TACSM Abstract

Predicting VO_2max from 1- and 1.5-Mile Runs

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ABSTRACT

VO_2max is the gold standard to assess cardiovascular fitness, an important factor in the longevity of health. Consequently, not everyone can perform a maximal cardiovascular test. **PURPOSE**: To determine the accuracy of the 1-mile or 1.5-mile run to predict VO_2max. **METHODS**: Field runs were counterbalanced and performed on an outdoor, all-weather 400m oval track. Subjects (N=114) warmed up and stretched, then lined up single file and signaled to go in ten second increments. At the end of the run, HR, RPE (Borg's 6-20) and time was recorded. VO_2max: subjects were fitted with a Polar heart rate monitor, a head gear to support a one-way valve mouthpiece that was connected to a ParvoMedics TrueOne 2400 metabolic cart and performed a standard Bruce protocol on a motorized treadmill until exhaustion. Pearson's correlation coefficient were used to assess the relationship between VO_2max and the field runs. A two-way random (constancy) intraclass correlation coefficient (Cronbach's Alpha) was used to assess reliability between the measures. Repeated measures ANOVA was used to assess differences between actual VO_2max from the treadmill and predicted the timed runs. Simple linear regression was used to create a prediction equation for each field run. Alpha was set at .05 for all tests. **RESULTS**: VO_2max and VO_2max estimated from the 1-mile run ($r(112) = .795$, $p = .001$) as well as VO2max estimated from the 1.5-mile run ($r(112) = .845$, $p = .001$). Cronbach's Alpha indicated high reliability between VO_2max and VO_2max estimated from the 1-mile run (Cronbach's$(113) = .874$, $p = .001$) and from the 1.5-mile run (Cronbach's$(113) =. 916$, $p = .001$). Repeated measures ANOVA show a significant difference among the three measures of VO_2max ($F(2, 112) = 69.9$, $p = .001$), with pairwise comparisons indicating a significant difference between VO_2max and VO_2max estimated from the 1-mile run ($p = .001$, SEE = 5.3 ml/kg/min) as well as between VO_2max and VO_2max estimated from the 1.5-mile run ($p = .001$, SEE = 5.3 ml/kg/min). New Prediction Equations VO_2max= 75.056-(3.879*1-mile (min)), $p = .001$, SEE= 4.8 ml/kg/min and =76.775-(2.543*1.5-mile (min)), $p = .001$, SEE = 4.6 ml/kg/min. **CONCLUSION**: While significant differences exist between actual and predicted VO_2max, common field equations are quite reliable. If assessing a population similar to this sample, the new equations provide greater accuracy.