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ORIGINAL ARTICLE

COMBINED EFFECT OF BOBATH TECHNIQUE AND MOTOR RELEARNING PROGRAM (MRP) OVER ITS INDIVIDUAL EFFECTS TO IMPROVE UPPER LIMB FUNCTIONS IN STROKE PATIENTS	Search engine: www.ijmaes.org

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ABSTRACT

Background and Objective*: Functional recovery and motor control is one of the major causes of concern in stroke patients with performing activities of daily living. Upper limb impairment affects the performance of many activities of daily living. Our major objective of the study is to investigate the effectiveness of the individual and combined effect of Bobath technique and motor relearning program to improve upper limb functional recovery and motor control in stroke patients. **Methods:** A random sampling method is used to select patients with Right MCA stroke. Thirty patients were included and randomly divided into three groups by using lottery method, with ten in each group A, B and C. Group A, B and C had underwent MRP, Bobath and combined of these two techniques respectively. The outcomes are measured by the Modified Ashworth Scale(MAS), Stroke Rehabilitation Assessment of Movement(STREAM) and Fugal Meyer scale to find the outcome on spasticity, voluntary control and functional recovery of the upper limb in stroke patients. **Results:** Intra group analysis was done by Wilcoxon rank test. In intra group analysis, of Group A showed improvement in voluntary control & spasticity with p<0.005 but no significant improvement found in functional activities. Group B & C showed significant reduction in spasticity, improvement in voluntary control & functional recovery with p<0.005. **Conclusion:** The present study concluded that individual effect of motor relearning program is more effective than Bobath technique but the combined effect of these two techniques are more effective than the individual effect in the functional recovery of the upper limb in the right MCA stroke patients.*

Keywords: MCA, Stroke, Bobath technique, MRP, FMS, STREAM, MAS

INTRODUCTION

Stroke is an acute onset of neurological dysfunction due to an abnormality in cerebral vascular circulation with resulting signs and symptoms that corresponds to focal areas of brains[1]. According to Lance, Spasticity has been defined as an increase in muscle tone due to hyper excitability of stretch reflex and is characterized by a velocity-dependent increase in tonic stretch reflex. Age standardized stroke mortality rate was reported on 1990 as 60 for men and 45 for women per 100,000[3]. The global burden of stroke needs to be defined for both developing and developed nations. India will face an enormous socio-economic burden to meet the costs of caring for stroke victims. This is because the most affected in the age group 45 to 70 years are mostly the breadwinners of the family[4].

The prevalence of stroke is more common among people with low-socio economic status than among the high- economic status. Focal cerebral damage of vascular origin is in most cases the result of either infarct formation or hemorrhage. An infarct results from interruption of the blood supply; this may be due to thrombus formation[8]. Each year, about 700,000 people suffer from strokes. Of those, 500,000 are first–time strokes, and 200,000 are recurrent. In India the incidence of cerebrovascular disease was found to 13/100,000 population/year. Stoke prevalence varies in different regions of country and ranges from 40 to 270/100,000 in rural population and the stroke prevalence rates in urban areas are much lower than in metropolitan cities in India[5,6]. Stroke mortality is higher in winter than summer (Haberman, Capildeo, and Rose) and so, probably, is incidence[7]. Approximately 90% of infarcts and

2/3 of all first strokes of middle cerebral artery territory, 10% involve superficial and deep Middle cerebral artery territories, and over 50% involve the superficial Middle cerebral artery territory[10,11].

METHODOLOGY

This was an experimental study, conducted in the Department of Physiotherapy, Florence Rehabilitation Centre, Kalyan Nagar, Bangalore. Those subjects who were screened as MCA stroke with upper limb dysfunction and satisfied the selection criteria were included in the study. There were 27 male and 14 female subjects out of these 2 patients had cognitive deterioration, 5 of them were not willing to participate in the study and 4 patients had musculo-skeletal impairments. 30 patients only met the inclusion criteria and were willing to participate in the study. 30 subjects were selected and were randomly divided into three groups by using lottery method, with 10 subjects in each group. Total sample included both the gender for this study. Simple random sampling was selected so that each and every unit in the population had an equal probability of being selected in the sample.

Inclusion Criteria:

1. Subjects with age group between 40 to 60 years of both genders.
2. Right MCA infracts having left sided stroke.
3. Subjects having 20 or more than 20 score in STREAM.
4. Subjects having score of 2 in Modified Ashworth Scale (MAS) [14]

Exclusion Criteria:

Subjects with
1. Disorientation.
2. Hemorrhagic stroke

3. Progressive lesion like tumors.

4. Stroke due to traumatic lesion.

5. Scores less than 20 in STREAM[12]

6. Scores less or more than two in MAS.

Procedure: Randomly selected 10 subjects in group A underwent MRP treatment, 10 subjects in group B underwent Bobath treatment and 10 subjects in group C underwent combined Motor relearning program Bobath. They were made to lie down on the low couch comfortably and assessed thoroughly. The subjects were clearly explained about the treatment. The treatment frequency was 5 sessions/ week for 4 consecutive weeks, the treatment duration was 45 minutes in each session.

Exercise program Group A was treated with MRP[9].

The following exercises were given.

1. In supine the subjects were asked to lift the arm and supported it in forward flexion. Then the subjects were made to attempt to reach up towards ceiling.

2. In supine the subjects arm was supported it in forward flexion. The subjects were helped to elicit muscle activity by asking them to attempt parts of various tasks. Subjects were asked to take the hand above the pillow. During this procedure subjects were advised to elicit to muscle activity of deltoid and triceps, in particular.

3. Subjects were asked to practice their arm in forward flexion and moved it within an ever increasing range, in all directions, with maintaining control always.

4. The subjects were made to sit at a table, and then subjects were asked to practice reaching forward and upward. Subjects were asked to work within the range and advised to control the shoulder above 90 degrees, and subjects were asked to practicing below 90 degrees

5. The patient sits with his hands flat on the bed behind him and assistance was provided.

Exercise program for Group B was treated with Bobath[14].

The following exercises were given.

Weight bearing over the hemiplegic side was the most effective way of normalizing tone. Before weight-bearing through the UE, the UE and shoulder girdle was prepared. Then the scapula was gliding in forward protraction, elevation and upward rotation. After this mobilization of the scapula, the patients hand was placed on the couch several inches away from the hip. The humerus was placed in external rotation with the elbow in extension. The subjects were made to shift weight over the hemiplegic side, with elbow extended and when the subjects complain of pain or edematous the exercise was not done.

For weight, bearing of the arm the body was moved over the arm to normalize tone without put any stress on the joint. Bilateral activities with hands clasped together were also used to increase the awareness of the hemiplegic side of the subjects, the sensory input was increased to the hemiplegic side by bringing the affected in to the visual field. The patients had hand through normal pattern of movement during functional activities also done by placing

the therapist hand over the subjects hand with firm but not forceful movement.

1) To inhibit the flexor spasticity of the upper extremity, the subjects were made to sit in a high sitting position, then the arm were positioned to placing and holding of object. Then subjects were asked to move the trunk backwards, forwards and sideways.

a) Abduction of thumb with finger extension was given

b) After successful inhibition of flexor spasticity, the position of the arm can be actively maintained with little support by therapist.

c) Arm of the subjects was held in abduction position with little support.

Subject performing Bobath to inhibit the Flexor Spasticity

2) In high sitting position the subjects were moved the independent elbow while holding arm up at shoulder. At the same time, retraction of the shoulder was prevented passively

3) In high sitting the subject was asked to elevate the arms with clasped hands prior to placing hands on head. Then the upper arm moved upwards while the subject bends elbow. This was done with support.

a) With the raised arms, subjects asked to turn clasped hands so that the palm faces upwards and forward.

b) Then the subjects were asked to repeat the same movement with arms forward.

4) In standing the subjects were asked to walk backwards while keeping palms on table, either with hands clasped or palms down.

5) In standing, the subjects were asked to extend the arms raised and hands against the wall with palms flat. At the same time the therapist supported the arm at shoulder, to prevent pressure downwards.

6) In standing, the subjects were asked to place the affected arm resting on the table, well forward with hands open and fingers extended. Subjects were asked to control the associated reactions while rubbing the affected arm with sound hand.

7) In sitting the subjects were asked to do a controlled associated reactions by using right hand (the normal one) While leaving affected one flat on table, well forward, open hand (auto inhibition) and the Position of hand on table was marked. Then the same activity was done by the subjects while writing.

8) In standing the subjects were asked to do weight bearing on extended arms, shoulder well forward.

Exercise program Group C was treated with combination of MRP and Bobath.

RESULTS

Below the Table 1 shows the mean Ranks of MAS was 2.50, Sum of Ranks for MAS was 10.00 and Z value was 2.000 'p' value was <0.046. It shows that subjects have got significant reduction of spasticity on MAS scale following MRP when compared with the post score. (p< 0. 05). Mean Ranks of STREAM was 5.50, sum of Ranks for STREAM was 55.00 and Z value was 1.414. 'p' value was >.0157 level. It shows that subjects have not significant improvement in voluntary control on STREAM scale following MRP when compared with the

post score (p< 0. 05). Mean Ranks of Fugl Meyer scale 5.50, sum of Ranks for Fugl Meyer scale 55.00 and Z value was 2.449 at <0.014 level. It shows that subjects have got significant

improvement in functional activities on Fugl Meyer scale following MRP when compared with the post score p< 0. 05.

Scales	Ranks	No. of subjects	Mean Rank	Sum of Ranks	z-value	p-value
Modified Ashworth	Negative Ranks	4	2.50	10.00	2.000	<0.046
	Positive Ranks	0	0	0		
	Ties	6				
STREAM	Negative Ranks	0	0	0	1.414	>.0157
	Positive Ranks	10	5.50	55.00		
	Ties	0				
Fugl Meyer	Negative Ranks	0	0	0	2.449	<0.014
	Positive Ranks	10	5.50	55.00		
	Ties	0				

Table-1 Statistical inference based on Wilcoxon signed rank sum test between pre-post test of group A

Below the Table 2 shows mean Ranks of MAS was 1.50, Sum of Ranks for MAS was 3.00 and Z value was 2.807 'p' value was <0.005. It shows that subjects have got significant reduction of spasticity on MAS scale following Bobath when compared with the post score. (p< 0. 05). Mean Ranks of STREAM was 5.50, sum of Ranks for STREAM was 55.00 and Z value was 2.812. 'p' value was <0.005 level. It shows that subjects have got significant improvement in

voluntary control on STREAM scale following Bobath when compared with post score (p< 0. 05). Mean Ranks of Fugl Meyer scale 5.50, sum of Ranks for Fugl Meyer scale 55.00 and Z value was 2.831 at <0.005 level. It shows that subjects have got significant in improvement in functional activities on Fugl Meyer scale[13] following Bobath when compared with the post score (P< 0. 05).

Scales	Ranks	No. of subjects	Mean Rank	Sum of Ranks	z-value	p-value
Modified Ashworth	Negative Ranks	2	1.50	3.00	2.807	**<0.005**
	Positive Ranks	0	0	0		
	Ties	8				
STREAM	Negative Ranks	0	0	0	2.812	**<0.005**
	Positive Ranks	10	5.50	55.00		
	Ties	0				
Fugl Meyer	Negative Ranks	0	0	0	2.831	**<0.005**
	Positive Ranks	10	5.50	55.00		
	Ties	0				

Table-2 Statistical inference based on Wilcoxon signed rank sum test between pre- post test of group B

Below the Table 3 shows mean Ranks of MAS was 3.50, Sum of Ranks for MAS was 21.00 and Z value was 2.814 'p' value was <0.005. It shows that subjects have got significant reduction of spasticity on MAS scale following Bobath and MRP when compared with the post score (P< 0. 05). Mean Ranks of STREAM was 5.50, sum of Ranks for STREAM was 55.00 and Z value was 2.827 'p' value was <0.005. It shows that subjects have got significant

improvement in voluntary control on STREAM scale, when compared the post scores following Bobath and MRP (P< 0. 05). Mean Ranks of Fugl Meyer scale 5.50, sum of Ranks for Fugl Meyer scale 55.00 and Z value was 2.814 at <0.005 level. It shows that subjects have got significant improvement in functional activities on Fugl Meyer scale following Bobath and MRP when compared the post score. (P< 0.05).

Scales	Ranks	No. of subjects	Mean Rank	Sum of Ranks	z-value	p-value
Modified Ashworth	Negative Ranks	6	3.50	21.00	2.814	**<0.005**
	Positive Ranks	0	0	0		
	Ties	4				
STREAM	Negative Ranks	0	0	0	2.827	**<0.005**
	Positive Ranks	10	5.50	55.00		
	Ties	0				
Fugl Meyer	Negative Ranks	0	0	0	2.814	**<0.005**
	Positive Ranks	10	5.50	55.00		
	Ties	0				

Table-3 Statistical inference based on Wilcoxon signed rank sum test between pre- post test of group C

DISCUSSION

Neurological damage and stroke in particular, is the leading cause of long-term disability worldwide. This study analyzed the individual effects of Bobath and Motor Relearning Program and the combined effect of these two techniques. The Fugl Meyer scale, MAS and STREAM Scale were used to measure the improvement of these effects.

The individual effects of Bobath, Motor Relearning Program and combined Effect of

Bobath and Motor Relearning Program analyzed with regard to Spasticity, Voluntary activity and functional recovery of the upper extremity. It was analyzed statistically by Wilcoxon signed ranks test. In group A the subjects got significant reduction of spasticity on MAS following MRP treatment (P<0.05). STREAM analysis shows that subjects have no improvement in voluntary control following MRP. But in FMS shows that subjects have got significant improvement in functional activities (P<0.05). So statically, it was proved that the individual effect of Motor Relearning Program

was found to be significant in the reducing spasticity and improving functional activity but there was no change in voluntary control. In the present study, Motor Relearning Program showed significant improvement in improving functional activities of upper limb in right MCA stroke. This view was well supported by the recent research study that MRP reduced length of stay and improved motor functions [14].

Group B shows that subjects got significant reduction of spasticity, improved voluntary control and increased functional activity on MAS, STREAM and FMS following Bobath treatment (P<0.005).So statically, it was proved that the individual effect of Bobath was found to be significant in the reducing spasticity, Voluntary activity and functional activity. The result of the study suggests that bobath technique was effective in reducing tone, and improving voluntary control along with functional activities. He proved that Bobath concept was effective in upper limb impairments by reducing tone and functional approach[12].

Group C shows that subjects got significant reduction of spasticity, increased Voluntary control and improved functional activity on MAS, STREAM and FMS following combined effect of Bobath and Motor Relearning Programme (P<0.005). So statically it was proved that the combined Effect of Bobath and Motor Relearning Programme was found to be significant in the reducing spasticity, Voluntary activity and functional activity within the group C [11].

The 'p' value for the post test of all the three groups in STREAM was >0.0001, which shows that there was significant improvement. It proves that the group C shows more significant

than other two groups in reduction of voluntary control. So statistically, it suggests that even though all the techniques have demonstrated that there was increase in voluntary control individually, but the group C of combined effect shows more significant effect than other two individual groups in improving voluntary control.

This study tries to find out the combined effect of Bobath and Motor Relearning Programme for upper limb recovery with Right MCA stroke. All patients in the study improved in their gross motor function and upper-limb motor and functional abilities and voluntary control in the upper limb affected by MCA stroke. The finding of the study is supported by previous studies [13].

CONCLUSION

The results showed that the use of individual effect of motor relearning program was more effective than Bobath technique but the combined effect of these two techniques were more effective than the individual effect, with significant changes in the functional recovery of the upper limb in right MCA stroke patients.

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