

## Comparison of Physiological Responses and Perceived Respiratory Resistance Among Mask Usage During Exercise

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### ABSTRACT

Since the beginning of the COVID-19 pandemic, the use of a face mask in public is recommended when social distancing cannot be maintained to decrease the spread of the virus with many fitness facilities requiring their patrons to wear a face mask during exercise. The physiological response of wearing a face mask during exercise is relatively unknown and is speculated among the media resulting in contradicting messages conveyed to the public **PURPOSE:** The purpose of this study was to determine if a face mask influenced performance (time to exhaustion), physiological responses (heart rate, oxyhemoglobin saturation and temperature) and subjective measurements such as dyspnea, perceived respiratory resistance, and rating of perceived exertion (RPE) during exercise. **METHODS:** Fifteen healthy males (n=8) and females (n=7) completed three graded exercise treadmill tests with (1) a surgical face mask, (2) a cloth face mask, and (3) no mask randomly with at least 48hrs apart. Heart rate (HR), oxyhemoglobin saturation (SpO<sub>2</sub>), temperature, RPE, dyspnea, was measured throughout exercise. Participants rated their perceived respiratory resistance for each condition at rest, beginning of exercise, and at fatigue using a 100 mm visual analog scale. **RESULTS:** Significant differences ( $p < 0.05$ ) were observed in perceived respiratory resistance between no mask and both surgical and cloth conditions at rest ( $1.55 \pm 2.34$ mm;  $6.33 \pm 6.11$  mm;  $9.67 \pm 10.77$ mm respectively) and at the beginning of exercise ( $5.93 \pm 6.64$ mm;  $15.47 \pm 12.56$ mm;  $21.07 \pm 15.04$ mm respectively). During stage 3 of the exercise test, the no mask condition had a significantly lower RPE compared to the cloth mask condition ( $13.22 \pm 2.14$ ;  $14.60 \pm 2.13$  respectively). Time to exhaustion was similar for all conditions (mask:  $11:51 \pm 2:31$ min; cloth:  $11:16 \pm 2:24$ min; surgical:  $11:32 \pm 2:23$ min). At all times points, there was no significant ( $p > 0.05$ ) difference between the conditions for HR, SpO<sub>2</sub>, temperature, and dyspnea. **CONCLUSION:** Wearing either a surgical or cloth face mask is safe during exercise in healthy adults and has no effect on HR, SpO<sub>2</sub>, or body temperature. It appears that wearing a face mask may have a minor influence on subjective measurements such as perceived respiratory resistance or RPE during exercise.