



Case Study

Effects of task-oriented training on upper extremity function and performance of daily activities in chronic stroke patients with impaired cognition

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Abstract. [Purpose] This study aimed to determine the effects of task-oriented training on upper extremity function and performance of daily activities in chronic stroke patients with impaired cognition. [Subjects and Methods] In this study, 2 chronic hemiplegic stroke patients underwent task-oriented training. The training was conducted once a day for 30 minutes, 5 times/week, for 2 weeks. The patients were evaluated 3 times before and after the task-oriented training. Changes in upper extremity function were assessed using the manual function test, and changes in the ability to carry out daily activities were assessed using the functional independence measure. [Results] The patients showed improvement in both the upper extremity function and ability to perform daily activities after task-oriented training. [Conclusion] Task-oriented training was proven effective in improving upper extremity function and ability to perform daily activities in chronic hemiplegic stroke patients with impaired cognition.

Key words: Task-oriented training, Stroke, Upper extremity function

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INTRODUCTION

Task-oriented training, a rehabilitation intervention used in patients with neurological damage, is patient- and task-focused, and is not therapist-focused¹⁾. It involves training to improve the patient's ability to achieve set goals for task completion and to develop problem-solving skills and effective compensatory strategies by improving patient adaptability in diverse circumstances^{2, 3)}. In this training, it is assumed that providing stroke patients with opportunities to attempt problem solving during functional tasks is more effective in improving upper extremity function and performance of daily activities than repetitive practice of normal movement patterns⁴⁾.

However, task-oriented training has been criticized by most studies as being inadequate in its application in patients with impaired cognitive functions^{5, 6)}; it has therefore been difficult to apply this task-oriented approach in patients with stroke, which is often accompanied by impaired cognitive function. In this study, the therapeutic effects of a 2-week task-oriented training program on upper extremity function and performance of daily activities in stroke patients with impaired cognition were explored.

SUBJECTS AND METHODS

This study involved 2 patients with post-stroke hemiplegia, who were receiving treatment in hospital D in Korea. From a group of voluntary patients, those who understood the objectives and content of this study and displayed intent for active participation were chosen as subjects for this study. An informed consent form was signed by the subjects and their guardians

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after they received information on the study purpose and method. Additionally, the present study was approved by the Inje University Faculty of Health Science Human Ethics Committee. The general characteristics of the subjects are presented in Table 1.

Subject 1 was a 58-year-old man diagnosed with left hemiplegia of 19 months' duration caused by an infarction of the middle cerebral artery. Subject 2 was a 62-year-old man suffering from left hemiplegia of 21 months' duration caused by an infarction of the middle cerebral artery. Both subjects were right-handed before the onset of hemiplegia and were receiving 30 minutes each of conservative physical therapy and occupational therapy, 5 times/week. The subject selection criteria were as follows: patients diagnosed with stroke by a specialist, with a Mini-Mental State Examination-Korea (MMSE-K) score ≤ 19 corresponding to confirmed dementia, without hemi-neglect phenomenon, and with Brunnstrom recovery stage ≥ 4 .

An interrupted time series (ITS) design was used in this study to determine whether task-oriented activity had a greater effect than natural recovery on upper extremity function and activities of daily living in post-stroke individuals. The subjects were evaluated 3 times each, for 3 weeks, before and after the intervention. The selected methods of evaluation were the functional independence measure (FIM) for evaluating the ability to carry out daily activities and the manual function test (MFT) for evaluating upper extremity function. The FIM is used widely for subjective evaluation of disabled patients' ability to carry out daily activities, with a certified reliability of 0.83–0.96⁷⁾. MFT is a simple evaluation method that assesses the recovery process and upper extremity function during daily living activities. Its test-retest reliability and inter-rater reliability have a steadfast Cronbach alpha coefficient ≥ 0.95 and internal consistency validity ≥ 0.95 ⁸⁾.

This study used the task-oriented training program introduced by Park and Yoo, which was conducted once a day for 30 minutes, 5 times/week, for 2 weeks. Task-oriented training consisted of 6 tasks that could be performed by the patients on their own: changing clothes, throwing a tennis ball into the basket, piling up cones, moving pegs, polishing the table with a towel, and passing loops through a curvy pipeline.

Data analysis included descriptive analysis of mean differences to test whether this task-oriented activity had a larger positive effect on impairment than natural recovery. For each participant, individual pre-intervention data points were used to determine a mean pre-intervention score on each measure; the same procedure was followed to obtain mean post-intervention scores.

RESULTS

Table 2 presents the pre- and post-intervention upper extremity function scores and the mean differences for all parameters. All subjects demonstrated improvement in most parameters.

DISCUSSION

This study focused on exploring the possible therapeutic effects of task-oriented training on upper extremity function and performance of daily activities in chronic stroke patients with impaired cognition. Both subjects showed improved upper extremity function and performance of daily activities with task-oriented training. These results, which are not in agreement with the existing negative opinions of the effects of task-oriented training in patients with impaired cognition^{5, 6)}, propose

Table 1. General characteristics of the subjects

	Age (years)	Gender	Diagnosis	Affected side	Dominant hand	Months from stroke onset	MMSE-K
Participant 1	58	Male	Ischemic	Lt.	Rt.	19	19
Participant 2	62	Male	Ischemic	Lt.	Rt.	21	19

MMSE-K: Mini-Mental State Examination-Korea; Rt.: right; Lt.: left

Table 2. Mean pre- and post-intervention scores and mean differences

Measure	Pre-intervention mean	Post-intervention mean	Mean difference
MFT			
Participant 1	19.0	20.0	1.0
Participant 2	18.2	20.0	1.8
FIM			
Participant 1	101.0	103.0	2.0
Participant 2	98.0	100.0	2.0

MFT: manual function test; FIM: functional independence measure

positive therapeutic effects of task-oriented training in chronic stroke patients with impaired cognition. Additionally, these results support a recently published experimental result by Preissner, which reports the possibility of positive effects of task-oriented training in patients with impaired cognitive functions⁹⁾. The clinical importance of this study lies in the confirmation of the therapeutic effects of task-oriented training targeting chronic stroke patients with impaired cognition. However, this study has limitations, as the small number of patients does not allow generalization of the results, and the use of different treatment periods for the 2 subjects does not exclude the possible effect of external variables.

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