12. SWACSM Abstract

Are Age-Related Differences in Critical Power and Work-Prime Simply Due to Differences in Muscle Mass?

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ABSTRACT

Critical Power (CP) represents the threshold between sustainable, steady-state and unsustainable, non-steady-state exercise while Work Prime (W') represents tolerable work above CP. The combination of CP and W' potently influence exercise tolerance. We recently observed age-related reductions in both CP and W' in active adults. Age-related decreases in muscle mass, which was not measured, could account for the reduction in CP and W'. **PURPOSE**: The aim of this study was to determine if CP and W' are decreased in active, older adults when normalizing for muscle mass. **METHODS**: Single leg knee extension exercise was used to determine CP and W' on both young (18-35 years, N=10) and older (60-67 years, N=7) participants. Six tests to failure were performed on a modified cycle ergometer across multiple visits. Failure occurred when the subject was no longer able to maintain 80 rpm. CP and W' were determined by time of failure and total work performed. Participants received a DEXA scan to determine muscle mass of the right leg. **RESULTS**: Average CP for the young was 39±10 Watts and for the old, it was 33±9 Watts (p = 0.29). Average W' for the young was 2868±1507 Joules and for the old was 1523±788 Joules (p = 0.01). Average leg muscle mass was not different between young and old (p = 0.49). When divided by muscle mass of the active leg (Kg), CP for the young was 4±1.5 Watts/Kg and for the old was 4±1.3 Watts/Kg. W' for the young was 2868±1507 Joules/Kg and for the old was 1494±723 Joules/Kg. Critical Power, when normalized for muscle mass, was not significantly different (P = 0.547) with age, while W', when normalized for muscle mass was down 52% in older people (P = 0.033) **CONCLUSION**: Active older individuals have the same CP as the young, even when normalizing for muscle mass but W' is half for the old participants as the young, even when normalizing for muscle mass. The decrease in W' could represent the lower tolerance to fatigue previously reported for older adults.