EFFECTIVENESS OF CONSTRAINT INDUCED MOVEMENT THERAPY IN COMPARISION WITH TRADITIONAL REHABILITATION THERAPY IN TREATING UPPER EXTREMITY OF THE ACUTE AND SUBACUTE STROKE PATIENTS

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ABSTRACT

Objective
To determine modified constraint induced movement therapy (m)CIMT feasibility and comparing its efficacy to traditional rehabilitation in acute and sub-acute stroke survivors exhibiting upper limb hemiparesis

Design: Pre post case series

Setting: Outpatient department (physiotherapy) and in patient of a hospital

Subjects: 25 acute and sub-acute stroke patients were taken for the treatment purpose.

Results
Before intervention, all patients exhibited stable motor deficits and more affected arm non-use. After intervention, (m)CIMT patients displayed increased affected upper extremity use. Traditional rehabilitation patients exhibited nominal changes in affected limb use on the FM and ARAT (+5.35 and +4.92). fugylmeyer assessment and ARAT changes were significant for the (m)CIMT group only (p<0.05).

Conclusions
Modified constraint induced movement therapy is a promising regimen for improving more affected limb use and function in acute and sub-acute cerebrovascular accident.

KEYWORDS: CIMT, Stroke, Tia

INTRODUCTION

Stroke is a generic term in use to describe the sudden interruption of blood flow to the part of brain, resulting loss of brain function. The term stroke does not give pathological significance. A stroke may be also known as cerebrovascular accident. Cerebrovascular accident which defines as those in which brain disease occurs secondary to a pathological disorders of blood vessels of blood supply. It is essential to know about the magnitude of impact of stroke globally. According to the data published by the world health organization in the year 2008, 10.8% of the deaths in the world are due to cerebrovascular accident. The human brain is the most complex structure in the human body. Only 2 percent of the body is contributed by the brain and, it utilizes about 25 percent of the body’s oxygen supply and 70 percent of glucose. Stroke is a medical emergency, which can causes severe irreversible neurological damage resulting in disability of and death. This types and degrees of
disability that following a stroke or brain attack purely depends on the area of the brain damaged. Types of stroke: 1) ischemic stroke hemorrhagic

METHODS

Soon after a stroke attack, once the patient in the unit is stabilized, will be referred for neuro rehabilitation. Potential patients will be screened to determine if they meet the study inclusion criteria. Apart from the participants from in patients unit, patients who come to the outpatients department of physiotherapy unit will also screened to determine the potential candidate. The participants will be randomly and equally divided into two groups. The sampling technique followed will be simple random sampling such as lottery method. No 1 to 30 will be printed in the cards. The cards will be shuffled well and a card will be drawn out by the patient. If the drawn card contains odd number means the patient will be assigned for modified constraint induced movement therapy. If the drawn card contains even numbers means the patient will be assigned for traditional rehabilitation therapy. The patient will be assigned for traditional rehabilitation therapy. The patients will be briefed about the study and a duly signed informed consent from will be obtained from all the participants.

Fifteen patients will be participating in modified constraint induced movement therapy. The other fifteen patients will be participating in traditional rehabilitation therapy. Duration of the therapy assigned for both the groups will be one hour / day. Four days in a week for 4 weeks for both group i.e., controlled and experimental group. The study was done inlp and Op of the ACS medical college and hospital in Chennai and study type is pre and post test series, population were selected by the study was acute and sub-acute stroke patients and sample size is 30 patients were selected to the study, duration of the study is 3 months.

Materials Used Are

Sling (shoulder immobilizer) made of poly urethane material. Hair brush, cup, marbles, cards, blocks, tissue paper, cones, Swiss ball, dexterity board.

Inclusion Criteria

Age 45 to 60 years, Severity: acute and sub-acute stroke patients, diagnosis of first stroke, confirmed by the participants medical reports, Ability to actively at least 10 degrees at the metacarpophallangeal joints and 20 degrees of wrist extension, No excessive spasticity the score range to be on the modified ashworth scale is 2 or more, No severe deficits in communication, Memory or understanding. A mini mental status examination should be 19 or more.

Exclusion Criteria

Patients participating in any experimental rehabilitation on drug studies, Patients with implants such as pacemaker, Neuro stimulator containing electric circuitry, and implants generating electric sign, Patients with anxiety and claustrophobia, Patients with previous history of stroke or other neurological, Neuromuscular or orthopaedic disease, patients undergoing chemotherapy.

Treatment Procedure

Modified CIMT protocol, A multiple baseline randomized controlled pre – post case series design will be applied, 15 patients will be assigned for (m)CIMT. The strategies followed in the treatment of (m)CIMT were: 1. Restriction of movement of the unaffected hand by using a mitt or sling (shoulder immobilizer) for 6 hours per day. 2. Intensive training
of the affected arm for one hour a day. Four days in a week, 30 minutes of therapy will concentrates on affected limb use in 3 ADLs chosen by patients such as writing picking up a hairbrush and combing hair, typing on a computer, picking up a cup and drinking, picking up marbles, flipping cards, stacking blocks, reaching exercise, grasp exercise, pinch exercise, during which unaffected limb will be restricted with arm sling or shoulder immobilizer. Repetition on each particular task is performed by using general shaping progression parameters. For e.g.: using bigger or heavier objects, increasing the speed, changing the position of the things used in the exercise, 30 minutes will be spent on the affected limb range of motion, Upper limb stretching will be done to facilitates MAS s, Dynamic standing balance activities, Gait training.

**Traditional Rehabilitation Therapy Protocol**

Other fifteen patients will be assigned for traditional rehabilitation. The duration of the therapy given to the control group will be same as the (m) CIMT group. Unaffected upper limb will not be restrained in traditional rehabilitation therapy. 30 minutes of the therapy focus on all activities performed bimanually and the affected arm will be supported with unaffected hand, Standard therapy for the affected upper limb including weight bearing activities stretching, 30 minutes for manual dexterity exercises. For example – grasp release, stacking cones and coordination exercises.

**Illustrations and Figures**

![Arm Sling](image1)

Figure 1: Arm Sling

![Upper Limb with Arm Sling](image2)

Figure 2: Upper Limb with Arm Sling

![Opening the Bottle Cap](image3)

Figure 3: Opening the Bottle Cap

![Pouring Water on the Glass](image4)

Figure 4: Pouring Water on the Glass
RESULTS

Differences of pre and post values of ARAT are compared between and within the groups of traditional rehabilitation therapy and modified constraint induced movement therapy using ANOVA.

Table 1

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<td><strong>0.0054</strong></td>
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Differences of pre and post values of fugylmeyer assessment are compared between and within the group of traditional rehabilitation therapy and modified constraint induced movement therapy using ANOVA

Table 2

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<tr>
<td><strong>Total</strong></td>
<td><strong>58.96</strong></td>
<td><strong>24</strong></td>
<td><strong>7.73</strong></td>
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Results for the effects of modified constraint induced movement therapy and traditional rehabilitation therapy in improving the upper extremity function of acute and sub-acute stroke patients. The result of the studied showed significant and tremendous effects favoring the modified constraints induced movement therapy on the action research Arm test and FMA. Statistical significance was set at $p \leq 0.05$. Significant and moderate to large effects existed on action research Arm test ($P=0.010$) significant and moderate to large effects existed.

When p-value is less than the predetermined significance level which is often 0.05 or 0.01, indicating that the observed results would be highly unlikely under the null hypothesis. Thus, the study hypothesis was supported. Thereby null hypothesis is rejected and alternative hypothesis is accepted.

DISCUSSIONS

However in many hospitals and clinical setups the scarce resources allocated rehabilitation services which in turn limits the applicable for such as intensive training ,therefore (M) CIMT protocols consisting of a reduced or shortened training period (reduced session frequency) has been put forward. Repeated affected limb use is thought to bring about
cortical reorganization and improved motor function; yet in the current study nominal changes where observed in patients receiving TR therapy. This outcome measures may illustrate a fundamental shortcoming of traditional rehabilitation therapy that may explain why conventional motor rehabilitation has shown negligible efficacy. Together, data suggests that (m) CIMT improves more affected limb use add function. Modified CIMT studies report cortical reorganization resulting in fundamental improvement. The acute and sub-acute phases are believed to be times of considerable potential recovery.

CONCLUSIONS

Many facilities may have CVA patients with learned non-use who are receiving traditional therapy regimens. However several lines of reasoning support early implementation of CIMT. From a motor learning perspective, early implementation might minimize learned non-use. This study provides evidence of greater improvements in motor control during reach to grasp movement after (M) CIMT versus traditional rehabilitation therapy. In conclusion data presented herein also suggested the M (CIMT) is a feasible and efficacious approach to improve the usage and function of the affected limb in acute and sub-acute CVA.

LIST OF ABBREVIATIONS USED

(M)CIMT: Modified constraint induced movement therapy.
TIA: Transient ischemic attack
ARAT: Action Research Arm Test
FMA: Fugyl Meyer assessment

REFERENCES


