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Effects of Motor Imagery and Task Oriented Approach to Improve Trunk Control in Acute Stroke Patients

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ABSTRACT

Background: motor imagery technique and task oriented approach are effective emerging technique used in rehabilitation for stroke patients. The purpose of the study is to find out the comparative effect of motor imagery and task oriented approach to improve trunk control in acute stroke patients.
Methods: 20 patients with acute stroke were assigned into two treatment groups. The first group (n=10) treated with task-oriented approach. The second group (n=10) treated with motor imagery. The effect of 3 weeks treatment was measured by Trunk Impairment Scale (TIS) and Modified Functional Reach Test (MFRT).
Result: After 3 weeks of treatment using task oriented approach had a statistically significant improvement on recovery of trunk control in acute stroke patients than motor imagery technique.
Conclusion: The study proves that task oriented approach is more effective to improve trunk control in acute patients than motor imagery technique.

Key Words: Trunk impairment scale (TIS), Modified functional reach out (MFRT), motor imagery, and task oriented approach.

1. INTRODUCTION

A Stroke is a central nervous system disease that has serious impact on individual lives. It is a leading cause of disability worldwide which affects mostly elderly people and a commonest life-threatening neurological disorder all over the world. The greatest impact of stroke on both patients and families are long term disability, including impairments, limitation of activity and participation restrictions in life situations.[4]
Stroke [CVA] is a sudden loss of neurological function caused by an interruption in the blood flow to the brain.3 The world health organisation [WHO] defined stroke as rapidly developed clinical signs of focal or global disturbance of cerebral functions lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin.[1]
Worldwide 15 million people suffers stroke each year. In which 5 million die each year and another 5 million live with permanent disability. The estimated adjusted prevalence rate of stroke ranges from 84 -262/100,000 based on the recent population studies.[3]
The risk increases with age, the incidence doubling with each decade after the age of 45 years and over 70 percent of all the stroke occurs above the age of 65.[2]

The Middle cerebral artery [MCA] is the most common site for stroke the blood supply to the brain comes from the internal carotid and the vertebral arteries. In MCA stroke trunk is mostly affected than upper limb and lower limb. The primary functions of MCA is to supply specific regions of brain parenchyma with oxygenated blood. The cortical branches of the MCA irrigate the brain parenchyma of the primary motor and somatosensory cortical areas of the face, trunk and upper limbs, apart from the insular and auditory cortex.[4]

TRUNK CONTROL MEASURES

The common problem with hemiplegia is the inability of the upper trunk to move independently of the lower trunk. Effective limb functions depends on better postural control in sitting and standing posture. Trunk muscles not only help in maintaining an erect trunk posture but also allow effective weight shifts during dynamic postures.6 Impaired trunk control post stroke many patients with stroke tend to demonstrate insufficient trunk control, affecting their functional ability in many activities, e.g.., turning in bed, sitting up/lying down, raising from sitting to standing, standing and walking. Loss of trunk control causes, Dysfunction in upper and lower limb control, Increased risk of falls, Potential for spiral deformity and contracture, Impaired ability to interact with the environment, decreased independence in activities of daily living (ADL), Decreased sitting and standing tolerance, balance and function.[7]

2. MATERIALS AND METHODOLOGY:

A comparative study was conducted at the department of physiotherapy, Sri Ramakrishna hospital, Coimbatore. The duration of the study was 6 months. The source of data was gathered from Sri Ramakrishna Hospital, Coimbatore 20 Subjects with acute stroke were selected and assigned in two groups based on simple random sample techniques. GROUP A: received task oriented technique and GROUP B: received motor imagery technique.

CRITERIA FOR SAMPLE SELECTION

Inclusion Criteria-Patients with acute stroke, Age between 30 to 70 years.12, Single episodes of stroke, Able to sit for 30 secs.13, Both male and female are included, Able to follow the commands.

Exclusion criteria-Un cooperative patients, History of multiple stroke patients, psychologically affected patients, Past history of brain injury or any other cerebral pathology, seizure history blindness, hearing loss.

OUTCOME MEASURES

Primary outcome measure-Trunk impairment scale (TIS).

Secondary outcome measure-Modified functional reach test (MFRT)

3. INTERVENTION PROTOCOL

Patients of both the groups received treatment session for 5 days per week for 3 weeks. The duration of treatment period was 45 minutes per each session and each exercise for 20 repetitions with interval of 30 seconds after each 10 repetitions.

GROUP A (Task Oriented Technique) - The subjects were assigned to task oriented technique. In the task oriented programme, the selected tasks were,

REACHING AN OBJECT-An object is kept on the table. Ask the patient to clasp the hand and lean forward to reach the object beyond the arm length.

SIDE FLEXION- Side flexion to the most affected side touching the plinth with the elbow, side flexion to the opposite side touching the plinth with the elbow. Feet is placed in the floor.

SEATED TRUNK FLEXION-The patient is instructed to sit in a chair, ask the patient to clasp the hand and bend forward in sitting posture.

PICKING UP AN OBJECT FROM CHAIR-An object is kept on the floor. The patient is instructed to pick an object from the floor. Affected hand is placed on their thighs.
TRUNK ROTATION-The patient is instructed to clasp their hands and then touch the target point in sitting position.

LOWER TRUNK ROTATION USING SWISS BALL-The patient is instructed to lie down and place their legs on the swiss ball and asked to rotate their trunk.

GROUP B- MOTOR IMAGERY TECHNIQUE

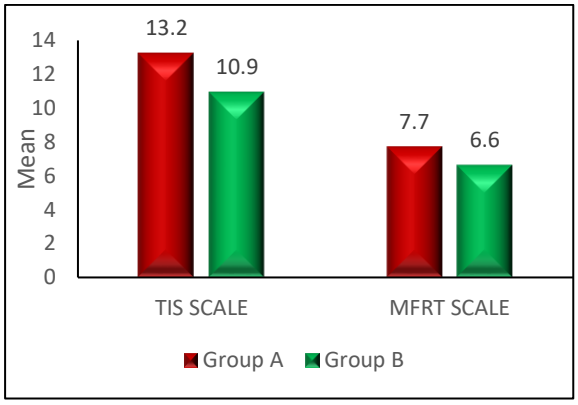
The subjects were assigned to motor imagery training. Before the imagery training, a video of normal person's trunk movements was produced. This video was provided in the treatment room for 10 minutes using visual and auditory information. Thereafter the patient was instructed to close his /her eyes, while in a comfortable sitting position in a chair, imagine the movements of the body in the video for 10 minutes with his /her body relaxed. The therapist will ask questions in the middle to see if the patients was concentrating on their imagination of the movements of the body.

This video was provided only once at the first session and only imagery training was undergone thereafter. The exercises are pelvic bridging, upper and lower trunk rotation in supine, in sitting position the forward reach outs, lateral trunk flexion, pelvic lifts were given.

4. DATA ANALYSIS:

Pre-test and post-test values of the study were collected and assessed for variations in improvement and their results were analysed using independent t test and parried t test. The statically analysis of the study showed that there is a significant difference between the group in TIS and MFRT with a t value of TIS was 2.45 and in MFRT was 2.108.

COMPARISON OF RESULTS



5. DISCUSSION

The study was aimed to evaluate the effects of motor imagery and task oriented approach for acute stroke patients to improve trunk. For this study 20 patients from Ramakrishna hospital were taken. From this sample of 20, the subjects were divided into 2 groups consisting of 10 subjects each.

The outcome measures were done by trunk impairment scale (TIS) and modified functional reach test (MFRT) and it is widely used and yields scores that are reliable valid. The group A conducted task oriented approach for five times in week for 3 weeks. The group B conducted motor imagery technique for five times in week for 3 weeks. Both the group were assessed on the first and last day of treatment.

On statistical analysis using independent t test, it was found that there is significant difference in the post test scores of group A over the group B in stroke rehabilitation, thus rejecting null hypothesis. The result showed that task oriented techniques are more effective than motor imagery, there by supporting the alternate hypothesis.

TASK ORIENTED APPROACH

Task oriented approach, improved functional performance, more recovery and quality of trunk function in patients with acute stroke.

In task oriented approach, static sitting balance are improved along with dynamic sitting balance in acute stroke patients. Task oriented approaches was proven to be effective in improving the muscle activation of trunk in acute stroke patients.

A study done by Karthikbabu et al 2011 suggested about task oriented approach that task- specific trunk exercises practiced in a challenging environment field (i.e. a stable as against an unstable surface) provided a gradual demand on the trunk muscles. Those treatment techniques were based on the ecological motor control theory and through this, the patient achieved a new skill. A study by Julee Das et al 2016 concluded that trunk performance and dynamic sitting balance could be improved early in the rehabilitation process, better functional improvement after stroke might be expected. Trunk rehabilitation exercises also showed a transfer effect on standing balance and ambulation. These findings might be explained by exercises implemented as soon as possible in functional tasks such as reaching and rolling. In this study, results showed that task oriented approach had better improvement as measured trunk impairment scale as compared with the improvement registered by the control group. The statically analysis of the study showed that there is a significant difference between the group in TIS and MFRT with a t value of TIS was 2.37 and in MFRT was 2.108.

6. CONCLUSION

The conclusion of this study is based on the post mean measures of TIS and MRFT of both group A and group B and concluded that there is a significant improvement on trunk control in acute stroke patients in group A, in comparison with the patients in group B.

As per data analysis and interpretation, null hypothesis (H0) is rejected and the alternate hypothesis (H1) is accepted which states that There is significant improvement on task oriented approach (Group A) than motor imagery technique (Group B) in the treatment of acute stroke.

7. ETHICAL APPROVAL AND CONSENT TO PARTICIPATE:

Ethical approval was obtained from the institutional review board of Sri Ramakrishna institute of paramedical sciences. All respondents agreed to participate in the study and informed consent was obtained from all the subjects. The privacy of the participants information was maintained, and there was no disclosure of their names or any information that could identify them.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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