23. SWACSM Abstract

Do Sex Differences Exist in Critical Power and W'?

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ABSTRACT

Among world-class athletes, biological males tend to be faster and stronger than biological females, in part due to differences in body composition, such as lower body fat percentage and increased muscle mass. Critical power (CP) represents the highest intensity that elicits compensable and sustainable disturbances to homeostasis, while W' is the amount of work and its associated metabolic disturbance that can be tolerated above CP. Together, CP and W' strongly influence endurance performance. **PURPOSE:** To determine if sex-based differences in CP and W' exist when normalizing for lean muscle mass. **METHODS:** We recruited 20 non-endurance trained individuals (10 female and 10 male, age= ~25.7yrs). VO_2max was first determined through a graded exercise test on a cycle ergometer. The subjects then performed time to task failure tests at different percentages of their maximum work rate. CP and W' were determined by linear regression of the relationship between time and work for the various tests to task failure. **RESULTS:** Leg lean mass was approximately 37% less in females than males ($p<0.001$). Critical Power, in Watts, was significantly greater in males than females (168 ± 11 vs. 105 ± 7, $P<0.001$). When normalizing CP by leg muscle mass, CP was no longer different between males and females (7.87 ± 0.42 vs.7.69 ± 0.36, $P=0.740$). Absolute W' was approximately 64% less in females than males ($p<0.001$). The difference in W' persisted when normalizing for leg lean mass (females: 601 ± 18 J/kg, males: 838 ± 66 J/kg, $p=0.006$). **CONCLUSION:** Absolute CP and W' are lower in biological females than males. Sex differences in CP, but not W', appear to be mediated by differences in muscle mass. Even when normalizing for differences in muscle mass, females exhibit a lower W' than males, indicating that biological females tolerate less disturbance to homeostasis than biological males.