relative to the assigned protocol, then a plateau was observed. McNemar’s test of marginal homogeneity was used to detect differences in the proportion of paired data of individuals’ attainment of VO$_2$max criteria. **RESULTS:** Of the 21 participants, 15 (71.4%) met the verification criterion while 6 (28.6%) did not, compared to the regression method where 16 (76.2%) achieved the regression criterion while 5 (23.8%) did not. McNemar’s test revealed no significant difference between participants’ ability to achieve the regression and verification criteria ($X^2$(1)=0, $p=.999$). **CONCLUSION:** The regression method used in this study may be an effective strategy for determining VO$_2$ plateau and confirming that VO$_2$max was attained during a GXT with middle-aged and older adults on a cycle ergometer. This time-efficient regression method is comparable with the verification criterion but does not require a second maximal test, which may be advantageous for those where the verification trial may not be practical.