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Effect Of Modified Constraint Induced Movement Therapy Vs Weight Bearing Exercises On Upper Extremity Function In Stroke Patients.

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Abstract:

Background :- Stroke is the leading cause of disability in the world, and upper limb hemiparesis is a primary impairment resulting in this disability. In previous studies it has been found that modified constraint induced movement therapy and weight bearing exercises is used to improve upper extremity function in stroke patients. The purpose of this study is to determine which technique is more effective in improving the upper extremity function in stroke patients.

Aim :- Effect of modified constraint induced movement therapy versus weight bearing exercises on upper extremity function in stroke patients.

Objective :- To study effect of modified constraint induced movement therapy on upper extremity function in stroke patient. To study effect of weight bearing exercises on upper extremity function in stroke patient. To compare effect of modified constraint induced movement therapy versus weight bearing exercises on upper extremity function in stroke patient.

Method :- This study included 20 stroke patient. Each group consisted of 10 patients. Group A received Modified Constraint Induced Movement Therapy who wore told to wear mitten for 4 hours in a day and for 1 hour varied exercise like picking up marbles, stacking rings, picking up balls, flipping cards were practiced. Group B received weight bearing exercises like prone on elbow, prone on hand, quadruped, sitting, standing.

CONCLUSION : As per the result and analysis, Mcimt have shown better results in improving upper extremity functions as compared to weight bearing

INTRODUCTION:

WHO defined stroke as "rapidly developed clinical signs of focal disturbance of cerebral function, lasting more than 24 hours or leading to death with no apparent cause other than vascular origin"1Clinically, a variety of focal deficits are possible including changes in the level of consciousness and impairment of sensory motor, cognitive, perceptual and language functions. To be classified as stroke, neurological deficits must persist for at least 24hours. Motor deficits are characterized by paralysis(hemiplegia) or weakness(hemiparesis), typically on the side of the body opposite the side of the lesion2 . During the last decade, the age adjusted prevalence rate of stroke was between 250-350/100,000. Stroke represented 1.2% of total deaths in India.3 TYPES OF STROKE Ischemic stroke is the most common type affecting about 80% of individuals, and results when a clot blocks or impairs blood flow, depriving the brain of essential oxygen and nutrients. Hemorrhagic stroke occurs when blood vessels rupture, causing leakage of blood in or around the brain2 . Upper extremity paresis is a leading cause of functional disability in everyday life. Upto 85% patients show an initial deficit in the arm. While recovery of arm function is poor in a significant number of patients, leg function has proven to be a less of a problem. Paralysis of an arm after a stroke makes arm movement such as reaching, grasping and manipulating of objects difficult. There are several approaches to physiotherapy treatment after stroke. There is no evidence of any one physiotherapy treatment approach being more effective than any other treatment approach for the recovery of disability or impairment after a stroke.4 2 WEIGHT BEARING EXERCISES Weight bearing of the upper extremity is essential in motions such standing up by pushing a hand against the floor5 . The application of weight-bearing is a treatment principle customarily applied by clinicians before a functional activity, on the assumption that it helps muscle tone and contributes to the normal development of skilled movement of the arm and hand6 .Weight bearing exercises are known to be effective for joint stability because they increase pressure on the joint to stabilize the humerus in the articular fovea, increase proprioceptive stimuli, and induce co-contraction of the muscles around the joint7 . Upper extremity weight-bearing exercises include motions to support or push something with the hands and being in quadruped, prayer, and tripod positions8 . MODIFIED CONSTRAINT INDUCED MOVEMENT CIMT is a behavioral approach in neuro-rehabilitation based on the principle of "learned non use". The term is derived from studies of non-human primates in which somatosensory deafferentation of a single forelimb is performed, after which the animal fails to use that limb9 . The major components of CIMT include intense repetitive (task oriented) training and behavioral shaping of the impaired limb with immobilization of the unimpaired arm. Intensive CIMT involves constraint of the unaffected arm for at least 90% of the waking hours whilst modified CIMT (m-CIMT) consists of constraint of the unaffected arm with a padded mitt or arm sling for a minimum of 4 hours per day.10,11m-CIMT is an alternative was needed that would be easier for patients to follow and access and for clinics to implement.12

RESEARCH METHODOLOGY:

1. Type of study: Comparative study

2. Type of sampling: Convenient sampling

3. Sample size: 20

4. No. of groups: 2

5. Group A: Modified constraint induced movement therapy 6. Group B: Weight bearing exercises

7. Study setting:

   i. Dr. Vasantrao Pawar medical college, hospital and research centre, Nashik

   ii. Subjects in and around Nashik.

8. Duration of study: 6 months

RESULTS AND DISCUSSION:

Results of Descriptive Statics of Study Variables:

GROUP A: MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY

Table 1: wolf motor function test.

Outcome measure	No. of patient	mean	Standard deviatiom
Pre treatment	10	33.6	3.977716
Post treatment	10	49.3	3.713339

P<0.0001

Table 2: Fugyl Meyer

Outcome measure	No. of patient	mean	Standard deviatiom
Pre treatment	10	33.4	3.438386
Post treatment	10	50.4	2.54733

P< 0.0001

GROUP B: WEIGHT BEARING EXERCISE

Table 3: Wolf motor function test.

Outcome measure	No. of patient	mean	Standard deviatiom
Pre treatment	10	25.5	2.91357
Post treatment	10	41.5	3.472111

P< 0.0001

Table 4: Fugyl meyer.

Outcome measure	No. of patient	mean	Standard deviatiom
Pre treatment	10	30.5	3.100179
Post treatment	10	44.7	2.626785

P< 0.0001

Comparison group A group B:

Wolf motor function test	Group A	Group B
mean	49.30	41.50
Standard devaition	3.713339	3.472111

P= 0.0001

Fugyl Meyer	Group A	Group B
mean	50.40	44.70
Standard devaition	2.54733	2.626785

P= 0.0001

DISCUSSION:

The main purpose of study was to compare the Modified Constraint Induced movement therapy versus Weight bearing exercises to improve upper extremity function in stroke patient , and to find out a better treatment option between these 2 methods.

In group A there were significant changes in score was noted pre and post treatment, the mean of wolf motor function pre treatment was 33.6 and post treatment it was 49.3 In group A there were significant changes in score was noted pre and post treatment, the mean of fugl meyer pre treatment was 33.4 and post treatment it was 50.4 As the p <0.0001 in Group A, result is statistically significant, thus Modified Constraint Induced Movement Therapy is effective in improving upper extremity function in post stroke patients. Thus, patients showed improvement in quality of the movement post intervention by Modified Constraint Induced Movement Therapy. Exercises were focused more on improving fine movements of the hand that could be performed in activities of daily living. Many have studies provided evidence of neuroplasticity following CIMT. The cortical changes seen with neuroimaging correspond to the functional and laboratory improvements demonstrated with motor assessments. Individuals demonstrated improvement in the amount of use and quality in more affected upper extremity. This was because CIMT therapy produced use- dependent cortical re-organization. 19,20

By restraining the use of less affected arm and requiring the performance of various functional task, the stroke patient is

placed in a situation where he either used the more affected arm or is rendered eventually helpless. This overcomes the learned non use. Through massed practice these changes are strengthened and still further weakens the conditioned inhibition that is responsible for non use. Also, the patient gradually develops new ways to move effectively21

.The focused training on the affected hand during mCIMT can lead to increased strength and dexterity. Through repetitive practice of functional tasks, individuals can regain strength in the muscles of the hand and improve their ability to manipulate objects mCIMT may also contribute to improvements in the range of motion of the affected hand and fingers. By actively engaging in movements that mimic activities of daily living, individuals can gradually increase their flexibility and mobility in the affected limb.

In group B there were significant changes in score was noted pre and post treatment, the mean of wolf motor function pre treatment was 25.4 and post treatment it was 41.5. In group B there were significant changes in score was noted pre and post treatment, the mean of fugl meyer pre treatment was 30.5 and post treatment it was 44.7 As the p <0.0001 in Group B, result is statistically significant, thus Weight Bearing Exercise is effective in improving hand motor function in post stroke patients.

Weight bearing exercises are known to be effective for joint stability because they increase pressure on the joint to stabilize the humerus in the articular fovea, increase proprioceptive stimuli, and induce co-contraction of the muscles around the joint5 Bearing weight on extremities has been recommended as a treatment to reduce abnormal muscle tone and prevent contractures. Upper extremity weight-bearing activities promote the

contraction of the rotator cuff and the scapula stabilizer muscles in the same way as closed-chain exercise performed with fixed distal parts22

. It is thought that this improvement in muscle functions promoted increases in the stability of the scapula and the co-contraction of the muscles around the shoulder joints, resulting in improved upper extremity function5 Weight bearing on the extended arms in the five different positions had a positive relationship with the overall prehension skills The co-contraction of joints and multi-joints increases, the muscle synergy of the affected extremity would decrease in order to perform separate movements of the upper extremities and that movement of the wrist on the affected side can be attempted in collaboration with movement of the elbow joint 23

.When treatment scores were studied comparing both Groups, this study showed statistical significance in improving hand motor function in Group A as compare to Group B i.e. Modified Constraint Induced Movement Therapy is more effective than Weight Bearing exercises in improving upper extremity function in post stroke patients. That may be because modified CIMT can result in an enlargement of the motor output map by increasing engagement of the damaged hemisphere which is associated with a greatly improved motor performance of the paretic limb. As in mCimt there were various exercises which kept patients attention and made it interesting for the them. As the goal of intervention was optimal participation in daily life situations, mCimt emphasized to promote maximum use of affected hand in performing activities of daily living (ADL) and also focused more on improving fine movements of the hand.

CONCLUSION : As per the result and analysis, Mcimt have shown better results in improving upper extremity functions as compared to weight bearing

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