SWACSM Abstract

Continuous Leg Cycling Ergometry Prescribed at Identical Relative Power Output Elicits Different Physiological Responses Versus Arm Cycle Ergometry

TANNER M. ROBSON[1], DAVID W. MCMILLAN[2], TODD A. ASTORINO[1], FACSM

[1]Department of Kinesiology; California State University San Marcos; San Marcos, CA
[2]University of Miami Miller School of Medicine; Miami, FL

Category: Undergraduate

Advisor / Mentor: Astorino, Todd A. (astorino@csusm.edu)

ABSTRACT

PURPOSE: The aim of this study was to compare physiological and perceptual responses to progressive moderate intensity continuous exercise (MICE) between leg (LCE) and arm cycle ergometry (ACE). **METHODS**: Seventeen active men and women (age and percent body fat = 26 ± 7 yr and 18 ± 3 %) initially performed graded exercise on each modality to assess maximal oxygen uptake (VO_2max) and peak power output (PPO). Using a randomized crossover design, they subsequently performed 45 min of MICE consisting of three 15 min bouts at 20, 40, and 60 % PPO on each modality. Gas exchange data (VO_2, VCO_2, V_E, and respiratory exchange ratio (RER), heart rate (HR), blood lactate concentration (BLa), affective valence, and rating of perceived exertion (RPE) were acquired during each bout. **RESULTS**: Compared to ACE, LCE revealed significantly higher ($p < 0.05$) peak (94 ± 6 vs. 88 ± 9 %HRmax, d = 0.81) and mean HR (73 ± 6 vs. 66 ± 6 %HRmax, d = 1.20) and VO_2 (54 ± 5 vs. 50 ± 7 %VO_2max, d = 0.68). Time spent above 70 (22 ± 7 vs. 15 ± 8 min, d = 1.03) and 80 %HRmax (15 ± 6 vs. 9 ± 6 min, d = 1.04) was significantly greater with LCE versus ACE. LCE revealed significantly higher BLa versus ACE (5.5 ± 2.0 vs. 4.7 ± 1.5 mM, d = 0.48). **CONCLUSIONS**: These results exhibit that progressive leg cycling at identical intensities elicits a greater cardiometabolic stimulus than arm ergometry. Moreover, leg cycling leads to greater duration spent at intensities between 70 – 89 %VO_2max which may have application to selecting specific exercise modes when prescribing MICE to increase cardiorespiratory fitness. Lastly, use of %PPO led to participants being classified in different intensity domains which merits prescribing MICE according to various threshold measures rather than relative intensities acquired from incremental exercise.