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Research Article

MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY: AN ADJUNCT TO CONVENTIONAL PHYSIOTHERAPY IN PATIENTS WITH CHRONIC HEMIPARESIS

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ABSTRACT

Research findings have indicated that mCIT can be used as an adjunct for the rehabilitation of upper limb in the patient of chronic hemiparesis. Subjects were divided into two groups, each of 15 subjects. Group A population were given conventional treatment with modified constraint induced movement therapy and group B were given conventional treatment alone. Treatment was given for 30-45min, 6 days/week for 2months. Results show that group A subjects showed more improvement than group B.

INTRODUCTION

Stroke is the sudden loss of neurological function caused by an interruption of blood flow to the brain[18]. India records 1.44-1.64 million cases of new strokes every year[19].

It is a major health issue not only because it is the third major cause of death but also because it leaves patients with several residual disabilities like physical dependence, in-coordination, cognitive decline, dementia and depression[20].

Among the myriad of stroke sequelae, hemiparesis is one of the most pervasive and disabling impairments1.Yet evidence supporting stroke rehabilitation efficacy is limited, [2, 3] with 30% to 60% of patients unable to use their more affected arms functionally following discharge.[4] As such, improved rehabilitation strategies are needed, particularly in the subacute (>3 months poststroke) and chronic (>1 year poststroke) stages, where spontaneous motor recovery often is slowed or stopped.[5,6] many stroke survivors are left with significant deficits. Upper limb hemiparesis after stroke is one of the most prevalent diagnoses treated by therapists. Deficits produce long term need for assisstance from caregivers and society.

Hemiparesis is a condition that is commonly caused by either stroke or cerebral palsy.

Detail: Hemiparesis is a condition that is commonly caused by either stroke or cerebral palsy, although it can also be caused by multiple sclerosis, brain tumors, and other diseases of the nervous system or brain.

The word, 'hemi,' means, 'one side, while, 'paresis,' means, 'weakness.' Approximately eighty-percent of people who experience a stroke also have some level of trouble moving one side of their body, or have weakness on one side. Hemiparesis is related to a condition called, 'hemiplagia,' involving paralysis of one side of a person's body, instead of weakness. There are a number of reasons people develop hemiparesis, although the condition most commonly occurs as a secondary complication of another medical issue. The treatment options for hemiparesis differ depending on the reason why a person has developed the condition.

The common clinical manifestations include contralateral hemiparesis, hemisensory loss, speech deficits and perceptual deficit[18]. Although most stroke survivors recover to some degree more than 50% of survivors are left with significant sensory, motor and cognitive deficits [20]. Hemiparesis is one of the most disabling consequence of stroke because of its impact on activities of daily living (ADLs) found in 80-90 per cent of all patients. The costs involved in caring for these patients are enormous and have adverse social implications[19].

Upper extremity hemiparesis is considered as the primary impairment underlying stroke-induced disability and it is the impairment most frequently treated[21].

More than 80% of survivors have paresis of upper limb and 30%-60% cannot use the paretic upper limb which compromises their independence and quality of life [42].

Functional recovery of upper extremity function is more difficult than recovery of lower limb function mainly because

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the patient with stroke and unlilateral upper extremity dysfunction may progressively avoid using the more affected arm in favour of non paretic extremity leading to learned non use[43].

Following stroke, the disturbed motor control results in subsequent movement disorders. Recovery means gradual returning of the specific function, after a deficit caused by a central nervous system damage (Held, 2000). The recovery of upper extremity movement following a stroke is generally poor. Three months after stroke its function remains totally or partially impaired in as much as 80 % of stroke survivors (Parker *et al*., 1986). Basmajian *et al*. (1982) reported that only 5% of stroke patients regained a total function of the upper extremity, and in 20% it remained totally non-functional. Majority of the reports indicated that in patients with initially markedly impaired upper extremity function, the recovery is minimal (Basmajian *et al*., 1982; Wade *et al*., 1983; Nakayama *et al*., 1994). In this group, a useful function of the upper extremity was regained in only 15% (Parker *et al*., 1986) or 18% of patients (Nakayama *et al*., 1994). It seems, however, that patients with initially partially impaired upper extremity function have a good potential for recovery. In this group, total recovery was reported in as much as 79% of patients (Nakayama *et al*., 1994).

Hemiparesis Is Among the most common deficits after stroke, leading in many cases to disability and permanent dependency on community care. In Germany, as well as other industrialized countries, various physiotherapeutic treatments are applied (and paid for by health care services) to improve chronic hemiparesis. However, controlled evaluation studies indicate that the effectiveness of these treatments is minor or moderate at best.[16] This finding is especially true for the transfer of therapeutic effects into the home environment (real-world outcome).[15,16] Recently, alternative approaches, which use repetitive training or forced-use procedures, have been applied with increasing success.[35-41] Constraint-induced movement therapy (CIMT), developed by Taub *et al*,[10] is the most effective intervention among these newer methods. Controlled experiments have shown that CIMT can greatly improve the amount of use of the affected extremity in chronic stroke patients, both in the laboratory and in the real-world environment.[25-29] Results were replicated in different countries with differing health care systems.30-31 Currently, CIMT is the subject of a multisite national clinical trial in the United States. Part of the theoretical framework for CIMT is provided by neurophysiologic and behavioral studies of learned nonuse.33This technique involves 3 key principles: (1) the forced use of the affected hand by restraining the intact arm, (2) training by shaping movements with the affected hand, and (3) massing the practice of both elements. Thus, during 10 consecutive weekdays (2wk), the patient wears a splint and armsling ensemble on the intact arm during waking hours to force the use of the affected hand. In addition, patients are trained for 6 hours a day to perform increasingly complex movements with the affected hand. Applied in this manner, CIMT achieves long-term improvements (2y follow-up) of the amount of use and the quality of movement of the affected arm (for reviews, see Taub *et al*[27, 32]). Because stroke patients with poorer physical condition have less capacity for demanding activities, a 6-hour a day training schedule may be too strenuous for them. The demanding nature of behavioral intervention techniques can be a major concern in stroke patients; it may also act against the therapy's effectiveness, when a patient is pushed beyond his/her endurance limits and becomes fatigued. Studying the effects of enrichment on recovery from brain lesions in animals, Will *et al*[34] found that enrichment of 2 hours a day was as beneficial as 24 hours a day. Thus, the question arises: What might the optimal amount of training be? The present study addresses this issue in that it compares the efficacy of the standard CIMT protocol, as used by Taub *et al*,[27] Miltner *et al*,[30] and Kunkel *et al*,[16] with a modified version in which the daily training schedule has been reduced by 50% to 3 hours a day.

Damage to the person's brain can lead to muscle weakness . Stroke; however, is the most common reason people develop hemiparesis. At times, muscle weakness is one of the key symptoms of stroke, bringing people to the hospital in the first place.

Treatments & Rehabilitation

Rehabilitation can help people with hemiparesis to learn new ways of moving and using their legs and arms. There is potential, with immediate therapy, for people who experience hemiparesis to eventually regain movement. There are a number of professionals involved in rehabilitation for hemiparesis. Physiatrists, Physical Therapists, Occupational Therapists, Electrical Stimulation, Cortical Stimulation, Botox/Baclofen, Motor Imagery (MI).

Physical Therapists: Physical therapists specialize in treating disabilities related to large movement and can help with endurance, strength, and range of motion problems. A physical therapist may also assist with getting a person who has had a stroke the use of their legs and arms back via balance and coordination skills exercises.

Modified Constraint-induced Therapy (mCIT): mCIT is a form of treatment involving people with hemiparetic arms who visit a therapist three times per week for a half hour throughout a ten-week period of time. Through that time, as well as at home for a number of hours each day, the person practices focused exercises using their weak arm. Research studies have demonstrated that modified CIT increased both the movement and use of the person's arm. Modified CIT; however, only works for people who have some level of movement remaining in their wrists and fingers.

Treatment of hemiparesis may include treatment of the person's underlying condition with the goal of resolving the hemiparesis, or ending its progress entirely. Physical therapy is an important part of the person's treatment. Therapy assists people to regain control of their muscles while developing muscle strength. Physical therapists might also give a person adaptive tricks and tips that can help them to navigate a world that has been created for people who have full muscle strength in both sides of their body. Assistive devices to include walkers, braces, and wheelchairs may also be helpful to people who have difficulties with walking as a result of hemiparesis.
Improvements in more affected arm use and function have been reported after people with stroke participated in constraint-

induced therapy(CIT).[7-9] Constraint -induced therapy emphasizes massed practice with the more affected upper limb through :(1)restricting patients less affected upper limbs during 90% of waking hours of a 2-week period and (2)requiring patients to engage in 6-hour activity sessions using their more affected limbs on the 10 week-days of the same 2-week period .Shaping (see Taub[10] for a description) also is applied during the 6-hour therapy sessions, in which the patients is verbally encouraged to perform progressively more difficult components of the movement. Although CIT efficacy was shown in a recently completed trial[11], its clinical feasibility has been questioned[12]. Indeed, a recent CIT case study reported that the patient" grew tired of wearing the mitt and had difficulty with full adherence...'cheating' with the uninvolved hand was a frequent temptation"[13] (page851) This finding was corroborated by a survey of subjects' and therapists' opinions about CIT,[14] in which the majority of the subjects reported that they would not want to participate in CIT and more than 80% of the therapist reported that their facilities could not administer such an intensive protocol. A recently published CIT clinical trial[9] also reported that several subjects could not participate because of home duties.

Both modified constraint induced movement therapy and conventional therapy are techniques which are in expensive, can be self administered and practiced at home.

Aim of Study

To find out the effect of Modified Constraint-Induced Movement Therapy combined with conventional physiotherapy as compared to conventional physiotherapy alone in patients with chronic hemiparesis in upper extremity.

Objectives

1. To find out the effect of modified constraint induced movement therapy combined with conventional physiotherapy in patients with chronic hemiparesis.
2. To find out the effects of conventional physiotherapy in patients with chronic hemiparesis.
3. To compare the effect of conventional physiotherapy alone and modified constaint induced movement therapy with conventional physiotherapy.

Need of Study

A number of interventions have been published evaluating the effect of various rehabilitation methods in improving upper-extremity motor control and functioning, such as exercise training of the paretic arm, impairment-oriented training of the arm, functional electric stimulation, robotic-assisted rehabilitation and bilateral arm training. However, most of the treatment protocols for the paretic upper extremity are labour intensive and require 1-to-1 manual interaction with therapists for several weeks, which makes the provision of intensive treatment for all patients difficult[44].

It is a well established fact that there is no ideal treatment protocol for stroke rehabilitation and there continues to be a shortage of scientifically validated therapeutic procedures applied to physical rehabilitation of the hemiparetic limb[45]
Both modified CIMT suggested to be simple, inexpensive and most importantly patient directed treatment that improves upper extremity function[42.]

There has been no study comparing the efficacy of modified CIMT and mirror therapy on the motor function of the upper paretic limb which this study aims to fulfil.

Studies have discussed the additive effect of modified constraint induced movement therapy but lenghty treatment session was the loophole in the successful and satisfying treatment for patients. in previous various study it was reported that long hour restriction causes tiredness, depression ,irritation and cheating with the uinvolved hand was a frequent temptation. While shorter duration restriction of arm study showed positive result. Hence to study the additive effect of modified constraint induced movement therapy with conventional therapy with reduced duration, this study is undertaken.

This study is designed to answer the following questions:

1. can we replicate the therapeutic efficacy of the standard 6 hours a day protocol found in earlier week?
2. do patients also improve when treated with 3 hours of daily shaping training?
3. are there any differences in the outcome of the 2 treatment schedules.

METHODOLOGY

1. Study design: Interventional/experimental
2. Sample size:30
3. Type of study: Randomized control trail
4. Sample Source: Physiotherapy department of tertiary care hospital
5. Duration of study:2months
6. Group A containing 15 patients received modified constraint induced movement therapy along with convention physiotherapy.

Group B containing 15 patients received conventional physiotherapy alone.

Inclusion Creteria

1. Patients with history of no more than one stroke;
2. Ability to selectively extend atleast 10 degrees at the metacarpophalangeal and interphalangeal joints and 20 degrees at the wrist;
3. Stroke experienced more than 12 months prior to study enrollment;
4. A score 69 on the Modified Mini Mental Status Examination;
5. Age greater than 18 years and less than 80 years; and
6. More affected arm nonuse, defined as a score of less than 2.5 on the MAL.

Exclusion Creteria

1. Excessive spasticity, defined as a score of greater than or equal to 3 on the Modified Ashworth Spasticity Scale;
2. Excessive pain in the more affected arm,as measured by a score of greater than or equal to 4 on a 10-point visual analog scale;
3. Still enrolled in any form of physical rehabilitation; and
4. Currently participating in any experimental rehabilitation or drug studies.
5. still enrolled in any form of rehabilitation;

6. participating in any experimental rehabilitation or drug studies; and
7. receipt of botulinum toxin A administered to the affected arm, wrist, or fingers withi the past 4 months.
8. subjects were not excluded based on ambulation ability, or lack thereof However, all subjects were taught to safely don and doff the restraint device during the first intervention session.

MATERIALS

- Cotton hemi sling, resting hand sling, arm sling, specially designed half glove,
- balls, matchbox, cards, spoon, pen, book
- Wooden blocks, marble, washers, test tubes, glasses
- Table, chair, baskets, tray
- Stepper, stopwatch.

Study Procedure

- Written consent form will be taken from all the participants.
- Participants will be randomly divided into two gropus A and B.
- Group A containing 15 patients will recieve modified constraint induced movement therapy along with conventional physiotherapy consissted of 2 components.
- First component of half-hour, one on one sessions of more affected arm sessions 6 days per week for 2 months periods.
- operant conditioning, applied in such a way that current motor capacity was extended using positive verbal encouragement.
- In the second component of the modified constraint induced movement therapy intervention, during the same week period, subjects less affected were restrained 6 days/week for 3 hours identified as a time of frequent arm use.

Intervention

Treatment consisted of 2 main elements: (1) restriction of movement of the unaffected upper extremity by placing it in a resting hand splint/sling ensemble for 90% of the hours spent awake for a period of 2 months and (2) training of the affected arm by a procedure termed “shaping” for approximately 3 h/d on the 6 weekdays during that period.

Movement Restriction

The ventrum of the affected lower arm and hand was placed in a resting hand splint that was fastened across its dorsal surface by Velcro straps; it does not permit wrist flexion and grasp and thus prevents the manipulation of objects. The arm in the resting hand splint was then placed inside a sling. Learning to put on and remove the splint/sling ensemble usually required no more than one-half hour of instruction before subjects could accomplish these tasks by themselves without difficulty. A formal behavioral contract with the subject was set up detailing the agreed-upon activities the patient would carry out while not wearing the constraint ensemble (eg, bathing, washing, some aspects of dressing, and any activity in which safety would be compromised) and the activities that the patient would carry out while wearing the resting hand splint and sling (eg, grooming, household tasks, eating).

Shaping

This is a commonly used operant conditioning method in which a behavioral objective (in this case movement) is approached in small steps of progressively increasing difficulty. The subject is rewarded with enthusiastic approval for improvement but is never blamed (punished) for failure. A basic basic principle is to keep extending motor capacity a small increment beyond the performance level already achieved. A battery of approximately 50 tasks was used for shaping, from which a subset of 15 to 20 was selected for individual subjects. Task objects were frequently used household objects (eg, jars, eating utensils, spring-loaded clothespins), children’s toys (eg, building blocks, marbles), and standard devices used in physical and occupational therapy

- Each exercise was performed 10 times each. MCIT included each participant formulated five realistic aims related to ADL or leisure time activities before starting the intervention. Daily activities were the basis for an individual activity form which was updated with daily progress. Exercises were chosen from a collection of approximately 150 activities to be carried out with one hand, divided into 10 fields: personal care, kitchen & household, games, handicrafts, gardening, office work, shopping, sports, strength & mobility. The activities ranged from complex to simple tasks & were individually adjusted with regard to number of repetitions, tempo, resistance, range of motion, texture, weight, size & shape. The participants had mini -breaks when they shifted from one field of activity to another after half an hour.
- PT treatment 6 days per week for a period of 2 months. In addition, constraining was worn; no training was provided .Two types of constraints were used; a resting hand splint & arm sling ensemble or a specially designed half glove. In patients without balance problems, the splint & sling ensemble was worn on the unaffected hand. In the patients with balance problems, a half glove was used to enable the subject to use the unaffected hand for safety in the event of a fall.
- Group B containing 15 patients will receive conventional therapy alone for half an hour to the affected arm 6 days per week for 2 months periods. Conventional therapy will include range of motion exercises, stretching, strengthening exercises, electrical stimulation (if required) to both paretic and non paretic sides of the body respectively. It will range from time duration of 30-45 minutes.

RESULTS AND TABLES

Table 1 Age distribution

Group A		Group B		Paired t test	
Mean	SD	Mean	SD	P value	Difference
53	7.031	52	4.287	0.756	Not significant

Table 2 Intragroup analysis for FM

	Group A		Group B	
Parameter	PRE	POST	PRE	POST
Mean	44.53	50.87	44.67	47
Std deviation	3.34	2.85	3.48	4.08
Median	46	51	47	48
Lower 95% CI	42.69	49.29	42.74	33.35
Upper 95% CI	46.38	52.45	46.59	38.51
P value	<0.0001		<0.0001	

Table 3 Intragroup analysis for ARAT

	Group A		Group B	
Parameter	PRE	POST	PRE	POST
Mean	36.6	41.07	36.20	38.20
Std deviation	1.88	1.71	1.42	1.74
Median	37	41	36.00	38.00
Lower 95% CI	35.56	40.12	35.41	37.25
Upper 95% CI	37.64	42.01	36.99	39.16
P value	<0.0001		<0.0001	

Table 4 Intragroup analysis for Modified Ashworth Scale

	Group A		Group B	
Parameter	PRE	POST	PRE	POST
Mean	1.53	0.80	1.40	1.13
Std deviation	0.64	0.41	0.74	0.64
Median	2.00	1.00	2.00	1.00
Lower 95% CI	1.18	0.57	0.99	0.78
Upper 95% CI	1.89	1.03	1.81	1.49
MAS	<0.0001		0.04	

Table 5 Intergroup analysis of FM

Parameter	POST(Group A)	POST(group B)
Mean	50.87	47.40
Std deviation	2.85	4.08
Median	51	48
Lower 95% CI	49.29	45.14
Upper 95% CI	52.46	49.66
P value	0.0124	

Table 6 Intergroup analysis for ARAT

Parameter	POST(Group A)	POST(Group B)
Mean	41.07	38.20
Std deviation	1.71	1.74
Median	41	38
Lower 95% CI	40.12	37.24
Upper 95% CI	42.01	39.16
P value	<0.0001	

Table 7 Intergroup analysis for MAS

Parameter	POST Group A	POST Group B
Mean	0.80	1.13
Std deviation	0.41	0.64
Median	1.00	1.00
Lower 95% CI	0.57	0.78
Upper 95% CI	1.03	1.49
P value	0.081	

DISCUSSION

The purpose of the study was to find out the effect of mCIT combined with conventional physiotherapy as compared to conventional therapy alone in patients with chronic hemiparesis. Inclusion criteria for this study was, patients with 20^0 extension of wrist and atleast 10^0 extension of metacarpophalangeal joint and inter phalangeal joint and 20^0 at the wrist, with stroke experienced one year prior to the study enrollment.

The present study showed that mCIT combined with conventional physiotherapy (Group A) showed significant improvement in upper extremity motor component of Fugl-Meyer assessment and extremely significant improvement with respect to Action Research Arm Test after 2 months of treatment program. 't' test showed non significant differences between the pretesting scores and so has not mentioned in the results. During assessment of individuals in group A, it is found that some of the component in upper extremity motor component of Fugl-Meyer assessment and Action Research Arm Test showed greater improvement on comparison of Post-treatment of mean of both the groups. It showed significant improvement in gripping, grasping, & movement of hand which can also be predicted by statistic of this study. As seen throughout the treatment period, continuous improvement of hand movements in the shaping tasks was observed in each patient. For example increasingly smaller objects could be picked up faster & with progressively less effort. The patients functional movement capabilities improved so that new tasks of daily living could be performed outside the laboratory and in the home environment after treatment. The new real-world behaviors that patients performed after treatment consisted of such ADL tasks as eating soup with a spoon, cutting vegetables, or combing hair with the affected hand. The greatest changes in mCIT with conventional physiotherapy groups were seen on the FMA wrist & hand items and on the ARAT grip, grasp and pinch scales. Functionally, mCIT with conventional physiotherapy group reported better ability to perform valued ADLs that they could not previously perform, including farming, writing, grooming. These subjects reported new ability to perform valued activities with the affected hand.
The above changes in affected arm use were manifest in behavioral changes. Specifically, whereas patients exhibited stable motor deficits before intervention, they exhibited motor improvements after intervention. Subjects also exhibited greater motor changes. Patients were able to perform tasks which they were unable to perform prior to treatment. Certainly (FM, ARAT) are important, but these subjective changes were much more significant, because they allowed subjects to reintegrate into their homes and communities[48].

It is believed that stroke patients express greater motor disability on their more affected sides than that which actually exists. Over time, this movement suppression, or learned non-use, becomes so habitual that patients use the less affected side for most ADLs. Data from this study provide further support for the contention that learned nonuse after stroke can be overcome by mCIMT[65,66]. Furthermore, FMA and ARA data support the contention that mCIMT participation can elicit functional changes. Given that previous CIMT studies reported use-dependent cortical reorganizations[56], and given that remarkably short training protocols have induced cortical and functional changes[35,67-69], increases in affected limb use that we observed are believed to have caused cortical reorganizations that resulted in the functional improvement.

After stroke patients shows lack to attention towards affected side,i.e, they pay less attention to body parts which are not functionally well, so their is lack of feedback from affected side of the body.

mCIT produces changes in brain effectively through changes in neural connection which progessively leads to structural alternation in brains.

The treatment is thought to work because it overcomes a strong tendency not to use the weaker arm, mCIT strengthens synaptic connections and produces rewiring of the brain.

CONCLUSION

After 2 months of treatment study concluded that

1. There was significant improvement iin FM score, ARAT score & no significant reduction in MAS was seen in both the groups.
2. On comparing both the groups together ,it is found that there was significant improvement in FM & ARAT score in group A than group B & no significant improvement in MAS was seen

Clinical Implication

1. Modified Constraint Induced Movement Therapy is a very good adjunct to conventional physiotherapy.
2. Modified Constraint Induced Movement Therapy has beneficial effects on functional independence & ADLs.
3. Task performing & ADLs related activity doesn't make patients tired & bored.
4. Not strenuous for patients.

Summary

Hemiparesis is "partial loss of motor function on one side of the body". Main difficulties associated with hemiparesis are alteration tone, loss of selective movement, inability to perform ADL's. Severe arm paresis in patients leads to limited functionally usage of arm i.e. The patients could only protract their shoulder girdle, hold their extended arm while lying of flex, and extend their elbow slightly atleast moderate upper limb flexor spasticity on the affected side; mild or no impairment of sensation, tested for touch , pain and position sense.

The test to measures arm motor functions are FM, ARAT and for spasticity is modied ashworth scale.

Management for chronic hemiparesis patients focusing on the arm included the following goals, they are as follows:

1. Minimize the effect of tonal abnormalities.
2. Maintain the joint range of motion and prevent deformity.
3. To improve motor functions of the affected arm.
4. To improve hand prehensions like gripping, grasping, pinch.
5. To promote awareness, active movements and use of the affected hand.
6. To initiate self care activities.

Primary motor cortex is reponsible for motor functions of arm. Previous studies show that mCIT leads to motor reorganisation and also realted to neuroplasticity. hence, Modified constraint induced movement therapy can be utilized in the treatment of hemiparesis by using adaptation, habituation, and compensation exercise to improve motor function of arm, maintain joint range of motion, and to increase use of the affected hand.

30 patients were included in the study according to inclusion and exclusion criteria. Informed consent was taken from them. Study consists of 2 groups. Group A subjects were given modified constraint induced movement therapy along with conventional physiotherapy and Group B subjects were given conventional physiotherapy alone. Duration of the study was 2months and 6 treatment sessions in each week. For both the groups patients were assessed on Upper extremity motor component of Fugl-Meyer assessment of physical performance, Action reasearch arm test, and modified ash worth Scale, before and after the treatment.

Data was analyzed using appropriate statistical tests for both groups and it was concluded that within group analysis showed significant improvement in FM, ARAT and no reduction in MAS after 2 months of treatment. Whereas there was extremely significant improvement in ARAT and also in FM in group A than group B but no difference was found in MAS when compared using post treatment scores of the scales.

So restoring the functional activity is important for these patients. Modified constraint induced movement therapy causes regain of motor activity, and also improve dextirity of the affected hand.

Hence mCIT can be used as good adjunct to conventional physiotherapy and helps in improving ambulation and functional independence in community. Even addition of these exercises is not strenuous for patients

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