

## **The Effects of Different Intensities on Eccentric Cycling Blood Flow Patterns at a Concentric Cycling Workload Match**

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### **ABSTRACT**

Decrease of blood flow to tissues, due to plaque built by atherosclerosis, increases mortality and morbidity. Homeostatic balance in the vascular system depends directly on endothelial cells, and blood flow, better known as endothelial sheer stress (ESS). Different types of blood flow patterns have been established measured by Reynolds number (Re), and turbulent flow has been associated with the decrease of ESS. Eccentric exercise (ECC) has gained attention as a novel exercise modality that increases muscle performance without increasing metabolic demands; however, little is known about ESS during ECC. **PURPOSE:** To determine the effects of ECC cycling in blood flow patterns in young, apparently healthy individuals. **METHODS:** 18 apparently healthy participants, were recruited for two laboratory visits. First visit served to obtain maximum oxygen consumption and peak power (PP), to determine workload intensities, followed by a 5-min familiarization on eccentric ergometer. Second visit on eccentric ergometer assessed blood flow patterns (i.e. ESS and Re measured via imaging ultrasound and Doppler) during a 3-workload steady exercise test at low, moderate, and high intensities. **RESULTS:** There was an interaction of exercise intensity on antegrade ESS ( $F(3,53.7)=26.90$ ,  $p<0.001$ ), but not Sex ( $p>0.05$ ), and a random effect of participant ( $p<0.001$ ) and Re anterograde ( $F(3,53.6)=25.03$ ,  $p<0.001$ ), but not Sex or random effect of participant ( $p>0.05$ ). There was an interaction of condition on retrograde ESS ( $F(3,53.4)=11.21$ ,  $p<0.001$ ), but not Sex ( $p>0.05$ ), and a random effect of participant ( $p<0.001$ ), and Re retrograde ( $F(3,54.3)=12.34$ ,  $p<0.001$ ), Sex ( $F(1,18.5)=4.41$ ,  $p=0.05$ ), and random effect of participant ( $p>0.05$ ). **CONCLUSION:** Eccentric cycling exercise produces exercise-induced blood flow patterns that are intensity-dependent in males and females and these patterns are similar to traditional concentric cycling.