

Original Article

A PRELIMINARY STUDY ON EFFECTIVENESS OF CONVENTIONAL AND SYMMETRICAL WEIGHT TRAINING IN STROKE PATIENTS TO PREVENT FALLS

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ABSTRACT

Introduction: Stroke is the leading cause of disability in the elderly and significant source of disability. In the stroke patients the occurrence of fall is one of the essential factors hindering the rehabilitation process. Asymmetrical weight bearing is the major cause for frequent falls in stroke patients.

Materials & Methods: In this study 15 patients subjected to Symmetrical weight bearing along with conventional stroke training in Experimental group. Other 15 patients subjected to conventional stroke training alone in control group. After 3 months of training period the pre and post test values of frequency of falls were compared.

Results: As per the study results the mean difference of reduced number of falls in experimental group was 5.8 and the mean difference of reduced number of falls in control group was 2.86. The calculated value of experimental group was 31.8 whereas in control group 14.3.

Discussion: Stroke patients can be trained easily with conventional weight training exercise which is highly beneficial. Further study can be done with huge number of stroke patients.

Conclusion: The study concluded that the number of falls in stroke cases were reduced significantly by using symmetrical weight training exercise and conventional stroke training compared to conventional stroke training alone.

KEYWORDS: Stroke; Symmetrical Weight Training Exercise; Conventional Stroke Training.

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INTRODUCTION

Disease of the cerebral blood vessels are the third most common cause of death in the developed world after cancer & ischemic heart disease and responsible for a large proportion of Physical disability. ¹

Stroke is defined as "an acute onset of neurological dysfunction due to an abnormality in cerebral circulation with resultant signs & symptoms that correspond to involvement of focal areas of brain". ¹

Stroke is the leading cause of disability in the elderly and a significant source of disability.

Stroke affects approximately 700,000 individuals each year with an estimated number of 5400,000 stroke survivor population. The incidence of stroke increases drastically with age, doubling every decade after 55 years of age. ¹

It is a common observation that individuals with hemiparesis exhibit asymmetrical weight bearing in quasi – static standing posture & during functional movements. This asymmetry has been associated with impaired physical performance, balance and may contribute to disordered gait. ² The asymmetry also leads to frequent falls which may end up with complications like head injuries & fractures.

In addition, the maximal peak torque of trunk flexion and extension in hemiplegics was significantly smaller than that of healthy controls.³ So the asymmetry is a challenging problem for physiotherapists in stroke cases.

Balance is the ability to maintain or move within a weight bearing posture without falling.⁴

The conventional stroke rehabilitation training gives good results to improve the physical performance, balance & gait pattern. One among the various research results says that the symmetrical weight training is the most effective treatment for retraining sitting symmetry.⁵ So, In addition to the conventional stroke rehabilitation training, the symmetrical weight bearing training gives more effective early results.

This study has taken place in India (Warangal General Hospital-2004-2005). The study was aimed at justifying the effectiveness of Conventional Stroke training combined with symmetrical weight training among stroke patients to reduce the fall by improving the symmetrical weight bearing.

MATERIALS AND METHODS

The study done with Pre and post test Experimental study design with Random sampling Technique. The study venue was District Government Hospital, Warangal, India. The patients selected with informed consent letter with following selection criteria.

This study included the samples with less than six months of hemiparesis cases of Motor Assessment Scale-3 to 4.

For this preliminary study, 30 Patients were selected randomly and assigned in to two groups.

Group-A: Experimental Group which gains Symmetrical Weight training and Conventional Stroke training.

Group-B: Control Group which gains Conventional stroke training alone.

In this study,

Conventional Stroke Training includes the Passive movements, passive stretching, Free exercises and Gait training.

Symmetrical weight training - Sit-to-stand transitions, visual biofeedback, Static bicycling and Balancing exercise with bilateral weighing machines.

The measurement tool was occurrence of falls and the outcome measures were number/frequency of falls.

The randomly selected 15 patients (Experimental group) were trained with symmetrical weight training along with Conventional stroke training. The symmetrical weight training skills used in this study was,

a) Sit-to-stand transitions- This was practiced in experimental group with an emphasis on symmetrical weight bearing and controlled responses of trunk. Initially the patients must actively flex the trunk and use momentum to shift the weight forward (Flexion momentum phase) which can be assisted by the therapist and clasped hands of the patient himself. Then the patient's movement is directed into extension or upward phase by recruiting knee extensors. This method is successfully used for many patients⁹

b) Visual bio feedback- By standing bio feedback trainer, which includes a height adjustable work table, weight bearing sensors, and a real time visual and auditory feedback system.

c) Static bicycling and Balancing exercise with bilateral weighing machines.

This training was repeated with the help of physiotherapists, Government hospital, Warangal, India 5 days a week for 3 months along with conventional stroke training.

The other group of 15 patients (Control group) was trained with conventional stroke Training alone.

First, the pre-test values of frequency of falls were recorded for both groups.

At the end, the post test results of frequency of falls were recorded for both groups during the follow up program. Compare and contrast the pre and post test values.

RESULTS AND TABLES

In Experimental group the calculated 't' value was 31.8 and the table value at the level of 5% significance was 2.15 (Table 1).

Table 1: Experimental group-pre test versus Post test.

	Occurrence of fall	
	Pre test	Post test
Mean	8.26	2.46
Calculated 't' value	31.8	
Table value at the level of 5% significance	2.15 (degrees of freedom 14)	

Table 2: Control group-Pre test versus Post test.

	Occurrence of fall	
	Pre test	Post test
Mean	8.33	5.46
Calculated 't' value	14.3	
Table value at the level of 5% significance	2.15 (degrees of freedom 14)	

Table 3: Experimental group versus Control group.

	Reduced number of falls	
	Experimental group	Control group
Mean	5.8	2.86
Calculated 't' value	8.06	
Table value at the level of 5% significance	2.05 (degrees of freedom 28)	

In Control Group the calculated 't' value was 14.3 and the table value at the level of 5% significance was 2.15 (Table 2).

The data analysis between the Experimental group and Control group gives the result of calculated 't' value 8.06 and the table value at the level of 5% significance was 2.05 (Table 3). Thus the number of falls has reduced markedly in experimental group compared to control group.

DISCUSSION

In stroke cases, the Symmetry is very much needed to maintain the balance and to avoid falls. Various studies results supports that the rate of rise in force was significantly lower in stroke fallers than in stroke non-fallers and healthy subjects.⁷ Other study result concluded that the stroke patients, who could stand up within 4.5 seconds or who had a maximal vertical force difference of less than 30% body weight between both legs had better performance than others did.⁸ So, improving the symmetry and balance in stroke cases by various physiotherapy skills is mandatory.

By the above study results, it is very clear that the Symmetrical weight training should be applied to the stroke cases for preventing/reducing the number/frequency of fall in better way.

The limitations of this study, Includes.

1. The number of individuals sampled in each group of the study was less; it is suggested that large samples must be taken in following main study for more accurate results.
2. Other Symmetrical weight bearing exercise using Bio feedback and force plates can be included in the study.

CONCLUSION

In this study the efficacy of sit-to-stand training & symmetrical standing training in improving the symmetrical weight bearing in stroke patients has been proven. Other studies¹⁰ supports the same. In addition, the effects of the Visual bio feedback and Static cycling are tremendous¹¹. Using the conventional Physiotherapy skills alone is not enough to increase the balance & reduce the number of falls. So it needs special attention with Symmetrical weight bearing Exercise Training along with conventional training.

Conflicts of interest: None

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