

## **Impact of Mask-Wearing During High-intensity Interval Training on Exercise Hemodynamics**

LUKE HEIKKA, PAYTON PRICE, MALIA NOWLEN, RYAN GUENETTE, RUTHIE LARSON, ADARIUS WEST, JUSTIN EMELIFE, SARA BURTON, SOFIA HARMAN, TONY ACEVEDO, & ZACHARY ZEIGLER

GCU POWER Lab; College of Science, Engineering and Technology; Grand Canyon University; Phoenix, AZ

---

*Category: Undergraduate*

*Advisor / Mentor: Zeigler, Zachary (zachary.zeigler@gcu.edu)*

### **ABSTRACT**

As the guidelines regarding the COVID-19 pandemic regressed, allowing the re-opening of health centers, many established regulations required mask-wearing during exercise to limit transmission of the virus. Current literature suggests that the impact of a mask during exercise has minimal effects on exercise hemodynamics. However, limited data exists measuring blood pressure, cardiac output, and systemic vascular resistance during high-intensity exercise. **PURPOSE:** The purpose of this study was to examine the impact of mask-wearing on exercise hemodynamics. **METHODS:** Nine total participants aged 18-30 yr were recruited for this experimental cross-over study. This within subject design involved six randomized conditions; control no mask, no exercise (CON-NE), control-surgical mask, no exercise (CON-SUR), control-exercise, no mask (CON-E), exercise surgical mask (EXS-SUR), exercise N95 mask (EXS-N95), and exercise cloth mask (EXS-CL). The exercise protocol used was a HIIT 4 x 3 on a cycle ergometer. Participants exercised at 85% of VO<sub>2</sub>max for 4 minutes followed by a 3-minute rest period, repeated 4 times. Measurements of cardiac output (Q), stroke volume (SV), heart rate (HR), systemic vascular resistance (SVR), and brachial/central blood pressure (BP) was measured during exercise. **RESULTS:** There was no statistically significant difference between any exercise group on outcomes of HR ( CON-E: 172 ± 11, EXS-SUR: 171 ± 13, EXS-CL: 178 ± 9, EXS-N95: 177 ± 10, P=0.564), SBP (CON-E: 160 ± 26, EXS-SUR: 160 ± 23, EXS-CL: 166 ± 24, EXS-N95: 157 ± 22, P=0.913), DBP (CON-E: 70 ± 13, EXS-SUR: 69 ± 9, EXS-CL: 67 ± 11, EXS-N95: 75 ± 7, P=0.986), SV (CON-E: 102 ± 43, EXS-SUR: 85 ± 48, EXS-CL: 107 ± 44, EXS-N95: 100 ± 42, P=0.073), or SVR (CON-E: 1942 ± 4425, EXS-SUR: 3175 ± 6486, EXS-CL: 1270 ± 2601, EXS-N95: 1311 ± 4034, P=0.123). **CONCLUSION:** This study is consistent with current literature in suggesting that mask-wearing during exercise, even at high intensity has no effect physiologically during exercise.