**Preparatory changes in the cerebral and muscle oxygenation before maximal voluntary handgrip exercises; A NIRS study**

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**Purpose:** Preparatory sympathoexcitation before voluntary exercise is probably regulated by central command. This study examined the influence of central command before a voluntary exercise on oxygenation in cerebral cortex and forearm flexor muscle by near-infrared spectroscopy (NIRS).

**Methods:** Thirteen young healthy males participated in the two experiments was with exercise task (ET) and without exercise task (Con). Subject was asked to perform mental rehearsal to bring out their maximal contraction at the start while maintain a constant respiratory rhythm from 120 seconds before starting the exercise in ET. On the other hand, the subjects repeated only to constant respiratory rhythm in Con. Cerebral oxygenation was measured from 10-channel NIRS. Muscle oxygenation was measured from forearm flexor muscles by 2ch NIRS.

**Results and Discussion:** During 30 seconds before the exercise in Ex, the oxyHb and totalHb in the contralateral and ipsilateral premotor cortex (PMC) were significantly higher than those in Con, and deoxyHb was lower than that in Con. The muscle tissue oxygenation index in ET was significantly higher than that in Con in both hands. These results suggested that increases in PMC activation were coupled with increased muscle oxygenation resulting from the preparation for high intensity exercise.

Keywords: near infrared spectroscopy, premotor cortex, preparation, forearm flexor muscle

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**The effects of stretching exercise on night sleep**

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**Purpose:** This study investigated whether stretching exercise before sleep affects night sleep.

**Methods:** Seven undergraduate and graduate students (mean ± SD: 22.6 ± 2.2 years of age) who did not habitually exercise participated in this study. This experiment consisted of a control session without exercise, and an hour-long stretching exercise session. Then, there were two hours of rest time before bed in both conditions. Sleep stages were discerned using polysomnography during night sleep, and sleep onset latency (SOL) and other sleep factors were analyzed.

**Results and Discussion:** As a result, the SOL in the stretching exercise sessions was shorter than that in the control conditions. In addition, the wake time after sleep onset and REM sleep latency were slightly shorter during night sleep than in the control condition. There were no effects on other sleep factors. These findings suggest that the stretching exercise before bed promoted falling asleep and also possibly improved sleep maintenance.

**Key words:** sleep, stretching exercise, sleep onset latency, polysomnography