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KENT STATE UNIVERSITY
College of Education, Health, and Human Services

DOCTORAL DISSERTATION DEFENSE

of

Edward Z. Pelka

For the degree of

Doctor of Philosophy

Exercise Physiology

VASCULAR AND MITOCHONDRIAL
RESPONSES TO CONTINUOUS SINGLE AND
DOUBLE LEG CYCLING

August 6th,
12:00 p.m.
MACC Annex 272
Kent State University
Edward Z. Pelka

Master of Science in Kinesiology and Health
Miami University, 2021

Bachelor of Science in Kinesiology and Health
Miami University, 2019

Eddie is a PhD Candidate at Kent State University. Over the last three years he has assisted with research in the Vascular Health Laboratory and taught numerous Exercise Science courses such as Exercise Programming and Introduction to Exercise Science.

In the research lab, Eddie has worked with a variety of different equipment such as near-infrared spectroscopy and doppler ultrasound on numerous projects. He has been able to present this research at various regional and national conferences within his field.

Eddie plans to continue his passion in exercise physiology and be the best person he can be. He plans to continue this through educating others regarding the importance of exercise. He also believes you should practice what you preach and will continue to maintain an active lifestyle.

Vascular and mitochondrial responses to continuous single and double leg cycling

The present study sought to determine if single and double leg cycling results in acute alteration in skeletal muscle oxidative capacity and vascular function.

Ten individuals completed 30-minutes of single and double leg cycling at 60% of their double leg VO$_2$ max. Measures of skeletal muscle oxidative capacity, flow-mediated dilation (FMD), reactive hyperemia and single passive limb movement (sPLM) were assessed prior to exercise, as well as one- and two-hours post exercise. Additionally, substrate utilization, heart rate and power were measured throughout the 30-minutes of cycling.

There were no differences in VO$_2$ across 30-minutes of cycling. However, single leg cycling resulted in a significantly greater heart rate, carbohydrate oxidation and limb specific power. There were no condition by time interactions for measures of skeletal muscle oxidative capacity, reactive hyperemia and single passive limb movement. However, there was a significant main effect of time for skeletal muscle oxidative capacity. Additionally, there was a significant condition by time interaction for %FMD, in which single leg cycling resulted in a significant reduction in %FMD one-hour post cycling. Collectively, this suggests single leg cycling results in acute alteration to numerous biological systems that may be beneficial for various populations.