Hemodynamics during motor imagery of self-feeding with chopstick

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Abstract:
Motor imagery (MI) is defined as the act of mentally simulating movement without motor execution (ME). Previous studies have revealed that MI activates brain regions similar to ME, and mental practice (MP), in which MI is repeated to improve the performance of motor tasks, is attracting attention in the rehabilitation field. Many studies have been reported comparing brain activity during ME and MI. However, most of these reports focus on simple movements, and there are no reports on complex tasks that are required as rehabilitation tasks. It is necessary to clarify cerebral hemodynamics during MI tasks involving complex movements. Therefore, in this study, near-infrared spectroscopy (NIRS) was used to compare the cerebral hemodynamics during the ME and MI tasks of self-feeding activity with chopsticks, and during the MI tasks of the dominant and non-dominant hands. Experiment 1 involved 21 right-handed healthy adults, experiment 2 involved 20 right-handed healthy adults. The task was to eat pickled cucumbers on a small plate with chopsticks. In experiment 1, the task was performed under two conditions, dominant hand ME and dominant hand MI, and in experiment 2, the task was performed under two conditions, dominant hand MI and non-dominant hand MI. For both experiments, a two-way ANOVA with two factors of regions of interests and condition was performed. ME and MI in the goal-oriented complex movement of self-feeding activity are not completely consistent in brain activity, and it was recognized that there are areas in which MI causes higher activation. It was speculated that this was due to the difference in the degree of involvement of cognitive processes in ME and MI. In addition, it was suggested that the difference in cerebral hemodynamics between dominant and non-dominant MI may be affected by the difference in MI vividness.

Biography:
Dr. Moemi Matsuo is an occupational therapist, PhD (Medical) working for Nishikyushu University as a junior associate professor. Her previous project was regarding neuroscience, especially motor imagery and mental practice using neuroimaging system. Additionally, she has five years clinical experiences at the hospital regarding field of physical disfunctions include stroke, intractable neurological disease, dementia, respiratory and cardiac diseases, and so on. Moreover, worked with the government and educational institutions for researches and educational systems on the pediatric field. Her main research theme is relating "neurosciences and occupational therapy", interested in verifying effects of occupational therapy and establishing new rehabilitation methods focused on brain functions. Her next project is "Development of attentional function evaluation method using EEG and machine learning."