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A Comparative Study of Unilateral Strength Training Versus Mirror Therapy with Unilateral Strength Training for Upper Extremity in Hemiplegia

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ABSTRACT

Introduction: A stroke is a sudden, non convulsive loss of neurological function due to an ischemic or hemorrhagic event in the brain (WHO2006). Our study aims to compare the effect of unilateral strength training versus mirror therapy with unilateral strength training for upper extremity in hemiplegia.
Methodology: A sample of 30 patients within the age group of 35-65 years with hemiplegia were randomly divided into two groups, Group a (n= 15) and group b (n= 15). The subjects in group A is treated with Unilateral strength training and the subjects in group B is treated with mirror therapy with unilateral strength training. The patients improvement on ROM and reduced spasticity is assessed by Modified Ashworth Scale and ABILHAND Questionnaires. The pre and Post test results were tabulated and assessed.
Results: The study concludes that there was statistically significant improvement on ROM and reduced spasticity in group B compared to group A in response to treatment.
Conclusion: Based on the result, this study concluded that mirror therapy with unilateral strength training is effective than unilateral strength training for upper extremity in hemiplegia.

Key Words: Unilateral Strength Training, Mirror Therapy, Modified Ashworth Scale, ABILHAND Questionnaire.

INTRODUCTION

A stroke is a sudden, non convulsive loss of neurological function due to an ischemic or hemorrhagic event in the brain (WHO2006)[1]. WHO defines stroke signs and symptoms lasting longer than 24 hours or main to loss of life without a obvious reason apart from that of vascular origin. Stroke is the second leading cause of death and a major cause of disability worldwide[2]. 20-30% deaths occur within the first 10 days after stroke. A high proportion of young people (<40 years) are affected by stroke in India. Stroke is a leading cause of functional impairment. For patients who are ≥65 years of age, 6 months after stroke, 26% are dependent in their activities of daily living, and 46% have cognitive deficits[3].

The main causes for stroke are Atherosclerosis, cerebral thrombus, Cerebral embolus, Embolism from the heart, Intracranial hemorrhage, Subarachnoid hemorrhage, Intracranial small vessel disease, Arterial aneurysms, Arterio-venous malformation, Hematological disorders. The

incidence rate is 119-145 /1000000 based on the recent population-based studies. The estimated adjusted prevalence rate of stroke range ,84-262/100,000 in rural and 333-424/100,000 in the urban areas[4].Diagnosis depends on clinical features and brain imaging to differentiate between ischemic stroke and intra cerebral haemorrhage[5].

Prevention of recurrent stroke requires an understanding of the mechanism of stroke to target interventions, such as carotid endarterectomy, anticoagulation for atrial fibrillation, and patent foramen ovale closure. Presently, prevention of stroke is the best option considering the Indian scenario through control and/or avoiding risk factors of stroke. Our study aims to compare the effect of unilateral strength training versus mirror therapy with unilateral strength training for upper extremity in hemiplegia.

METHODOLOGY

The study was conducted at the outpatient department in J.K.K. Munirajah Medical Research Foundation college of physiotherapy. The sample size included 30 subjects. These subjects were selected by random sampling method. They will be divided into two groups. Group A and Group B with 15 subjects in each groups. Group A patients were trained with the unilateral strength training exercise on upper extremity using therabands. Patients performed 4 sets of 5 maximal isometric elbow extension in the non-affected or less affected limb. In this case limb strengthening was done on one side of the body with the intension of producing strengthening on both the limbs. This was done for 5 days per week for 12 weeks.(one sitting per day of 45 mins) Group B patients were also involved in strengthening exercise using theraband in the less-affected limb, in front of a mirror (mirror therapy). The mirror was placed in the mid -sagittal plane of the patients. Training sessions took for 5 days per a week for 12 weeks (one sitting per day of 45mins).

RESULTS

MODIFIED ASHWORTH SCALE: This represents the mean value, mean difference, standard deviation and unpaired t-test value of Modified Ashworth Scale [MAS] between Group A and Group B.

S.NO	POST TEST VALUES	MODIFIED ASHWORTH SCALE			UNPAIRED 'T' VALUE
		Mean	Mean difference	Standard deviation	
01	Group A	1.27			
02	Group B	2.40	1.13	0.552	5.62

The above table shows the mean value of two groups, the mean value of group A was 1.27 and group B value of 2.40 and the unpaired t-value was 5.62 level, which was greater than the tabulated t value. It showed statistically difference between mean values of Group A and Group B. Therefore, the study was rejecting the null hypothesis and accepting alternate hypothesis.

ABILHAND QUESTIONNAIRES: This represents the mean value, mean difference, standard deviation and unpaired t-test value of ABILHAND questionnaire test between Group A and Group B.

S.NO	POST TEST VALUES	ABILHAND QUESTIONNAIRE			UNPAIRED 'T' VALUE
		Mean	Mean difference	Standard deviation	
01	Group A	28.53			
02	Group B	32.13	3.63	14.3	0.689

The above table shows the mean value of two groups, the mean value of group A was 28.53 and group B value of 32.13 and the unpaired t-value was 0.689 level, which was lesser than the tabulated t value. It showed statistically difference between mean values of Group A and Group B. Therefore the

study was rejecting the null hypothesis and accepting alternate hypothesis.

DISCUSSION

The level of practical recuperation of the furthest point significantly influences the assessment and assurance of the level of help important to play out the exercises of everyday living and the degree of autonomy after stroke. Specifically, since many assignments in the exercises of every day living required the utilization of the furthest point, patients who can't utilize their hands become to encounter physical and mental agony. Stroke patients with genuine furthest point loss of motion here and there show repugnance against actual methodologies zeroed in on the recuperation of paretic limit capacities[6]. This marvel once in a while turns into an optional issue in accomplishing effective recuperation measures. One of the attributes of stroke patient's development issues is the brokenness of the sensorimotor input circle coming about because of difficulties in tactile capacities .This issue influences task related errand inborn criticism circle exercises to obstruct the recuperation of the engine elements of the attacked extremity[7].Given these realities, giving expanded tangible criticism utilizing assorted tactile boosts, for example, somatosensory improvements and proprioception can be supposed to be key for the recuperation of stroke patient's furthest point capacities.

In the previous studies show the effect of mirror therapy on functional recovery of upper extremity after stroke[8,9]. In this study compares the unilateral strength training versus mirror therapy with unilateral strength training for upper extremity hemiplegia. The previous study using a Modified Ashworth scale and Tone assessment scale for assessing the spasticity[10].In this study we are using a Modified Ashworth Scale and ABILHAND Questionnaire were taken as parameter to measure the improvements in the ROM and manual ability in the upper extremity[11]. The pre test data were collected for Group A and Group B patients and computed. Group A subjects were given Unilateral Strength Training and Group B subjects were given Mirror therapy with Unilateral Strength Training. The results of the post test of same parameters were recorded for comparison after 12 weeks of treatment.

Therefore the present study was accepting the alternate hypotheses and rejecting the null hypotheses.

CONCLUSION

Based on the result, this study concludes that Mirror therapy with Unilateral strength training is effective in reducing spasticity and increased ROM in patients with hemiplegia.

Declaration by Authors

Ethical Approval: Approved

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

REFERENCES

1. Mehrholz J, Pohl M, Platz T, Kugler J, Elsner B. Electromechanical and robot-assisted arm training for improving activities of daily living, arm function, and arm muscle strength after stroke. Cochrane Database Syst Rev. 2015 Nov 7;2015(11):CD006876. doi: 10.1002/14651858.CD006876.pub4. Update in: Cochrane Database Syst Rev. 2018 Sep 03;9:CD006876. PMID: 26559225; PMCID: PMC6465047.
2. Katan, M., & Luft, A. (2018). Global Burden of Stroke, Seminars in Neurology, 38(2),2018, 208–211.
3. Meschia J. F, Bushnell C, Boden-Albala, B, Braun, L. T, Bravata D. M., Chaturvedi,S, Creager M. A, Eckel, R. H, Elkind, M. S, Fornage, M., Goldstein, L. B, Greenberg S. M., Horvath S. E, Iadecola, C, Jauch, E. C, Moore W. S, Wilson J. A, "Guidelines for the primary prevention of stroke: a statement for healthcare professionals from the American Heart Association/American

Stroke Association." Stroke volume 45, 12 (2014): 3754-832.
4. Pandian, Jeyaraj Durai, and Paulin Sudhan "Stroke epidemiology and stroke care services in India." Journal of stroke, Vol15,3 (2013): 128-34.
5. Campbell, Bruce C V, and Pooja Khatri "Stroke." Lancet (London and England). Vol, 396,10244 (2020): 129-142.
6. Blanton, S, & Wolf, S. L, An application of upper-extremity constraint-induced movement therapy in a patient with subacute stroke, Physical therapy vol. 79, 9,sep1999,847-53.
7. Van Dijk,Jannink & Hermens, Effect of augmented feedback on motor function of the affected upper extremity in rehabilitation patients, Journal of rehabilitation medicine, Aug2005,37(4): 202-11.
8. Gurbuz, N, Afsar S. I, Ayaş S, & Cosar S. N, Effect of mirror therapy on upper extremity motor function in stroke patients: a randomized controlled trial .Journal of physical therapy science, 28(9),2016, 2501–2506.
9. Bai Z., Fong, K., Zhang, J, & Hu Z, Cortical mapping of mirror visual feedback training for unilateral upper extremity: A functional near-infrared spectroscopy study, Brain and Behaviour, Vol 10(1), 2020.
10. Gregson J. M., Leathley M., Moore A. P., Sharma, A. K, Smith, T. L, & Watkins C. L, Reliability of the Tone Assessment Scale and the modified Ashworth scale as clinical tools for assessing post stroke spasticity, Archives of physical medicine and rehabilitation,80(9),1999, 1013–1016.
11. Penta M, Tesio L, Arnould C, Zancan, A., & amp Thonnard J. L, The ABILHAND questionnaire as a measure of manual ability in chronic stroke patients: Rasch-based validation and relationship to upper limb impairment, stroke vol. 32,7 (2001): 1627-34.

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