**Effect of exercise duration on post-exercise persistence of oxyhemoglobin changes in the premotor cortex: A near-infrared spectroscopy study**

**A. Tsubakia**, S. Morishitaa, Y. Tokunagaa, D. Satoa, W. Qina, and H. Onishia

*a Institute for Human Movement and Medical Sciences, Niigata University of Health and Welfare, Japan*

*Corresponding author e-mail address: tsubaki@nuhw.ac.jp*

**Abstract:** Measurement of cerebral oxyhemoglobin (O2Hb) changes in the cerebral cortex using near-infrared spectroscopy shows that the levels increase during moderate-intensity exercise and persist after the exercise. However, the effects of exercise duration on O2Hb persistence in the premotor cortex (PMC) are unknown. We aimed to compare the effects of exercise duration on the persistence of O2Hb changes after moderate-intensity cycling exercise. We recruited healthy young volunteers to participate in this study. After an incremental exercise test on a cycle ergometer to determine the VO2 peak, the subjects performed another cycle ergometer exercise on a different day. After a 3-min rest period, the exercise was initiated at a workload corresponding to 50% VO2 peak. The exercise continued for 10 min (8 women, total of 12 subjects) and 20 min (9 women, total of 12 subjects), followed by a 15-min rest. Nine subjects (8 women) participated in both exercises. The O2Hb levels in the right (R-PMC) and left premotor cortex (L-PMC) were measured using a 34-channel near-infrared spectrometry system. The results were expressed as changes from the mean pre-exercise rest-phase values. To compare the effects of exercise duration on the persistence of O2Hb after exercise, the values measured during the 15-min post-exercise rest period were averaged, and an unpaired *t*-test was performed. Statistical significance was set at p < 0.05. The O2Hb values during the 15-min post-exercise rest period in the R-PMC were 0.010 ± 0.011 mM･cm after the 10-min exercise and 0.035 ± 0.010 mM･cm after the 20-min exercise, without significant differences (p = 0.104). The O2Hb value in the L-PMC during post-exercise rest was 0.055 ± 0.010 mM･cm after the 20-min exercise, which was significantly higher than the 0.023±0.007 mM･cm after the 10-min exercise (p = 0.014). Thus, the effects of exercise duration on O2Hb persistence has laterality in PMC.

Reference

Tsubaki A, et al. Adv Exp Med Biol. in press.

Acknowledgements

This study was supported by a Grant-in-Aid for Scientific Research (C) from the Japan Society for the Promotion of Science and a Grant-in-Aid for Exploratory Research from Niigata University of Health and Welfare.

I prefer:  