

# Comparison of Constraint-Induced Movement Therapy Vs Traditional Rehabilitation Therapy to Improve Upper Limb Function in Hemiplegic Acute and Subacute Stroke Patients

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## ABSTRACT

**Background:** 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. A stroke may be also known as cerebrovascular accident. Cerebrovascular accident which defines as pathology in which brain disease occurs secondary to disorders of blood supply of brain. It is essential to know about the magnitude of impact of stroke globally.

**Aim:** To determine effectiveness of constraint induced movement therapy and comparing its efficacy to traditional rehabilitation in acute and sub-acute stroke survivors exhibiting upper limb hemiplegia

**Methodology:** This was a randomized clinical trial study, conducted in Lahore in which eighteen stroke patients had participated. Current study includes MAL and WMFT questionnaire in it and sample size was 18. Patients were treated 4 times a week and unaffected limb was constrained for two hours in therapy session and onwards to 10 hours to motivate the use of effected limb. Readings were taken weekly and patients were reassessed by using MAL and WMFT. CIMT treatment protocol consists of 3 or 4 month of daily intensive training of the affected extremity for 2 hours in association with restriction of the non-affected extremity for 10 hours a day. Group B: Traditional rehabilitation therapy used Sling (shoulder immobilizer) made of poly urethane material. Hair brush, cup, marbles, cards, blocks, tissue paper, cones, Swiss ball, dexterity board.

**Results:** Statistical analysis was set at  $p \leq 0.05$ . huge and direct to vast impacts existed on WMFT ( $P=0.010$ ) noteworthy and direct to extensive impacts existed When p-value is not as much as the foreordained importance level which is frequently 0.05 or 0.01, showing that the watched results would be profoundly impossible under the alternate theory. In this way, the alternate hypothesis was supported. Subsequently null hypothesis is rejected and alternate hypothesis is accepted.

**Conclusion:** This study concluded that the patients who were treated with CIMT showed remarkable change in upper extremity functions. While patients who were treated with traditional rehabilitation therapy they exhibited less change in their functional activities than Constraint-Induced Movement Therapy.

**Keywords:** Comparison, traditional rehabilitation therapy, Constraint-Induced Movement Therapy (CIMT) Approaches,

## INTRODUCTION

Constraint-induced movement therapy is a practice of rehabilitation therapy which increases upper limb task in stroke and other CNS injury dupes by increasing the usage of their pretentious upper limb. The three major constituents of CIMT include

1. Repetitive, structured, training severe therapy in the more affected arm
  2. Restriction of the unaffected arm
- Application of a package of interactive techniques that relocates improvements from the clinical setting to the existent world<sup>1</sup>

CIMT has been utilized as a part of recovery rehearse for a long time trying to conquer upper appendage engine disabilities. Unique CIMT incorporates obliging of the non-paretic arm and errand arranged preparing. Adjusted variants of CIMT are not generally as concentrated as unique CIMT. "The first and changed sorts of CIMT effectively affect engine work, arm-hand exercises, and self-revealed arm-hand working in day by day life, quickly after treatment and at long haul development"<sup>2</sup>. As uncovered by an examination that analyzed the impact of CIMT on execution of undertakings following a direct to

extreme stroke. As indicated by the information distributed by the world wellbeing association in the year 2008, 10.8% of the passing's on the planet are because of cerebrovascular mishap. The human mind is the most complex structure in the human body. Just 2 percent of the body is contributed by the cerebrum and, use around 25% of the oxygen supply in the body and 70% of the glucose. Stroke is a restorative

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crisis, which can cause extreme irreversible neurological harm bringing about inability of and passing. This writes and degrees of disability that following a stroke or cerebrum assault absolutely relies upon the region of the mind harmed. Sorts of stroke: 1) ischemic stroke hemorrhagic<sup>2</sup>. Altered CIMT can be connected to an average Australian people group recovery setting, to treat upper appendage shortfalls in stroke survivors. The assets utilized for CIMT to a great extent equaled common care, without any distinctions in results, recommending that the intercession is plausible and possibly gainful. In any case, there were not very many stroke survivors who met

investment criteria, demonstrating that interest for the intercession is limited<sup>3</sup>.

After the cancer and the heart diseases, Stroke is going to be the foremost primary reason of death which is going to produce huge amount of desperateness among the patients and it is the basic general restorative issue in the world<sup>3</sup>. Stroke is going to be the important concern, being among and the most broadly apparent clarifications behind the physical impairment and the death<sup>4</sup>. The impedances of cerebral are most inevitable of all, lacks seen in the stroke<sup>5</sup>. The big Motor loss is also mixed the relationship of all the cranial nerves, the muscle control and the tone, the walk, the coordination, the apraxia and the reflexes<sup>6</sup>.

The loss of motion in the upper appendage is the, common and frightful outcomes, of the paraplegic which upsurges, action confinement. Ordinarily the recuperation of paraplegic is not as much as the misfortune system of slower cutoff work<sup>7</sup>. In stroke Upper appendage brokenness is portrayed by paresis, manual loss of smoothness and change assortments from the standard that may impact incredibly on the execution of exercises of every day livings<sup>8</sup>. Comprehension, holding and controlling articles are well ordered works that stay ailing in 45% to 65% of patients 2 to a half year post stroke<sup>9</sup>.

In Physiotherapy, unmistakable mediations look been surrounded evaluating the effect of various recuperation methodologies in overhauling uttermost point motor control and working. Undertaking sorted out get ready is generally used strategy to retrain patients with hemiplegia<sup>10,11</sup>. Errand arranged prepare is a valuable approach in light of the structure hypothesis of engine control. Bernstein in 1967 gave this theory that to hold the patients with change issue<sup>12,13</sup>. That approach uses an arranging venture that spotlights on particular valuable attempts to connect with the neuromuscular and musculoskeletal structure<sup>7</sup>. There is solid confirmation that early, preposterous and undertaking related prepares redesigned engine recuperation and cortical re-trying after stroke<sup>8</sup>.

Constraint induced movement therapy ("CI Therapy", "CIMT") has numerous noteworthy advantages which have been demonstrated through research and utilization of CIMT in facility settings<sup>4</sup>. The advantages of requirement initiated development treatment for the arm and hand include:

- Improved scope of development
- Improved muscle quality
- Increased measure of utilization of weaker arm
- Improved nature of development
- Increased inspiration to utilize the weaker arm in capacity

Note that requirement initiated development treatment can't reestablish an arm and hand to an indistinguishable level from the unaffected side. Despite the fact that the upgrades can be critical and have an enduring change on the kid's utilitarian capacities, there will even now be a few shortfalls in their upper appendage coming about because of the first neurological harm.

CIMT advances development of furthest points influenced by crippled stroke. The real parts of CIMT incorporate extreme dreary (undertaking focused) preparing and the social, sharpening of the debilitated

appendage with restricted movement of the healthy upper extremity. Creature examines recommend the expanded utilization of the influenced appendage conquered the diminished engine movement related with the brain cortical injuries Confirmation bolsters the adequacy of the CIMT, in enhancing expertise and engine worked with people with unending upper limb paralysis. There are a few confinements to across the board utilization of CIMT in stroke restoration: to start with, unique CIMT convention requires consistent supervision, in this manner, it is more costly than standard precaution. And the Second, unique CIMT convention require imperative of the genuine hand for roughly of the 90% of the waking hours, however a few people with hemiplegia can't endure this long cutoff, and there are additionally there are some of the security issues, particularly in intense stroke patients. Contrasted and unique CIMT convention, the changed CIMT conventions were attainable and very much endured in intense stroke patients<sup>14</sup>.

CIMT created out of essential exploratory brain science investigate by Edward Taub and his associates, starting in the late 1960s, on tangible commitments to engine learning in non-human primates They started by recreating past work demonstrating that, when substantial sensation is precisely nullified from a solitary forelimb by disjoining all dorsal spinal nerve roots enervating that limb, the creature did not make utilization of the appendage in a characteristic setting once more, without intercession, despite the fact that active engine signals by means of ventral roots stayed unobstructed<sup>15</sup>.

## MATERIAL & METHODS

Current study was a Randomized Control Trial study. Data was collected from out door of Neuro Rehabilitation Centers of Lahore general hospital, mayo hospital Lahore, services hospital Lahore and Riphah college of rehabilitation sciences, Lahore campus. After the approval of synopsis, the study was completed within 6 months. Minimum a sample size of 18 patients was required in this study with 5% level of significance and 95%. Participants were divided into two groups A and B. Group A received CIMT. The novel CIMT procedure, involves 2 -3 weeks of the daily basis serious training, of the pretentious limb for the six hours in, connotation with constraint of the unaffected limb for the ten hours per day. Group B Received Traditional rehabilitation therapy. In this therapy, Sling (shoulder immobilizer) made of poly urethane material. Hair brush, cup, marbles, cards, blocks, tissue paper, cones, Swiss ball, dexterity board. Consecutive sampling technique was used to collect the data. Lottery method was used to do randomization in group allocation. Patients without any visual-perceptual problems. Patients were included without any communication barriers/language issues, with proper balance and safety while wearing the restraint and with conformation of Acute/sub-acute stroke on CT scan or MRI. Patients with any experimental rehabilitation on drug studies, with implants such as Neuro stimulator containing electric circuitry, and implants generating electric sign were not included in this study. Data collection tools were "MOTOR ACTIVITY LOG" and "WOLF MOTOR FUNCTION TEST". The data was analyzed by using SPSS 21. Statistical

significance value was set at P = 0.05. Frequency tables, pie charts, bar charts were used to show summary of group measurements measured over time. t-test was used to show the progress of two groups between any two successive visits in terms of subjective and objective measurements. Independent sample t- test was used.

**RESULTS**

Table 1 shows this study includes two groups one with conventional treatment, included 9 patients and other group with CIMT consisted of 9 patients.

Table 2 shows Gender description of study, in conventional group male patients were 5 and female were 4, in CIMT group male patients were 4 and female were 5.

Table 1: Group of patients

Valid	Frequency	%	Valid%	Cumulative%
Conventional PT	9	50.0	50.0	50.0
CIMT PT	9	50.0	50.0	100.0
Total	18	100.0	100.0	

Table 2: Gender

Study group	Frequency	%	Valid%	Cumulative%
Conventional PT				
Male	5	55.6	55.6	55.6
female	4	44.4	44.4	100.0
Total	9	100.0	100.0	
CIMT PT				
Male	4	44.4	44.4	44.4
Female	5	55.6	55.6	100.0
Total	9	100.0	100.0	

Table 3: Motor Activity Log (MAL) Composite Score Pre Treatment

Valid	Frequency	%	Valid%	Cumulative%
Conventional PT				
Mild disability (0-20)	1	11.1	11.1	11.1
moderate disability(21-40)	2	22.2	22.2	33.3
Severe disability(41-60)	2	22.2	22.2	55.6
unable to do(60-75)	4	44.4	44.4	100.0
Total	9	100.0	100.0	
CIMT PT				
Mild disability (0-20)	1	11.1	11.1	11.1
Moderate disability(21-40)	2	22.2	22.2	33.3
Severe disability (41-60)	2	22.2	22.2	55.6
Unable to do (60-75)	4	44.4	44.4	100.0
Total	9	100.0	100.0	

Table 3 shows composite score of motor activity log pretreatment of motor activity log in conventional group, mild disability (0-20) was found in 11.1 % patients, with moderate disability (21-40) found 22.2% patients, with severe disability (41-60) found 22.2% patients and unable to do (40-60) were found 44.4 %. In CIMT group mild disability (0-20) was found in 11.1 % patients, with moderate disability (21-40) found 22.2% patients, with

severe disability (41-60) found 22.2% patients and unable to do (40-60) were found 44.4%.

Table 4 shows composite score of post treatment of motor activity log in conventional group, mild disability (0-20) was found in 11.1 % patients, with moderate disability (21-40) found 22.2% patients, with severe disability (41-60) found 22.2% patients and unable to do (40-60) were found 44.4 %. In CIMT group mild disability (0-20) was found in 33.3 % patients, with moderate disability (21-40) found 44.4% patients, with severe disability (41-60) found 11.1% patients and unable to do (40-60) were found 11.1%.

Table 5 shows composite score of wolf motor function test pretreatment in conventional group, mild disability (0-40) was found in 11.1 % patients, with moderate disability (40-80) found 22.2% patients, with severe disability (80-120) found 22.2% patients were found 44.4 %. In CIMT group mild disability (0-40) was found in 22.2% patients, with moderate disability (40-80) found 22.2% patients, with severe disability (80-120) found 55.5%.

Table 6 shows composite score of wolf motor function test post treatment in conventional group, mild disability (0-20) was found in 11.1% patients, with moderate disability (21-40) found 22.2% patients, with severe disability (41-60) found 22.2% patients and unable to do (40-60) were found 44.4%. In CIMT group mild disability (0-40) was found in 44.4% patients, with moderate disability (40-80) found 44.4% patients, with severe disability (80-120) patients were found 11.1%.

Table 4: Motor Activity Log (MAL) composite score post treatment

Valid	Frequency	%	Valid%	Cumulative%
Conventional PT				
Mild disability (0-20)	1	11.1	11.1	11.1
moderate disability(21-40)	3	33.3	33.3	44.4
Severe disability(41-60)	3	33.3	33.3	77.8
unable to do(60-75)	2	22.2	22.2	100.0
Total	9	100.0	100.0	
CIMT PT				
Mild disability (0-20)	3	33.3	33.3	33.3
Moderate disability(21-40)	4	44.4	44.4	77.8
Severe disability(41-60)	1	11.1	11.1	88.9
Unable to do(60-75)	1	11.1	11.1	100.0
Total	9	100.0	100.0	

Table 5: Wolf Motor Function Test ( WMFT) composite score pre treatment

Valid	Frequency	%	Valid%	Cumulative%
Conventional PT				
Mild 40-0	2	22.2	22.2	22.2
Moderate 40-80	2	22.2	22.2	44.4
Severe 80-120	5	55.6	55.6	100.0
Total	9	100.0	100.0	
CIMT PT				
Mild 40-0	2	22.2	22.2	22.2
Moderate 40-80	2	22.2	22.2	44.4
Severe 80-120	5	55.6	55.6	100.0
Total	9	100.0	100.0	

Table 6: Wolf Motor Function Test (WMFT) composite score post treatment

Valid	Frequency	%	Valid%	Cumulative%
<b>Conventional PT</b>				
Mild 40-0	3	33.3	33.3	33.3
Moderate 40-80	3	33.3	33.3	66.7
Severe 80-120	3	33.3	33.3	100.0
Total	9	100.0	100.0	
<b>CIMT PT</b>				
Mild 40-0	4	44.4	44.4	44.4
Moderate 40-80	4	44.4	44.4	88.9
Severe 80-120	1	11.1	11.1	100.0
Total	9	100.0	100.0	

**DISCUSSION**

A remarkable number of investigates, must existed to assess the effects of CIMT for upper member intense and sub-acute stroke. The essential objective of this, investigation was to take a gander at between customary restoration treatment and CIMT Tactics to Increase Upper appendages Operational in the CVA Patients for that total 18 individuals (both gender ) 9 in each social occasion, with their, first CVA attack were joined and 9 individuals were fused into store up Which was task masterminded and 9 individuals were fused into collect B which was CIMT gathering (16). as indicated by current investigation Results for the impacts of adjusted CIMT and conventional recovery treatment in enhancing the furthest point capacity of intense and sub-intense stroke patients. The aftereffect of the examined indicated noteworthy and enormous impacts supporting the adjusted limitations incited development treatment on the WMFT and MAL. Statistical criticalness was set at  $p \leq 0.05$ . huge and direct to vast impacts existed on WMFT ( $P=0.010$ ) noteworthy and direct to extensive impacts existed When p-esteem is, not as much, as the foreordained importance level that is 0.05 or 0.01, showing that, the observed results, would be profoundly impossible under the invalid theory. In this way, the investigation theory was upheld. Subsequently invalid speculation is rejected and elective theory is accepted<sup>17</sup>.

Current study results show the comparison of means at pre intervention reading of motor activity log (MAL) in both groups as in CIMT group mean is 13.7600 and standard deviation is 2.84722 and in conventional group mean is 13.8400 and standard deviation is 3.26190. Independent samples test shows pre intervention readings of MAL shows significance 9.927.

Current study shows the comparison of means at post intervention reading of motor activity log (mal) in both groups as in CIMT group mean is 15.750 and standard deviation is 2.32522 and in conventional group mean is 17.870 and standard deviation is 2.94392 independent samples test shows post intervention readings of MAL shows post intervention significance is 0.00.

Present study shows the comparison of means at pre intervention readings of Wolf motor function test (WMFT) in both groups as in CIMT group mean is 10.580 and standard deviation is 1.86011 and in conventional group mean is 10.850 and standard deviation is 0.98826. Independent samples test shows pre-intervention readings of WMFT significance is 0.347.

Present study shows the comparison of means at post intervention readings of Wolf motor function test

(WMFT) in both groups as in CIMT group mean is 17.590 and standard deviation is 1.28062 and in conventional group mean is 15.200 and standard deviation is 1.26095. Independent samples test shows post intervention readings of WMFT significance is 0.00

Present study shows that comparison of paired sample test at pre and post intervention reading of MAL in both groups in paired sample statistics of MAL shows that CIMT group pre & post reading pair shows 0.00 significance while conventional group pre & post reading shows 0.078.

Current study shows that comparison of paired sample test at pre and post intervention reading of WMFT in both groups in paired sample statistics of WMFT shows that CIMT group pre & post reading pair shows 0.00 significance while conventional group pre & post reading shows 0.060.

In a past report, there were 40 subjects. When mediation, scores for the assessment tool FMA furthest point things, WMFT scale, WMFT completing periods, and it indicated huge changes, from the  $49.35 \pm 10$ . to  $52.88 \pm 8.0$  emphases,  $(3.48 \pm 0.65)$  to  $(3.72 \pm 0.67)$  (mean + standard deviation) emphases,  $(14.37 \pm 13.22)$  to  $(10.58 \pm 11.97)$  seconds, and  $(75.0 \pm 12.0)$  to  $(77.7 \pm 12.0)$  emphases, correspondingly<sup>16</sup>.

**CONCLUSION**

This study concluded that the patients who were treated with CIMT showed mega change in upper extremity functions. While patients who were treated with traditional rehabilitation therapy they exhibited less change in their functional activities than Constraint-Induced Movement Therapy. So the results described that CIMT is an impending action for progression of the motor frontier of upper appendages and actions of step, by step, living in the patients with CVA.

**Conflict of interest:** Nil

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