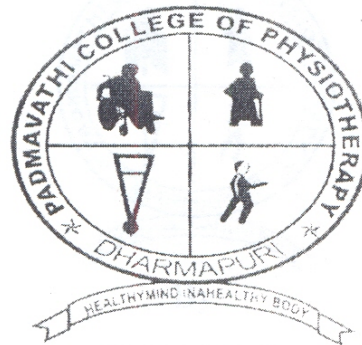


**A COMPARATIVE STUDY ON EFFECTIVENESS
OF CONSTRAINT INDUCED MOVEMENT
THERAPY VERSUS CONVENTIONAL THERAPY
IN IMPROVING UPPER LIMB FUNCTIONAL ON
PATIENTS WITH STROKE**



By

(Reg. No . 27101808)

**PADMAVATH COLLEGE OF PHYSIOTHERAPY
PERIYANAHALLI
DHARMAPURI**

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Submitted in Partial fulfillment of the requirements for the

Degree of **Master of Physiotherapy**

From

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

**PADMAVATH COLLEGE OF PHYSIOTHERAPY
PERIYANAHALLI
DHARMAPURI**

CERTIFICATE

This is to certify that the project entitled “**A COMPARATIVE STUDY ON EFFECTIVENESS OF CONSTRAINT INDUCED MOVEMENT THERAPY VERSUS CONVENTIONAL THERAPY IN IMPROVING UPPER LIMB FUNCTIONAL ON PATIENTS WITH STROKE**”



Submitted by the candidate

(Reg. No . 27101808)

is a bonafide work done in partial fulfillment of the requirements for the

Degree of **Master of Physiotherapy** from

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

Guide

Principal

Viva-voce Examination held on _____

Internal Examiner

External Examiner

DECLARATION

I hereby declare and present my dissertation entitled entitled “**A COMPARATIVE STUDY ON EFFECTIVENESS OF CONSTRAINT INDUCED MOVEMENT THERAPY VERSUS CONVENTIONAL THERAPY IN IMPROVING UPPER LIMB FUNCTIONAL ON PATIENTS WITH STROKE**” the outcome of the original research work undertaken and carried out be me , under the guidance of **Mr. G. ELAVARASAN, M.P.T. , MIAP.**, Assistant Professor, Padmavathi College of Physiotherapy, Periyanahalli, Dharmapuri , Tamilnadu.

I also declare that the material of this dissertation had not formed in any basis for the award of any other Degree previously from the Tamilnadu Dr. M.G.R. Medical University, Chennai.

(KALAI SELVAN .M)

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(KALAI SELVAN .M)



**DEDICATED TO MY BELOVED
PARENTS , STAFFS
AND
LOVABLE FRIENDS**

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INTRODUCTION

Stroke is an acute onset of neurological dysfunction due to abnormality in cerebral circulation with resultant signs and symptoms that correspond to the involvement of focal areas of the brain. It is one of the most common cause of disability among adults in the world and third leading cause for death.

The most common features in middle cerebral artery stroke are Paresis of contra lateral face, arm and leg (leg in least affected), Sensory impairment, Motor speech disorder (expressive aphasia, telegraphic, halting speech), Wernicks (or) receptive Aphasia (Fluent but often Jargon speech, poor comprehend), Perceptual Problems such as, Unilateral neglect, Depth perception Problems, Spatial relation difficulties, Homonyms Hemianopia, Loss of conjugate gaze to opposite side, Ataxia on contra lateral limb (Sensory ataxia).

In spastic stage, abnormal Muscle tone may contribute to poor scapular position (Depression, retraction, downward rotation) and contributes to subluxation and restricted movement. Secondary tightness

of ligaments, tendons and joint capsule can develop quietly and leading to pain during shoulder movement.

For Functional assessment of upper limb dysfunction following measure were used: Functional independent scale, Barthel index, Katz index, Fugl – meyer assessment scale, Modified barthel index, Performance based assessment.

In this study Fugl – meyer assessment scale were used to assess the upper limb dysfunction.

Constraint induce movement therapy is a rehabilitation approach that is designed to reduce in capitating motor deficits of the upper limbs in patient after neurological injury and increase their functional independence.

Conventional Therapy (CT) is a usual and customary care on improve the upper extremity function.

STATEMENT OF THE STUDY

A comparative study on effectiveness of constraint induced movement therapy versus conventional therapy in improving upper limb function on patients with stroke.

AIM AND NEED FOR THE STUDY

AIM OF THE STUDY

Aim of the study is to find out whether there is any significant difference between constraint induced movement therapy versus conventional therapy in improving upper limb function on patients with stroke.

NEED OF THE STUDY

This study is essential as most of the population suffer from this problem. This results of the study will help the physiotherapists to treat this patients in a better form.

REVIEW OF LITERATURE

1. **Nilsson L., et.al., (1998)** showed that, constraint induced movement is significantly effective in improving upper limb function than conventional therapy on patients with stroke.
2. **Benvenuti.P, (1998)** concluded that, Fugl – Meyer Assessment scale was a valid and reliable tool to measure the upper limb function.
3. **Moseley A.M., et.al., (2000)** Conclude that, constraint induced movement was significantly effective in improving upper limb function in stroke patients.
4. **Walsh.K (2000)** stated that, conventional therapy improving upper limb function in patients with stroke.
5. **Enjo Walker, (2000)** Concluded that, use of Fugl – meyer Assessment scale and Barthel – Index scale was shown to be a good measuring instrument for the classification of general clinical performance of the patient.

6. **LAUFERY, et.al., (2001)** suggested that, constraint induced movement therapy was more effective than conventional therapy in improving upper limb function on patients with stroke.

7. **Ellen Winchell Millar, et al., (2002)** showed that, constraint induced movement was more effective in improving upper limb function on patients with stroke.

8. **Eich J et al., (2002)** proved that, constraint induced movement was better than conventional therapy in improving upper limb function on patients with stroke.

9. **Ann Charistin Eliasson.et.al (2004)** concluded that, constraint induced movement therapy shows greater improvement in upper limb function than the conventional therapy on patients with stroke.

10. **Suputtitada. A, et. Al (2004)** concluded that, the constraint induced movement therapy showed greater improvement for upper limb function in chronic stroke patients.

11. **Toward Taub.et.al (2005)** concluded that the application of constraint induced movement therapy produced major and sustained improvement in motor function.
12. **Bonifer.N.M.et.al (2005)** concluded that, constraint induced movement therapy showed greater improvement in upper limb function in stroke patient.
13. **Corriveau.H, (2007)** concluded that, there was a significant improvement in upper limb function following the application of conventional therapy.
14. **Corriveau.H, (2007)** concluded that, there was a significant improvement in upper limb function following the application of constraint induced movement.
15. **Chang.J.J, et.al (2007)** concluded that, the conventional therapy shows greater improvement in strength and motor control ability in upper limb.

RESEARCH METHODOLOGY

RESEARCH DESIGN

The study was experimental in nature. Twenty samples were selected using simple random sampling method and divided into two equal groups.

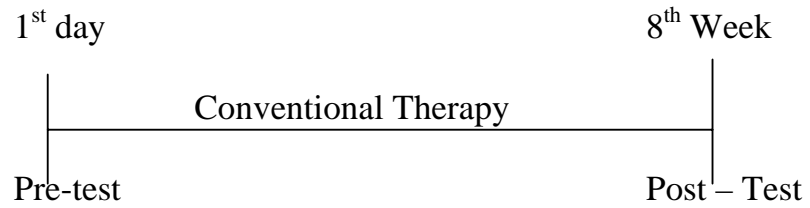
1. Experimental group - I
2. Experimental group - II

Pretest measurements of upper limb function were taken for both the groups using Fug1 – meyer scale.

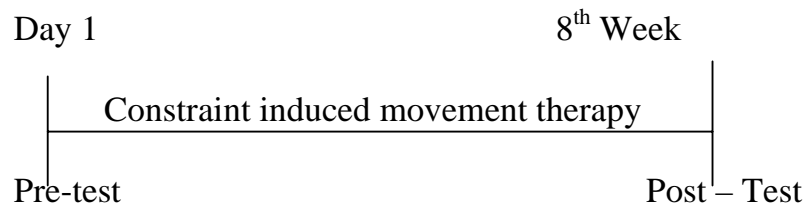
After the pretest, the experimental group – I received conventional therapy whereas experimental group II received constraint induced movement therapy for a period of 8 weeks.

Post – test measurement where taken for both the experimental groups in a similar fashion as that of pretest assessment at the end of 8 weeks.

EXPERIMENTAL GROUP – I



EXPERIMENTAL GROUP – II



CRITERIA FOR SELECTION

Inclusion Criteria

- Age 40-60 Years
- Both sex
- Chronic stroke patients
- MCA involvement
- Side – both side
- Cerebral infarction

Inclusion Criteria

- Shoulder dislocation
- Shoulder subluxation
- Cervical myelopathy
- Traumatic brain injury
- Brachial Plexus injury

POPULATION

All the patients who fulfilled the selection criteria were taken as the population of the study.

SAMPLE SIZE AND METHOD OF SELCTION

Twenty samples were selected from the population using simple random sampling method.

VARIABLES

Independent variable

- Conventional therapy
- Constraint induced movement therapy

Dependent Variable

- Upper limb function

VALIDITY AND RELIABLILITY OF THE TOOL USED

Fugl – meyer scale is a valid and reliable tool to measure upper limb function.

SETTING

The study was conducted in out patients department of Padmavathi College of Physiotherapy, Dharmapuri and Govt Medical College Hospital, Dharmapuri.

METHODOLOGY

Twenty samples were selected using simple random sampling method and were divided into two equal groups. Both the groups underwent pretest assessment of upper limb function using visual Fugl-meyer scale.

Pre test measurement of upper limb function was done using Fugl-meyer scale.

PROCEDURE

EXPERIMENTAL GROUP-I

After the pre-test analysis the experimental group I were given conventional therapy.

CONVENTIONAL THERAPY (CT)

It is usual and customary care on improve the upper extremity function.

Lying

- Positioning the limbs
- elongate the trunk
- Mobilize the scapula
- Elevate the arm
- Abduction the arm
- Self – assisted arm movements

Sitting

- Arm elevation
- Trunk rotation
- Weight bearing
- Self assisted arm movement

EXPERIMENTAL GROUP – II

After the pre-test analysis the experimental group II were given constraint induced movement therapy.

Constraint Inducted Movement Therapy (CIMT)

Principales of CIMT

- Constraining the unaffected limb
- Forced use of the affected limb
- Massive practice.

This approach has been used most frequently with persons recovering from stroke and the main aim is to retrain the brain by constraining the unaffected arm and forcing the use of the weakened arm.

The patient were engaged in daily repetitive task and behavioral shaping sessions, which included training in tasks such as,

- Opening a lock
- Turning a door knob
- Pouring a drink
- Eating lunch
- Throwing a ball
- Playing dominoes

The post test measurement of upper limb function were collected at the end of 8th weeks in a similar manner as that of pretest measurement.

OBSERVATION AND ANALYSIS

The collected data were analyzed using paired “t” test and independent “t” test.

EXPERIMENTAL GROUP – I

Table 1.1

Conventional Therapy

Variable	“t” cal value	“t” table value
Upper limb function	20.03*	2.262

“t” calculated value > “t” table value

Significant at 5% level.

EXPERIMENTAL GROUP – II

Table 1.2

Constraint induced movement therapy

Variable	“t” cal value	“t” table value
Upper limb function	20.03*	2.262

“t” calculated value > “t” table value

Significant at 5% level.

Independent “t” test

Table 1.3

Constraint induced movement therapy

Variable	“t” cal value	“t” table value
Upper limb function	3.84*	2.101

“t” calculated value > “t” table value

Significant at 5% level.

RESULTS AND DISCUSSION

RESULTS

The data was subjected to statistical analysis and the following results were obtained.

Conventional therapy is significantly effective in improving upper limb function on patients with stroke.

Constraint induced movement therapy is significantly effective in improving upper limb function on patients with stroke.

Constraint induced movement therapy is significantly effective in improving upper limb function on patients with stroke.

Constraint induced movement therapy is significantly effective in improving upper limb function than conventional therapy on patients with stroke.

DISCUSSION

- Conventional therapy is significantly effective in improving upper limb function on patients with stroke.

The improving upper limb function following conventional therapy may be due Increases the efficiency and strength of synaptic connection. Enhances both parallel and hierarchial processing with in CNS, which

induced increases stored areas of the brain and it results in enhancing effective motor recovery. Prolonging the action potential through changes in potassium conductance. This allow increased excitatory post synaptic potentials.

Reactivation of the cortex was due to increased responsiveness of weak inputs from neighboring areas. Take over of existing descending pathway from premotor and supplementary motor cortex that have direct projection to brainstem area involved in motor control.

- Constraint induced movement therapy is significantly effective in improving upper limb function on patients with stroke.

The improving upper limb function following constraint induced movement therapy may be due induces long term structural changes in the organization and number of connection among neurons. Parallel and hierarchical processing

With in CNS markedly increased which results in peak amplitude and size of cortical output to the muscles were significantly larger and shorter reaction time. Practice (CIMT) makes the maps of cortical output to the muscles continued to enlarge until the subjects explicit knowledge of the

sequence. Repeated practice of motor skill results in improved synaptic efficiency between the sensory and motor cortex, increases the efficiency of the thalamocortical pathway that are co activated during learning process.

Recovery of arm function was associated with ventral extension of upper limb areas of the cortex (functionally related area). Strengthen of the shift in the hierarchical organization of the cortex, with supplementary motor cortex, premotor cortex descending pathways taking over for the primary corticomotor pathways.

- Constraint induced movement therapy is significantly effective in improving upper limb function than conventional therapy on patients with stroke.

This might have occurred due to Increased alternation of motor cortex by hard prospected training programme. Co-Activation of many muscles simultaneously present at initial level, of with continuous, hard practice those less efficient contractions are eliminated and only the necessary muscles contact. Extension of upper limb presentation in cortex and pre motor

supplementary motor cortex descending pathways taking over the primary corticomotor pathway.

Increasing of central mapping changes persists for large periods on intense practice and continues to enlarge until the subjects explicit knowledge of the sequence. Peak amplitude and size of cortical output to the muscle were significantly higher and reaction time becomes shorter. Increase short term and long term structural changes in organization and number of connection in neurons.

The study results conclude with, **Nilsson L., et.al., (1998)** showed that, constraint induced movement is significantly effective in improving the upper limb function than conventional therapy on patients with stroke.

Ann Charistin Eliasson.et.al (2004) concluded that the constraint include movement therapy shows greater improvement in upper limb function than the conventional therapy on patients with stroke.

RECOMMENDATION

- This similar study can be conducted for lower limb dysfunction in individuals with stroke.
- This similar study can be conducted in young children with cerebral palsy.
- This similar study can be conducted with the use of wolf motor function test.
- This similar study can be conducted with the use of action research arm test.

CONCLUSION

The results of this study make us conclude that constraint include movement therapy is significantly effective in improving upper limb function than conventional therapy on patients with stroke.

REFERNCES.

1. Adams, victor, “Principles of Neurology”, McGraw Hill (Dc, Health professions), 5th Ed. 1993.
2. Bobath.B, “Adult Hemiplegia, Evaluation and Treatment”, Heinman Medical Books. 3rd Ed. 1990.
3. Carolyn.M.Hicks, “Research for Physiotherapy” Churchill Biving stone. 2nd Ed. 1995.
4. Gupta. S.P. “Statistical Methods”, sultan chand & Sons, 26th Ed., 1993.
5. Dr.B.K.Maharajan, “Methods in Biostatistics”. JP Brother Medical publishers, 5th Ed. 1989.
6. Marilyn A.Harrison, “Physiotherapy in stroke management”.
7. Mahajan.B.K. “Mehthods in Biostatics” Jaypee Brothers, 5th Ed. 1991.
8. Patrician A, Pownie, Cash text book of neurology for physiotherapists, Jaypee Brothers Publications, New Delhi, 4th Ed, 1993.
9. Maria Strokes, “Neurological Physiotherapy”, Mosby Publication, London, 1998.

10. Susan. B.O. Sullivan “Physical Rehabilitation Assessment and treatment”, Jaypee Brothers Medical Publications, 3rd Ed, 1998.
11. Mark Kesster, Suzannoe, “Tink Martin, Neurlogic Intervention for physical therapist”, W.B. Saunders company, New York, 1st Ed. 2000.
12. Kotharai.C.R. “Research Methodology, Method and techniques”, wishva Prakasham, New Delhi, 1990.
13. Louis R. Caplan, “Caplan’s Stroke; A clinical Approach”, Butter worth Heinemann, Oxford, 3rd Ed. 2000.
14. Mitner W.H., et. Al. Effect of constraint induced movement therapy on patients with chronic stroke; Replication, Vol.30 (3) Mar 1999. Pp 586-92.
15. Suputtituda. A.et. al, effectiveness of constraint induced movement therapy in chronic stroke patients Vol 87 (12) Dec’2004, Pp 1482-90.
16. Steven.L. et. al compare the effect of CIMT Vs conventional therapy in upper extremity function among patients who had a stroke.
17. Edward Taub, et. al Compare the effect of CIMT Vs conventional therapy for children with cerebral Palsy.

18. Blanton, S., et al. An application of upper extremity constraint induced movement therapy in a patient with sub acute stroke. Vol 50(T) Jul'2000 Pp.711-3.

APPENDIX – I

Fugl – Mever Assessment Scale

I.Shoulder / elbow / forearm			
1.1 Reflex activity			
Flexors (beiceps and finger flexors)	0	1	2
Extensors (triceps)	0	1	2
1.2 Fxexors synergy – Volitional movement within synergy			
Shoulder retraction	0	1	2
Shoulder elevation	0	1	2
Shoulder abduction	0	1	2
Shoulder external rotation	0	1	2
Elbow flexion	0	1	2
Forearm supination	0	1	2
1.3 Extensor synergy – Volitional movement within synergy			
Shoulder adduction / Internal rotation	0	1	2
Elbow extension	0	1	2
Forearm Pronation	0	1	2

1.4 Volitional movement mixing the dynamic flexor and extensor strategies			
Hand on lumbar spine	0	1	2
Shoulder flexion	0	1	2
Forearm Pronation / supination	0	1	2
1.5 Volitional movement are performance with little or no synergy dependence			
Shoulder abduction	0	1	2
Shoulder flexion	0	1	2
Forearm pronation / supination	0	1	2
2. Wrist			
2.1 Wrist stability – elbow 90 ⁰	0	1	2
2.2 Wrist flexion / extension – elbow 90 ⁰	0	1	2
2.3 Wrist stability – elbow 0 ⁰	0	1	2
2.4 Wrist flexion / extension – elbow 0 ⁰	0	1	2
2.5 Circumduction	0	1	2
3. Hand			
Mass flexion	0	1	2
Mass extension	0	1	2

Grasp A – distal finger grasp	0	1	2
Grasp B – thumb adduction grasp	0	1	2
Grasp C – thumb to index finger grasp	0	1	2
Grasp D – Cylinder grasp	0	1	2
Grasp E – spherical grasp	0	1	2
4. Co-ordination / speed			
Tremor	0	1	2
Dysmetria	0	1	2
Speed	0	1	2
Upper limb score			

0- Unable to perform

1- Able to perform in part

2- Able to perform

APPENDIX – II

MASTER CHART

EXPERIMENTAL GROUP – I

(Conventional Therapy)

S.No	Fugl – Meyer Scale	
	Pre test	Post test
1.	11	41
2.	7	38
3.	9	36
4.	8	40
5.	10	32
6.	8	34
7.	10	32
8.	6	28
9.	7	28
10.	11	38

EXPERIMENTAL GROUP – II

(Constraint include movement therapy)

S.No	Fugl – Meyer Scale	
	Pre test	Post test
1.	10	35
2.	6	35
3.	7	38
4.	12	50
5.	8	48
6.	7	50
7.	11	49
8.	8	44
9.	6	38
10.	10	36