

Effectiveness of constraint-induced movement therapy on upper extremity motor function among patients with stroke: A quasi-experimental study

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Abstract

Background: Stroke is one of the leading causes of long-term disability worldwide, with upper extremity motor impairment affecting the majority of stroke survivors and significantly limiting their ability to perform activities of daily living. Constraint-Induced Movement Therapy (CIMT) is an evidence-based rehabilitation approach that promotes functional recovery of the affected upper limb by encouraging repetitive use while restricting the unaffected limb. However, evidence regarding its effectiveness in the Indian clinical setting remains limited.

Objective: To evaluate the effectiveness of Constraint-Induced Movement Therapy (CIMT) in improving upper extremity motor function among patients with stroke admitted to selected hospitals in Salem.

Methods: A quantitative quasi-experimental, non-randomized pretest–posttest control group design was conducted among 60 patients with ischemic stroke and upper extremity dysfunction. Participants were selected using a non-probability purposive sampling technique and allocated into an experimental group (n = 30) and a control group (n = 30). The experimental group received Constraint-Induced Movement Therapy in addition to routine care, whereas the control group received routine care alone. Upper extremity motor function was assessed using the Modified Fugl-Meyer Assessment (FMA) Scale and the Upper Extremity Motor Activity Log (UEMAL) before the intervention and on the 10th day after the intervention. Data were analyzed using descriptive and inferential statistics, with statistical significance set at $p < 0.05$.

Results: The experimental group demonstrated a statistically significant improvement in upper extremity motor function following CIMT. The post-test mean FMA score increased from 6.33 ± 2.26 to 11.80 ± 2.59 ($t = 14.9$, $p < 0.05$), while the post-test UEMAL score increased from 14.67 ± 6.98 to 26.83 ± 8.50 ($t = 8.45$, $p < 0.05$). Compared with the control group, the experimental group achieved significantly higher post-test scores on both the FMA ($t = 3.19$) and UEMAL ($t = 4.26$). No significant association was found between selected demographic variables and post-test motor function outcomes.

Conclusion: Constraint-Induced Movement Therapy was effective in improving upper extremity motor function among patients with stroke. Integrating CIMT into routine stroke rehabilitation may enhance functional recovery, improve independence in activities of daily living, and strengthen evidence-based nursing practice in neurological rehabilitation.

Keywords: Constraint-induced movement therapy (CIMT), stroke, upper extremity motor function, stroke rehabilitation, Fugl-Meyer Assessment, Motor Activity Log

Introduction

Stroke is one of the leading causes of mortality and long-term disability worldwide. Approximately 85% of stroke cases are ischemic, and a large proportion of survivors experience persistent motor impairments that significantly affect their functional independence and quality of life. Upper extremity dysfunction is one of the most common complications following stroke, limiting the ability to perform activities of daily living such as eating, dressing, grooming, and writing.

Constraint-Induced Movement Therapy (CIMT) is an evidence-based rehabilitation intervention that improves the functional use of the affected upper limb by restricting the unaffected limb and encouraging repetitive, task-oriented practice. The therapy promotes neuroplasticity, enhances motor recovery, and reduces learned non-use of the affected extremity. Recent studies have demonstrated that CIMT significantly improves upper extremity motor function, functional independence, and activities of daily living among patients with stroke compared with conventional rehabilitation.

Although the effectiveness of CIMT has been established in several international studies, limited evidence is available from the Indian clinical setting, particularly in Tamil Nadu. Evaluating the effectiveness of CIMT in local healthcare settings is important to strengthen evidence-based nursing practice and improve rehabilitation outcomes among patients with stroke. Therefore, the present study was undertaken to evaluate the effectiveness of Constraint-Induced Movement Therapy on upper extremity motor function among patients with stroke admitted to selected hospitals in Salem, Tamil Nadu, India.

Materials and Methods

A quantitative quasi-experimental non-randomized pretest–posttest control group design was adopted for this study. The study was conducted at Sri Gokulam Hospital and Thiru Hospital, Salem, Tamil Nadu. A total of 60 patients with stroke were selected using a non-probability purposive sampling technique and assigned to an experimental group (n = 30) and a control group (n = 30).

The experimental group received Constraint-Induced Movement Therapy (CIMT) along with routine care, while the control group received routine care alone. CIMT involved restraining the unaffected upper limb and performing task-oriented activities with the affected upper limb for 4 hours per day over 10 consecutive days.

Upper extremity motor function was assessed using the Modified Fugl-Meyer Assessment (FMA) Scale and the Upper Extremity Motor Activity Log (UEMAL) before and after the intervention. Ethical approval and written informed consent were obtained prior to data collection. Data were analyzed using descriptive and inferential statistics, including paired and unpaired t-tests and the chi-square test. A p-value < 0.05 was considered statistically significant.

Table 1: Percentage distribution of patients according to their pretest and post test scores on motor function of upper extremity according to modified Fugl Meyer Assessment scale in experimental and control group.

Sl.NO	Upper Extremity Function	Experimental Group				Control Group			
		Pretest		Post test		Pretest		Post test	
		Ff	% %	ff	% %	ff	% %	Ff	% %
1.	No motor function	7	23.33	-	-	15	50	1	.33
2.	Limited motor function	21	70	7	23.33	11	36.67	15	50
3.	Notable motor function	2	6.67	20	66.67	4	13.33	14	46.67
4.	Full motor function	-	-	3	10	-	-	-	-

Within the experimental group, significant improvements were observed between the pre-test and post-test scores on both the Modified FMA Scale ($t = 14.90$, $p < 0.05$) and the UEMAL ($t = 8.45$, $p < 0.05$), indicating the effectiveness of Constraint-Induced Movement Therapy. No significant association was found between post-test motor function scores and the selected demographic variables.

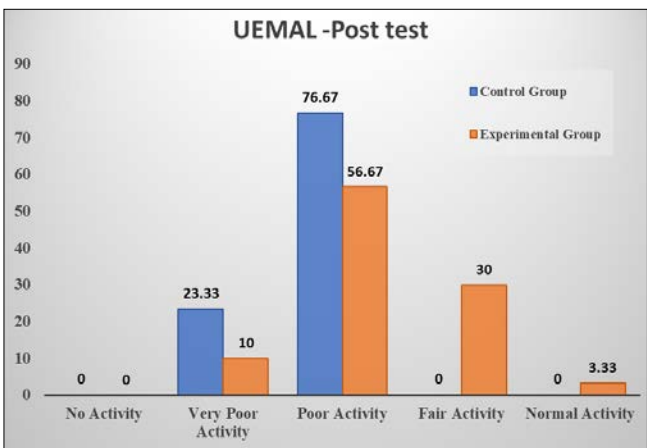


Fig 1: Percentage distribution of patients according to their pre and post test scores on motor function of upper extremity according to Upper Extremity Motor Activity Log in control group and experimental group.

Conclusion

The findings of this study demonstrated that Constraint-Induced Movement Therapy (CIMT) was effective in improving upper extremity motor function among patients with stroke. Patients who received CIMT showed significantly greater improvements in motor function than those receiving routine care alone. These findings support the integration of CIMT into routine stroke rehabilitation to enhance functional recovery, promote independence in

Results

A total of 60 patients with stroke participated in the study, with 30 patients each in the experimental and control groups. Baseline assessment showed that both groups had comparable upper extremity motor function before the intervention. Following the intervention, the experimental group demonstrated a significant improvement in upper extremity motor function compared with the control group. According to the Modified Fugl-Meyer Assessment (FMA) Scale, the post-test mean score was significantly higher in the experimental group (11.80 ± 2.59) than in the control group (9.57 ± 2.99) ($t = 3.19$, $p < 0.05$). Similarly, the Upper Extremity Motor Activity Log (UEMAL) score was significantly higher in the experimental group (26.83 ± 8.50) compared with the control group (19.40 ± 4.83) ($t = 4.26$, $p < 0.05$).

activities of daily living, and improve the quality of nursing care. Further multicentre studies with larger sample sizes are recommended to strengthen the evidence and improve the generalizability of the findings.

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