Brain activity measurement at performing motivative exercise vs passive exercise by Functional Near-Infrared Spectroscopy (Inpatient of Geriatric Health Services Facility) R000006968

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Key words: inpatient, post-stroke elderly, Takizawa Method Rehabilitation, motivative exercise, brain function, fNIRS

[Abstract]
We have reported the significant outcome of the Takizawa Method Rehabilitation here over the course of many years. The investigation of the mechanism is required therefore we planned to perform brain function evaluations using functional near-infrared spectroscopy (fNIRS). It is the intention of clarifying the specificity by comparing the Motivative exercise by the unaffected side priority to the passive exercise as seen in the many studies done. We selected 13 subjects by consent among inpatients of the Geriatric Health Services Facility. The motivative exercise significantly made the brain broadly active (P <0.05) for comparing the autonomous motivative exercise to the passive exercise by the physical therapist. This study proves the mechanism of the effective method that we have used for many years in our organization.

[Introduction]
We have reported the significant outcome of the Takizawa Method Rehabilitation here over the course of many years since publication of the book Make a Bedridden Elderly Walk in 1996 and the original articles for the reports that we could make over 30% of 200 bedridden elderly walk. Therefore the investigation of the mechanism is required for the Motivative exercise that is a core exercise program, we planned to perform brain function evaluations using functional near-infrared spectroscopy (fNIRS). The property, has since reportedly "re-acquired to that fact a lot of walking," a research report of the Takizawa method has for many years become an autonomous rehabilitation method supported by the research and publication of the 1996 Make a Bedridden Elderly Walk. This study was permitted by the ethi cal committee of the Biophilia Rehabilitation Academy and recorded to the UMIN as the clinical test number R000006968.

[Method]
It is the intention of clarifying the specificity by comparing the Motivative exercise by the unaffected side priority to the passive exercise as seen in the many studies done. We selected 13 subjects by consent among inpatients of the Geriatric Health Services Facility. The evaluation criteria used was the ADL evaluations that were used in the outpatient services. We examined the activation region of the brain at the time of performing bilateral simultaneous ankle and knee training named the motivative exercise by using devices and the passive exercise. We used FOIRE-3000 manufactured by Shimadzu Corp as the NIRS device. We measured 45 channel 14 set as the sending and receiving optical fiber. The Test was carried out for 4 days, April 4-9, 2010. The Patients tasks were the bilateral simultaneous and autonomous ankle and knee training by using the motivative exercise devices and the passive exercise. 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 change at the time of rest and task by the Bonferron's Method that was set to level 0.001 significance. In order to clarify an fNIRS evaluation, we picturized the head individually by the nuclear magnetic resonance imaging (MRI).

[Result]
The motivative exercise significantly made the brain broadly active (P <0.05) for comparing the autonomous motivative exercise to the passive exercise by the physical therapist.

[Discussion]
The elderly who require nursing care are increasing rapidly with the natural progression of aging throughout the world. There are 6,540,000 baby boomers, born from 1947-49 by the national census in 2010; the rapid increase in a population needing care will be expected approximately 15 years after due to them becoming of suitable age requiring care. A development of an effective rehabilitation method is an important subject even if it exceeds to rehabilitate in an acute term and in the convalescent stage towards the unprecedented sustainable aging society. This study proves the mechanism of the effective method that we have used for many years in our organization.