**A comparison of the effects of continuous and intermittent exercise on cerebral oxygenation and cognitive function**

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**Abstract:**

Introduction: The purpose of this study was to clarify the influence of cerebral oxygenation on cognitive function after continuous and intermittent exercise.

Methods: This study included 18 healthy adults. For the continuous exercise protocol, 5 minutes of rest was followed by 30 minutes of exercise; 5 minutes of rest was provided after exercise. In the intermittent exercise protocol, 3 sets of 10 minutes of exercise were completed, with 5 minutes of rest in between sets. Exercise intensity was 50% of maximum oxygen uptake. Oxyhemoglobin (O₂Hb) in the left prefrontal cortex (PFC) was measured in each protocol, and cognitive tasks (Stroop test) were performed before and after exercise.

Results: Left PFC O₂Hb was significantly higher post-exercise than pre-exercise in both conditions (continuous: pre-exercise = 0.0006 ± 0.001 AU, post-exercise = 0.08 ± 0.01 AU; intermittent: pre-exercise = 0.0005 ± 0.0005 AU, post-exercise = 0.09 ± 0.02 AU; p < 0.01). The average reaction time (RT) in the Stroop test was significantly shorter post-exercise than pre-exercise in both conditions (continuous: pre-exercise = 763.1 ± 35.1 ms, post-exercise = 711.2 ± 34.0 ms; intermittent: pre-exercise = 729.2 ± 25.2 ms, post-exercise = 689.7 ± 20.9 ms; p < 0.01). Error rate pre- and post-exercise was not significantly different in both conditions (continuous: pre-exercise = 3.8 ± 0.9%, post-exercise = 2.2 ± 0.5%; intermittent: pre-exercise = 2.5 ± 0.7%, post-exercise = 1.8 ± 0.4%; continuous: p = 0.22; intermittent: p = 0.44). Furthermore, there is no significant difference between the conditions in all measurement results (O₂Hb: p = 0.64; average RT: p = 0.50; error rate: p = 0.24).

Conclusion: O₂Hb was higher after exercise than before exercise in both conditions, and the average RT was shortened. Therefore, Left PFC O₂Hb rises even after intermittent exercise and can be suggested improve cognitive function.

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