EVALUATION OF THE BRAIN ACTIVITY BY fNIRS AT THE FACILITY OF TAKIZAWA METHOD ENFORCING

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[Background and Purpose]
We report our study of Brain activity using the functional near-infrared spectroscopy (fNIRS) by performing motivative and passive exercise on the lower extremities. We compare the legs motivative exercise which is a simultaneous legs training, leaded by unaffected side with the passive exercise, in order to clarify the feature which the motivative exercise activate the brain

[Method]
Subjects were 10 cerebrovascular disorder patients. (7 cerebral infarction, 2 intracerebral bleeding and 1 brain tumor). 5 women and 5 men are 67 to 81 years old (the average age is 74 years old). The activated part of the brain during the time when the passive exercise of a paralysis side leg joint performed and when the both legs were exercised together with the motivative exercise equipment were investigated. The FOIRE-3000 by Shimazu Corporation was used for fNIRS extermination. The test was conducted during December 8 to 10, 2009 with the passive exercise to a paralysis side leg or knee and the motivative exercise for their both leg or knee by using the devises simultaneously at the test. We made a task cycle for each patient, which is 20 seconds rest from a start - 30 seconds task - 20 seconds rest and performed three cycles. The evaluation was determined by the load average of the three cycles exercise. This analysis was performed using the Functional Optical Imager for Research (FOIRE) software equipped with FOIRE-3000 and performed multiple examination of the oxy hemoglobin (OxyHb) change at the time of rest and task. The yellow frames in Fig 1 and 2 show the significant difference at the points of measurement and the white frame show no significant difference.

[Result]
As for comparing passive exercise performed by a physiotherapist and motivative exercise, the motivative exercise shows brain broadly active ($P=0.000$). We show the result on Fig.1-1 and Fig.1-2 for the passive exercise effects and Fig.2-1 and Fig.2-2 for the motivative exercise effects. We used SPSS Ver15 for analysis, and used Wilcoxon signed rank test and T Test for examination and made ($P<0.05$) was significant.

[Consideration]
It shows that the motivative exercise using PATAKORO influences brain activity in the larger range than the passive exercise which PT performs, and it is seemingly made the brain activate. It is predicted that giving activation to a brain through a convalescence and chronic term due to enabling to obtain a brain activity stimulus in the large range by Motivative exercise which anyone can performs by Patakoro devices which can be introduced easily.

Fig.1-1  Fig.1-2: the passive exercise effects.
Fig.2-1  Fig.2-2: the motivative exercise effects.

This is the evaluations of the patient who has a disease of a brain tumor, right hemiplegia, epilepsy, a hernia of intervertebral disk, osteoarthritis in right knee, right humerus neck fracture, and asthma. The brain figures use the standard brain.