

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

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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/under-estimates 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.