

EFFECTS OF EEG-BASED ACTIVE ASSISTED NEUROFEEDBACK THERAPY ON HEMIPLEGIC UPPER EXTREMITY MOTOR FUNCTION

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The purpose of this thesis was to investigate the effect of EEG-based active assisted neurofeedback therapy (AANT) on stroke patients to improve both their upper extremity functionality and brain activity. Twenty chronic hemiplegic patients were included in this study. The subjects were assigned to two groups (10 per group), the control, which received only physical therapy and the experimental, which additionally received AANT. Subjects in both groups underwent routine physical rehabilitation, involving 30 minutes of exercise, 3 times/week for 4 weeks. Subjects in the experimental group performed an active assisted wrist extension exercise, which was combined with EEG neurofeedback. AANT was performed for 1 hour, 3 times/week for 4 weeks. Specifically, the subjects were asked to try extending their wrist and finger while looking at a monitor, which depicted the magnitude of real-time mu rhythm from the EEG. After an obvious voluntary suppression of the mu rhythm was achieved with the initiation of the wrist/finger extension, a physical therapist assisted the participant to attain full wrist and finger extension. The outcome variables of pre- and post- treatment evaluation included the EEG mu rhythm. We found that the electromyogram (EMG) activity and upper extremity Fugl-Meyer Assessment (FMA) score were significantly increased in patients of the experimental than in those of the control group. In addition, there was a significant increase in brain activity of the affected (contralateral) sensorimotor area (SMA) in the experimental, but not in the control group. Spasticity, on the other hand, was significantly decreased in the experimental, but not in the control group. According to the results of this experiment, AANT improved brain activity in the affected SMA as well as upper extremity functionality in stroke patients. Therefore, we suggest neurofeedback therapy combined with proper physical guidance, as a promising treatment option for chronic stroke patients.

BIOGRAPHY

JooHee Park has completed her doctoral degree at the age of 31 years from Yonsei University and post-doctoral course from Yonsei University School of Physical Therapy. HyeSeon Jeon is professor of Yonsei University.

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