IJCRT.ORG ISSN : 2320-2882
INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)
An International Open Access, Peer-reviewed, Refereed Journal

A Study Of Effectiveness Of CIMT Verses Conventional Therapy In Head Injury Patient

1Komal chaurasiya, 2Dr Dharmendra Sharma, 3Dr Vidhi Singh

1Physiotherapist , 2Assistant Professor , 3Assistant Professor

1Sanskriti University ,

2Sanskriti University ,

3Sanskriti University

ABSTRACT

Introduction: Traumatic brain injury (TBI) is a very common problem, with more than 500,000 people hospitalized each year due to traumatic brain injury, and approximately 70,000 of these suffer from intellectual disability, behavioral disorders, and intellectual disability. Recently, it has been demonstrated that these motor skills closely correlate with neurophysiological changes following CIMT.

Methodology: Two group pre-test and post-test experimental was study design. The study was conducted in physiotherapy outpatient department in selected hospital. Based on selection criteria, 30 patients with sub-acute head injury patients were selected and they were allotted into 2 groups by simple random sampling method as 15 subjects in each group. The study was conducted for a period of 6 months. The inclusion criteria include both the sexes were included, the age between 35-65 years old, and subjects with head injury, and also Subjects with Brunnstrom recovery stage of 2 to 5, and finally subjects with ability to understand therapists direction and communications. The exclusion criteria include patients with loss of sensation, patients with hypersensitivity, severe hemiplegia with Brunnstrom stage of <2 in upper limb, medical or neurological contraindications that limits the effects of intensive repetitive facilitation technique and modified CIMT such as severe sensory disturbance and pain or contracture of upper limb

Results: In this study, the effectiveness of exercise-based conventional therapy and constraint-induced movement therapy on the motor recovery of upper limb and hand functions in subacute head injury patients is compared. The Brunnström Recovery Scale for Arm and Forearm is used to assess the recovery of upper limb motor function, and a straightforward test is used to examine the recovery of arm motor function.

Conclusion: Constraint-induced movement treatment enhanced motor capabilities of the upper limb and hand in a patient with subacute head injury, according to an analysis of the findings. The exercise routine is brief and easy. In actuality, there are very few hazards involved, and after first observation by a therapist, the

instructions are simple to follow and may be done at home. Patients with subacute head injurys who have diminished upper limb motor function may be prescribed this training regimen.
Key words: Traumatic brain injury, constraint-induced movement therapy (CIMT), upper limb and motor function.

INTRODUCTION

Traumatic brain injury (TBI) is a very common problem, with more than 500,000 people hospitalized each year due to traumatic brain injury, and approximately 70,000 of these suffer from intellectual disability, behavioral disorders, and intellectual disability. More than a third (39%) of TBI patients are between 16 and 25 years of age at the time of injury, and nearly two-thirds are younger than 36 years of age. % of men [2], and although this population is primarily composed of young men with employable potential, standardized tests of psychological distress have shown that clinical the impression is confirmed. Improving motor function in TBI patients who feel alienated, isolated, overwhelmed, and mentally distracted [6] increases functional independence, thereby increasing caregiver May reduce stress. Studies have reported on the relationship between treatment intensity and outcome in this population, showing evidence that increased treatment intensity is positively correlated with improved exercise outcomes [7-10]. modified constraint-induced (CI) movement therapy (CI therapy) for people recovering from traumatic brain injury [11].

Just as no two people are exactly alike, no two brain injuries are the same. Therefore, neurorehabilitation and physical therapy after TBI should follow principles of neuroplasticity, motor learning and motor control, and a patient-centered approach. Personal Goal Setting and Treatment Procedure Selection Patient participation in goal setting that is specific, measurable, achievable, relevant, and time-bound provides clarity on the direction of the recovery process and Reinforce goals and plans that promote the patient's overall recovery goals. Depending on the stage and condition of recovery, physical therapy is an integral part of her MDT/IDT neurorehabilitation team, and neurorehabilitation is an integral part of neurorehabilitation. Physical therapy programs may require input from a variety of constituencies, including physical therapist and occupational therapist departments. Therapists and orthotists should receive guidance from professionals experienced in the management of neurological disorders [12].

Neurophysiotherapy is an assessment and treatment that supports brain injury patients and their relatives/carers to achieve optimal outcomes in terms of physical, cognitive, social and psychological functioning, social participation and quality of life. , is an interlocking process of management. Initiating Outcome Planning This overlaps with the UK Rehabilitation Prescription Plan and sets out a process to identify future rehabilitation needs, starting from the sub-acute phase. A patient's recovery process is informed by the patient's individual needs and proceeds through the following steps: Gradual pathways to services are closely monitored and, once achieved, enhance the transition process to other services or home/care settings [13].

Functional recovery after brain injury occurs through two processes:

• Spontaneous recovery: processes associated with early central nervous system repair and degeneration of neural connections after brain injury.

• Function-induced recovery: Restraint-induced exercise therapy, like training protocols, is based on processes that promote neuroplasticity and induce behavioral changes in response to activity practices and environmental stimuli.

Defining CIMT

The signature protocol for the original form of CIMT contains three components or ‘treatment packages’:

(1) intensive graded practice of the paretic upper limb aimed at enhancing task-specific use of the affected limb for up to 6 hours a day for 2 weeks (i.e., shaping)

(2) constraining or FU of the non-paretic upper limb with a mitt to promote the use of the more impaired limb during 90% of the waking hours; and

(3) adherence-enhancing behavioral methods designed to transfer the gains obtained in the clinical setting or laboratory to the patients' real-world environment (i.e., transfer package).(Morris D, et al., 2006) Thus, whereas FU does not apply any conditioning, CIMT employs operant training techniques in the context of rehabilitative medicine. Since its launch, Edward Taub and colleagues have looked at the first proof of the original CIMT idea in 9 chronic head injury patients. In a subsequent multicenter experiment involving 222 head injury patients, their encouraging results regarding motor function, dexterity, and self-reported arm-hand use in daily life were reproduced.(Wolf S, 2006) Other research teams have used "modified" forms of CIMT (mCIMT) in trials that change the dosage, timing, and therapeutic components. While maintaining the fundamental elements of the original form of CIMT, these modifications are typically distinguished by distributed training protocols with shorter training sessions, less time spent restraining the non-paretic arm, and the absence of a transfer package that included a contract with the patient, but a higher number of training days. For mCIMT, treatment sessions can last anywhere between two and twelve weeks and range from 30 minutes to six hours each day. A thorough evaluation and subsequent meta-analysis of trials using original or mCIMT are justified given the vast range of these adaptations.

The results of exercise treatment produced by restriction Researchers looked at how CIMT affected kinematics, actual hand use, motor function, daily activity, and illnesses such neurophysiological and behavioural disorders. Recently, it has been demonstrated that these motor skills closely correlate with neurophysiological changes following CIMT. Examples of CIMT impacts and ICF (International Classification of Functioning, Disability, and Health) model effects.

METHODOLOGY

Two group pre-test and post-test experimental was study design. The study was conducted in physiotherapy outpatient department in selected hospital. Based on selection criteria, 30 patients with sub-acute head injury patients were selected and they were allotted into 2 groups by simple random sampling method as 15 subjects in each group. The study was conducted for a period of 6 months. The inclusion criteria include both the sexes were included, the age between 35-65 years old, and subjects with head injury, and also Subjects with Brunnstrom recovery stage of 2 to 5, and finally subjects with ability to understand therapists direction and communications. The exclusion criteria include patients with loss of sensation, patients with hypersensitivity, severe hemiplegia with Brunnstrom stage of <2 in upper limb, medical or neurological contraindications that limits the effects of intensive repetitive facilitation technique and modified CIMT such as severe sensory disturbance and pain or contracture of upper limb

All subjects received an explanation of the study and the procedure to be used prior to treatment, and they were asked to report any discomfort they experienced. Before receiving treatment, all patients who expressed interest in taking part in the trial were asked to complete a consent form.

3.11. PROCEDURE

Thirty head injury patients are chosen based on the selection criteria. With 15 subjects in each group, they were divided into 2 groups using a basic random sampling procedure. For the pre-test evaluation of upper limb motor function recovery, all 30 participants were participated. The 60-minute sessions for the 8-week therapy programme were held five days each week. The Group A included patients given Conventional therapy were given for control group. The Group B included patients given Constraint induced movement therapy.

TABLE - 4.1 Brunnstrom Recovery Scale For Group A And Group B

UNPAIRED ‘t’ TEST - PRE-TEST VALUES

S.no	Group	Mean	Mean difference	Standard deviation	UNPAIRED ‘t’ VALUE
1	A	3.13	0.13	0.93	0.356
2	B	3.26			

The Brunnstrom recovery scale analysis for the unpaired 't' test is displayed in the above Table. The value of 't' as calculated in this case is 0.356. This result is less than the 't' value in the table, which is 2.048 at a 5% level of significance and 28 degrees of freedom. Here, we came to the conclusion that Group A and Group B differed significantly.

TABLE – 4.2 Brunnstrom Recovery Scale For Group A

PAIRED ‘t’ TEST - PRE-TEST AND POST-TEST VALUES OF GROUP A

S. no	Test	Mean	Mean difference	Standard deviation	Paired ‘t’ value	Percentile increase in BRS from initial value
1.	Pre test	3.13	1.07	+0.153	6.96	17.83%
2.	Post test	4.20				

The study of the Brunnstrom recovery scale in Group A is displayed in the above table. Here, we discover that the computed 't' value of 6.96 is higher than the tabulated 't' value of 2.145 when applying a paired 't' test with

14 degrees of freedom and a level of significance of 0.05%. The findings show that there was a significant variation between pre-test and post-test scores.

TABLE - 4.3 Brunnstrom Recovery Scale For Group B

PAIRED ‘t’ TEST - PRE-TEST AND POST-TEST VALUES OF GROUP B

S.no	Test	Mean	Mean difference	Standard deviation	Paired ‘t’ value	Percentile increase in BRS from initial value
1	Pre test	3.26	1.7	0.21	9	30%
2	Post test	5.08				

The study of the Brunnstrom recovery scale in Group B is displayed in the above table. Here, we find that the calculated t value is greater than the tabulated t value by performing a paired 't' test with 14 degrees of freedom and a level of significance of 0.05%. The computed t value is 6.96. The findings show that there was a significant variation between pre-test and post-test scores.

TABLE - 4.4 Brunnstrom Recovery Scale For Group A And Group B

UNPAIRED ‘t’ TEST - POST-TEST VALUES OF GROUP A AND GROUP B

S.no	Test	Mean	Mean difference	Standard deviation	Unpaired ‘t’ value
1	A	4.23	877	0.3031	2.88
2	B	5.08			

The study of the Brunnstrom recovery scale on the unpaired t test is displayed in the above table. At 5% level of significance and 28 degrees of freedom, we discover that the computed 't' value is 2.86, which is higher than the table's 't' value of 2.048. The results of the t test showed that there were significant differences between Groups A and B.

TABLE - 4.5

Evaluation Of Hand Function By Simple Test For Group A And Group B

UNPAIRED 't' TEST - PRE-TEST VALUES

S.no	Group	Mean	Mean difference	Standard deviation	Unpaired 't' value
1	A	43.67	1.77	3.33	0.733
2	B	41.266			

The analysis of the unpaired, simple 't' test used to evaluate hand function is shown in the above table. The estimated 't' value in this case is 0.720, which is lower than the table's 't' value, which is 2.048 at a 5% level of significance and 28 degrees of freedom. The results of the t test showed that there were significant differences between Groups A and B.

TABLE - 4.6

Evaluation Of Hand Function By Simple Test For Group A

PAIRED 't' TEST - PRE-TEST AND POST- TEST VALUES

S.no	Test	Mean	Mean difference	Standard deviation	Paired 't' value	Percentile increase in STEF from initial value
1	Pre test	43.37	10.77	1.066	9.92	11%
2	Post test	52.37				

The analysis of the group A basic test for evaluating hand function is shown in Table VI. Here, we discover that the computed t value of 9.91 is higher than the tabulated t value of 2.135 when performing a paired 't' test with 14 degrees of freedom and a level of significance of 0.05%. The results show that there was a significant difference between the pre-test and post-test readings.

TABLE - 4.7

Evaluation Of Hand Function By Simple Test For Group A and group B

Paired 't' test -Pre test and Post-Test values

S.no	Test	Mean	Mean difference	Standard deviation	Paired 't' value	Percentile increase in BRS from initial value
1	Pre test	41.31	37.11	1.31	29.77	37%
2	Post test	78.47				

The analysis of Group A's hand function evaluation using a straightforward test is displayed in the above table. Here, we discover that the computed 't' value of 29.87 is higher than the tabulated 't' value of 2.135 when applying a paired 't' test with 14 degrees of freedom and a level of significance of 0.05%. The findings show that there was a significant variation between pre-test and post-test scores.

TABLE -4.8

Evaluation Of Hand Function By Simple Test for group A and group B

Unpaired 't' test - Post-Test values

S.no	Test	Mean	Mean difference	Standard deviation	UNPAIRED 't' VALUE
1	A	53.66	24.7	3.22	7.88
2	B	78.43			

The aforementioned table demonstrates that the evaluation of hand function by simple test was conducted using an unpaired 't' test. At 5% level of significance and 28 degrees of freedom, we discover that the calculated 't' value is 7.94, which is higher than the table's 't' value of 2.048. The results of the t test showed that there were significant differences between Groups A and B.

V DISCUSSION

After a head injury, movement can be restored in large part by the use of constraint-induced movement therapy (CIMT). Improvements in real hand use, motor function, neurophysiological processes, kinematics, and quality of life are only a few of its consequences. The issue is that not all types of head injury victims can benefit from CIMT. Only those with mild to severe disabilities are supposed to use it. There are numerous CIMT protocols in addition. While some protocols count the hours, others count the repetitions of physical activity assignments or practises. Clinical decision-making can be hampered by ambiguous and resource-intensive protocols that base job completion on the number of practise hours. Therefore, it may be more reasonable to gauge the severity or quantity of practise assignments based on how many times they are performed. The CIMT app should be made more accessible to patients with significant damage following a head injury, perhaps by having them envision using a healthy leg to carry out tasks while under load. impacted limb. However, to use CIMT effectively, a physical therapist needs problem-solving, clinical decision-making, and clinical reasoning skills. Through reflective practise and ongoing professional development, these abilities can be attained.

Impaired upper limb function after a head injury causes functional handicap in survivors and increases reliance on carers. The first three months are when the upper extremity functions remit most frequently. However, the majority (30–60%) of patients with persistent upper limb movement impairment and moderate or severe disability are affected in just approximately 10% of cases, despite the fact that this motor dysfunction improves to some extent during rehabilitation training. (Zhu, L. 2003; Broeks, J. G. 1999).

In order to compare the effectiveness of constraint-induced movement therapy with conventional therapy in post-head injury patients, this study was carried out. The Brunnström Recovery Scale and arm function evaluation, which used straightforward assessments to gauge motor recovery in the hand and upper limb, respectively, were the key findings.

According to statistical examination of the pre-test means for groups A and B, there is no statistically significant difference between the two groups, proving that this program's subject group is unpaired. although they were chosen from the same demographic, the exercises were different. The Brunnström Recovery Scale and the straightforward test of arm function both revealed a significant improvement following the facilitator's rigorous repeated exercise when compared between pre- and post-test values in Group B at the 5% significance level. Therefore, it is acceptable to reject the null hypothesis. 39

The analysis's findings also indicated that group B experienced a rise in arm function assessed by basic dough of around 37.27%, compared to group A's increase of about 30%, on the Brunnström extraction scale. This illustrates how constraint-induced movement therapy outperforms traditional therapy.

It may be necessary to repeatedly perform the voluntary motions caused by rigorous, repetitive facilitator exercises for the semi-parietal upper limb and hand to regain functional use of them. It is impossible to repeat previous repetitive facilitation activities, such as 100 repetitions of each isolated upper limb movement and each toe movement impacted by synergistic patterns (Butefisch C-1995; Kawahira et al., 2009). These brand-new, strenuous, repeating approaches offer enough precise physical stimulation to help the patient make the motions they want to.

Physical stimulation can take many different forms, such as the stretch reflex, musculocutaneous reflex, binding brought on by tapping or massaging muscles, quick passive muscular stretching, or moderate resistance to motions that are instructed. These stimulations were potent enough to cause certain movements to occur in three different timing configurations or positions of the stretched muscles when they were synchronised. As a result, both combined movements and isolated movements of each finger, wrist, and shoulder could be directly initiated.

The ability to repeatedly perform the voluntary movements induced by the rigorous repetitive facilitation exercises may be necessary for the functional rehabilitation of the hemiparetic upper limb and hand. Previous repetitive facilitation activities, such as 100 repetitions of each isolated upper limb movement and each finger movement that is influenced by synergy patterns (Butefisch C-1995, Kawahira et. al., 2009), cannot be performed repetitively. This brand-new method of intensive repetition provides the patient with enough targeted physical stimulus to realise their planned actions.

Stretch reflex, skin-muscle reflex, "-" linkage caused by tapping or massaging the muscles, quickly passive muscular stretching, or minor resistance against the planned movements were some of the components of physical stimulation. These stimuli were delivered with enough force to cause the desired postures and motions of the stretched muscles in three different temporal combinations. This enabled direct elicitation of individual finger, wrist, and shoulder movements as well as combined, synergy-free movements of the shoulder, elbow, wrist, and fingers. 40

Additionally, in 40 minutes, these techniques are smoothly repeated for 500–800 reps (100 reps of each of the 5-8 patterns). This is crucial for the development of motor skills, and movements are also carried out without harmony. The ability of the brain to change shape contributes to the recovery of hand and upper limb functions. By making the motor cortex more excitable when voluntary movements are repeated (Hummelsheim H et al., 1995).

As a result, this investigation demonstrates that constraint-induced movement therapy is effective for enhancing hand and upper limb movement.

SUMMARY AND CONCLUSION

In this study, the effectiveness of exercise-based conventional therapy and constraint-induced movement therapy on the motor recovery of upper limb and hand functions in subacute head injury patients is compared. The Brunnström Recovery Scale for Arm and Forearm is used to assess the recovery of upper limb motor function, and a straightforward test is used to examine the recovery of arm motor function.

The prevalence of head injury is becoming a major global health issue. This is because it can bring serious hardship on patients and their families, as well as death and long-term disabilities like loss of motor function. Constraint-induced movement therapy (CIMT) is a physical therapy approach that can be used to either prevent or treat disability. To encourage compliance and enhance the number of repetitions of the assignment, CIMT incorporates a practise for assigning an injured limb, a constraint for an intact limb, and a transfer bag. By promoting adjustments in the brain's physiological processes, enhancing the use of the hand in the actual world, and enhancing the accuracy and quality of movement, it aids in the restoration of normal motor control. Its protocols are different, though. The intensity or quantity of practise is determined by some protocols using the number of hours, while others use the number of repetitions. This chapter makes the case that while CIMT is effective, protocols that need multiple hours of practical work are hazy and resource-intensive, and as a result, they may obstruct clinical judgement. Therefore, he recommended increasing the usage of IACML for patients with severe disability following head injury and employing many repetitions of practise exercises to decide on the quantity or intensity of practise assignments.

Participants in Group A were asked to practise homework teaching while Group A subjects got standard therapy for 40 minutes per day, five days per week. For 40 minutes each day for five days a week, participants in Group B underwent Constraint-induced movement therapy, which included eight facilitation techniques. The workout regimen lasted for 8 weeks, and by the conclusion of that time, the motor functions of the upper limb and hand had been recovered.

The Student's t test was used to analyse the results. He demonstrated that patients with subacute head injury responded better to constraint-induced movement therapy than standard therapy in terms of increasing upper limb and hand movement.

Constraint-induced movement treatment enhanced motor capabilities of the upper limb and hand in a patient with subacute head injury, according to an analysis of the findings. The exercise routine is brief and easy. In actuality, there are very few hazards involved, and after first observation by a therapist, the instructions are simple to follow and may be done at home. Patients with subacute head injurys who have diminished upper limb motor function may be prescribed this training regimen.

LIMITATIONS AND RECOMMENDATIONS

LIMITATIONS

1. The study comprised only 30 patients, which is a small enough control group to expect reliable results.

2. Physical therapists are unable to manage the rehabilitation program's home monitoring.

3. The inclusion of a sizable number of patients restricts the study's duration.

4. The strain on the good arm makes the patient more anxious, which aggravates them when they undertake other exercises.

5. It is impossible to manage interacting factors including medications, psychosomatic conditions, and the environment.

6. In limitation movement therapy, ADL movements are restricted without the need for overly complicated motions.

RECOMMENDATIONS

1. A big number of subjects can be used for this investigation.

2. To analyse the appropriate prognosis for the improvement of the motor functions of the arm and hand, the study's duration can be extended.

3. Different types of head injury can also be covered by this research.

4. Subjects of all ages can participate in this study.
5. This study has the potential to be further upon.
6. To prevent bias, psychological counselling and a controlled setting can be used.

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