**Predicting the Expenditure of Anaerobic Work Capacity (AWCexp) based on Changes to the Torque-Velocity Curve**

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**Background**

- Some cancer risks can be reduced by physical activity, but assessment is often self-reported and imprecise.
- Must establish individuals' objective, quantitative, and predictive measures for non-invasive means of activity levels.

Cycling is an effective model for activity assessment and this study is to demonstrate how 3 tests can determine an individual's Anaerobic Work Capacity (AWC), the threshold between heavy and severe exercise known as Critical Power (CP), and the correlation between AWC expended (AWCexp) and changes to the torque-velocity curve (T-v).

**Proposed Model**

**Methods**

- **Subjects**
  - Male (n=10) and female (n=2) subjects, regularly trained cyclists or triathletes. Age (37.8 ± 11.6). Weight (72.7 ± 11.6).
- **Exercise at increasing powers until exhaustion.**
- **Exercise for a set time at “all-out” power. CP6 last 30 second average, AWCexp area under the curve.**

3 Separate T-v sprints, each at different AWCexp fatigue levels based on predicted 6-min exhaustive power (CP6).

**Results**

**Figure 1. 3 Min-All-Out Protocol**

- Time (3 Minutes)
- Chart with CP and AWC over 30 seconds.

**Figure 2. Sprint Protocol (After Initial Fresh Sprint Established)**

- CP6 33% AWCexp
- CP5 67% AWCexp
- 2 min 8-sec 4 min 8-sec

**Figure 3. Effects of AWCexp on T-v Curve**

- Fresh Sprint
- Fatigue Sprint 1
- Fatigue Sprint 2

**Figure 4. Effect of AWCexp on T/Tmax, V/Vmax, and Area under T-v curve**

- Pearson Correlation Significance
  - *p<.05
  - **p<.01

**Conclusions**

- Our protocols can individualize exercise prescription by determining the threshold between moderate and vigorous exercise.
- Potentially, at any moment in time, changes to the T-v curve during a 6-second sprint could determine a subject's state of fatigue or remaining AWC.

**References**


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