

Can Cerebral Hemodynamics Explain the Changes in Cognition Associated With Wearing a Facemask During Exercise?

AXEL MUNOZ, VIVIANA GARCIA, CEREN ACIK, & STEFAN KESLACY

Brain Performance Lab; Kinesiology; California State University, Los Angeles; Los Angeles, CA

Category: Masters

Advisor / Mentor: Keslacy, Stefan (skeslac@calstatela.edu)

ABSTRACT

The use of facemask while exercising raises concerns about oxygen supply. Recent studies have found a decrease in exercise performance. An increased HR, RPE, and laborious breathing were reported when exercising with a mask. However, there is a knowledge gap on exercising with a mask on brain function. **PURPOSE:** to evaluate the effect of wearing a KN95 mask on cerebral hemodynamics and cognitive function. **METHODS:** 4 subjects participated in this preliminary study. They visited the lab twice and we randomized wearing a mask. Subjects completed a computerized Wisconsin Card Sorting Test (WCST, Psychtoolkit.org) before, during and 2' after an exercise. Reaction time, errors and correct sorting were measured. The exercise consisted of cycling for 5' at 90 watts (Monark cycle ergometric 828 E). Cerebral oxygenation, deoxygenation, and total hemoglobin (CerO₂, CerDeoxy and CerTTHb) were collected continuously using an Oxymon Mk III near-infrared spectroscopy (NIRS, Artinis Medical Systems, NH). **RESULTS:** Our preliminary data showed that wearing a mask induced a slower reaction time before (1270ms vs. 1464ms), during (1335ms vs. 1368ms) and after (1144ms vs. 1329ms) the exercise. The WCST showed no effect of the mask before (correct 52 vs. 52 and errors 7 vs. 8) or after the exercise (correct 53 vs. 53; errors 7 vs. 7). In addition, subjects had more correct sorting and fewer errors during the exercise with no mask (correct 44 vs. 51; errors 16 vs. 9). For brain oxygenation, we found a diminished CerO₂ before and during the exercise (-1.87, -16.17) and an increase after the exercise (52.46). No changes for CerDeoxy before (0.19), but a decrease during and after the exercise (-6.42 and -7.42). For CerTTHb, we found an increase before (1.80) and a decrease during and after the exercise (-4.17, -14.36). **CONCLUSION:** The preliminary findings showed that wearing a KN95 mask may affect cognition during exercise but not before or after. This could be related to a diminished CerO₂.