

47. SWACSM Abstract

Developing a Predictive Model for VO_{2MAX} in Middle-Distance Track and Field Athletes

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ABSTRACT

Purpose: Aerobic capacity is an indicator of an athlete's endurance and a key predictor of performance. The greater the aerobic capacity, the more oxygen available for working muscles, leading to delays in lactate buildup, thus increasing the potential for successful performance. Studies have investigated non-exercise and/or submaximal exercise measures to predict aerobic capacity, but few have analyzed the combination of maximal exercise and non-exercise measures in Division-3 runners. Therefore, the purpose of this pilot study is to determine the predictive ability of heart rate (HR_{max}), ventilation (VE), respiratory quotient (RQ), and rate of perceived exertion (RPE) on VO_{2max} in middle distance track and field runners. **Methods:** Eleven Division-3 400- and 800m runners (F:5, M:6, age 18-24) reported to the Human Movement Laboratory twice. HR_{max} , RQ, and RPE were collected during VO_{2max} testing using a CosMed treadmill and Cardiopulmonary Exercise Test (CPET), while VE was obtained through spirometry testing. A multiple regression analysis ($\alpha=0.05$) was used to predict VO_{2max} from HR_{max} , VE, RQ, and RPE. Additionally, the pool was split by sex, and correlations were run to assess relationships among variables ($\alpha=0.05$). **Results:** The multiple regression model statistically significantly predicted VO_{2max} ($p=0.018$, $adj. R^2=0.71$). Both HR_{max} ($p=0.004$) and VE ($p=0.014$) added to the statistically significant prediction. Correlation results indicate a positive relationship between HR_{max} and VO_{2max} in males ($r=0.90$, $p=0.015$) and females ($r=0.97$, $p=0.006$). **Conclusions:** HR_{max} contributed significantly to the model predicting VO_{2max} . VE also proved to be a significant contributor to the prediction of VO_{2max} . These results suggest that increasing VE through breathing training may positively influence VO_{2max} and performance in middle-distance runners. Future studies should formulate breathing exercises that work the respiratory muscles and test the effectiveness of breathing training in improving aerobic capacity in athletes.