

## Comparison of Astrand VO<sub>2</sub>max Prediction to a Graded Leg Ergometry VO<sub>2</sub> Max Test in Endurance Athletes

Van Horn, L., Cuomo, M., Huntbach, S., O'Donel, A., Mullin, C., Sanders, J., Braun W. (FACSM) Department of Exercise Science, Shippensburg University, Shippensburg, PA

Numerous methods for estimating aerobic power (VO<sub>2</sub>max) exist. Assessing the predictive accuracy of such estimations can be of value for gauging their generalizability. **PURPOSE:** To determine whether the Astrand submaximal protocol over/underestimates the prediction of the VO<sub>2</sub>max in aerobically trained athletes. Participants were 11 (6 male and 5 female) aerobically trained athletes, who trained at least 300+ minutes per week. **METHODS:** Subjects were tested on two protocols: 1) the Astrand and 2) a VO<sub>2</sub>max test using indirect calorimetry. Both tests were performed on cycle ergometers at a fixed RPM, with the Astrand maintaining a constant workload while the True VO<sub>2</sub>max test employed a graded test protocol. Heart rate and RPE (rate of perceived exertion) were collected throughout both protocols. **RESULTS:** The Astrand protocol tended to predict a higher aerobic power ( $57.6 \pm 8.3 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ ) vs. the actual VO<sub>2</sub>max ( $50.0 \pm 8.6 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ ) determination ( $p=0.054$ ). The Pearson correlation between the predicted VO<sub>2</sub>max and actual VO<sub>2</sub>max was  $r = 0.088$ , with a  $p$ -value of 0.796 between the two variables. **CONCLUSION:** There was a 15% over-prediction found when comparing the Astrand to the measured aerobic power as determined from graded exercise. Though on the cusp of statistical significance, this is a meaningful difference in measures. It appears that the Astrand protocol over-predicts the actual VO<sub>2</sub>max in aerobically trained individuals and the Astrand test may be more suitable for recreationally active people.