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TO COMPARE THE EFFECT OF WOBBLE BOARD VERSUS BAPS BOARD ON BALANCE IN STROKE PATIENTS

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ABSTRACT: Stroke is defined as a sudden neurological deficit caused by focal vascular lesion in the brain. Stroke patients are at high risk of falling because their balance control is impaired. Falls may cause several serious problems for stroke patients. So, effective therapeutic measure for improving balance function and preventing falls are important in the rehabilitation of stroke patients. Balance is the ability of an individual to successfully maintain the position of their body or restore the center of mass over time. Balance is achieved by the complex integration and coordination of sensory-motor control system including the sensory input, integration of that sensory input and by motor output to the head, eye, trunk and limb muscles. In physiotherapy**,** a wobble board is use for balance, athletic postural, coordination and falls prevention training. It is a circular object with an uneven base, on which the user attempts to balance. It is used to prepare people to avoid injurious falls; to prevent sports injuries especially to the ankle and knee for rehabilitation**.** BAPS Board is an acronym for biomechanical ankle platform system. It is used to improve balance and proprioception in ankle, knee, and hip after injury or surgery**.** Study design is A Randomized Comparative Experimental Study. Aim of this study is to Compare the Effect of Wobble Board versus BAPS Board on Balance in Stroke patients. Objective is to evaluate the efficacy of Balance by Wobble Board and BAPS Board. In this study we recruit 60 stroke patients, which will be divided into two equal groups. In first group patients we use Wobble Board exercises and in second group patient we use BAPS Board exercises to improve the Balance of Stroke patients and improvement were observed by Berg Balance scale to measure out the efficacy of above giving techniques to the stroke patients. We provide the 6 – week exercise program to the patients. And by comparing the pre and post value we found which technique is more effective. This study reveals that the Balance can be improved with the Wobble and BAPS Board exercises both in patients with Stroke. As per the result, it has been concluded that Wobble and BAPS Board exercises both can be used to treat the Balance in s patients Stroke patients effectively.

Keywords: *Stroke, Balance, Wobble board, BAPS Board, Berg Balance Scale*

I – INTRODUCTION

STROKE is a common medical emergency. The incidence rises steeply with age, and in many lower and middle-income countries it rising in association with less healthy life styles. About 20% of stroke patients die within a month of the event and at least half of those who survive are left with physical DISABILITY [1]

Stroke is defined as a sudden neurological deficit caused by focal vascular lesion in the brain. The vascular lesion can be either a hemorrhagic or ischemic involving the blood vessels supplying various parts of the brain. The extent of neurological involvement may range from mild motor deficit to gross involvement of various function namely sensory motor, perceptual, emotional, behavioral, memory, intelligence, speech and language function.[2]

If symptoms progress over hour or day, other diagnoses must be excluded. Delirium and memory or balance disturbance more often due to stroke mimics. Transient symptoms, e.g., syncope, amnesia, delirium and dizziness, do not reflect focal cerebral dysfunction but are often mistakenly attribute to TIA.[3]

Balance refers to the ability of a person not to fall. Stroke patients are at high risk of falling because their balance control is impaired. Falls may cause several serious problems for stroke patients. Therefore, effective therapeutic measure for improving balance function and preventing falls are important in the rehabilitation of stroke patients [4]. Balance is the ability of an individual to successfully maintain the position of their body or restore the center of mass over time [5]. In a good posture it can be achieved by the minimal work of involved muscles or with a minimal postural way. Balance is achieved by the complex integration and coordination of sensory-motor control system including the sensory input, integration of that sensory input and by motor output to the head, eye, trunk and limb muscles [6]. Balance is greatest when the body's center of mass (COM) or center of gravity (COG) is maintained over its base of support (BOS).

Center Of Mass is a point that corresponds to the center of the total body mass and is the point at which the body is in perfect equilibrium. It is determined by finding the weighted average of COM of each body segment [7].

Center Of Gravity refers to the vertical projection of the center of mass to the ground. In the anatomical position, the COG of most adult humans is located slightly anterior to the second sacral vertebra [8] or approximately 55% of a person's height [9].

Base Of Support is defined as the perimeter of the contact area between the body and its support surface; foot placement alters the BOS and changes a person's postural stability [10].

In physiotherapy a wobble board is use for balance, athletic postural, coordination and falls prevention training. It is a circular object with an uneven base, on which the user attempts to balance. It is used to prepare people to avoid injurious falls; to prevent sports injuries especially to the ankle and knee for rehabilitation.[11]

BAPS Board is an acronym for biomechanical ankle platform system. It is used to improve balance and proprioception in ankle, knee, and hip after injury or surgery.[12]

II - MATERIAL AND METHODOLOGY

- **SOURCE OF DATA**

✓ Lala lajpat rai hospital, Kanpur.

✓ Saaii college of medical science and technology, Kanpur

- **INCLUSION CRITERIA**

✓ Cerebro-Vascular Accident.

✓ Ability to maintain a standing position without aid for at least 5 minutes.

- **EXCLUSION CRITERIA**

✓ Cognitive impairment,

✓ Vestibular disorder,

✓ Paroxysmal vertigo,

✓ Visual disturbance,

✓ High risk of cardiac problem,

✓ Any orthopedic disease involving lower limb.

- **EQUIPMENT AND TOOLS**

✓ Neuro assessment sheet

✓ Balance Berg Scale,

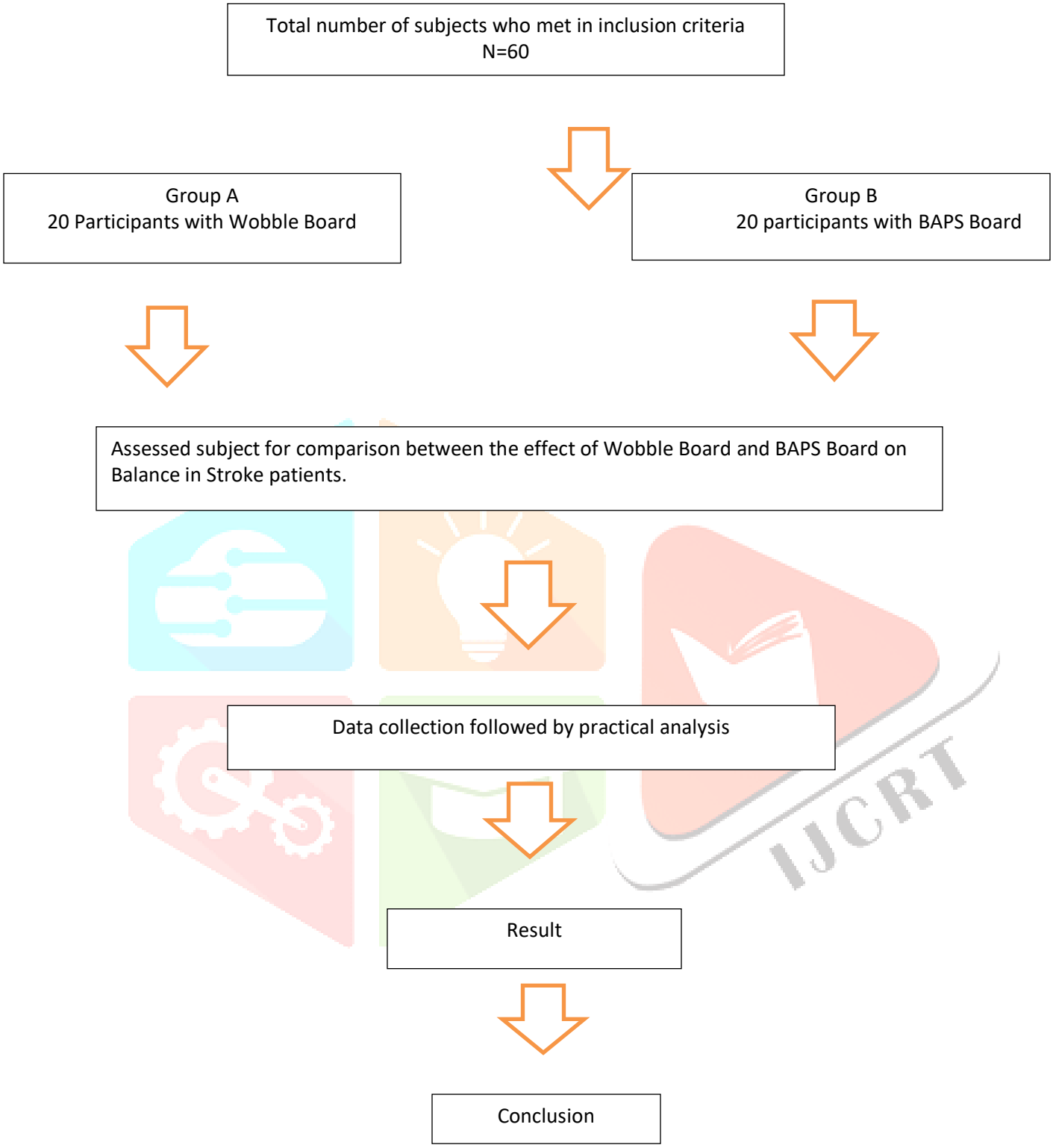
✓ BAPS board,

✓ wobble board

- **STUDY TYPE**: - Randomize control trial
- **STUDY DESIGN**: - comparative study
- **SAMPLE SIZE**: - 60 patients
- **TARGET POPULATION**: - stroke patients

III – PROCEDURE

In this study we recruit 60 patients of stroke, which will be divided into two equal groups. In first group patients we use BAPS board and in second group patient we use wobble board to improve the balance of stroke patients. We provide balance training to the stroke patient to improve the balance. Improvements were observed by berg balance scale to measure out the efficacy of both techniques giving to the stroke patients. We take score through Berg Balance Scale pre-treatment and post-treatment to find out the efficacy and changes occur during the overall procedure. We provide 6-week exercise program to the patients to check which one is better (Wobble and BAPS Board) to improve the balance on the stroke patient. At the end of exercise program by comparing both scales pre and post score, we found that which technique is more effective.



Flowchart: 1 shows the follow up procedure of research article

IV - DATA ANALYSIS

Data analysis was done using IBM SPSS Statistics (software package used for statistical analysis 2019 version-26). Descriptive statistics was done to determine the demographic characteristics of the subjects recruited in this study between the groups and the comparison between the groups is done by paired samples t-test.

The average age for Group 1 participants was 50.07 years and the average weight was 55.13 Kg. The participants had an average height of 161.73 cm and correspondingly the average for Group-1 BMI was calculated to be 21. This reflects that average participant were in the Normal category in Group-1.

Table 1: Showing descriptive data of Group 1: WOBBLE BOARD

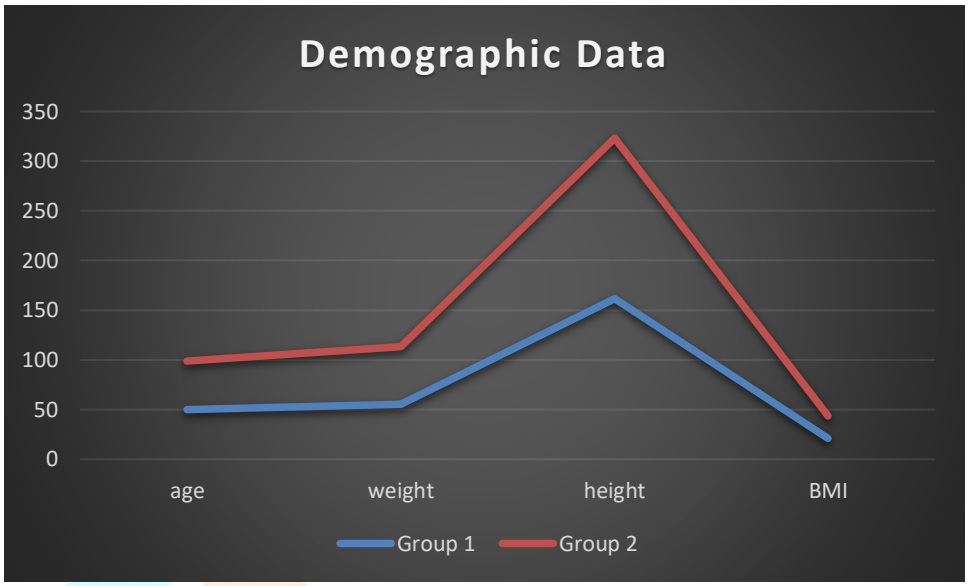
	N	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	30	22	80	50.07	15.254
Weight (Kg)	30	45	68	55.13	5.952
Height (cm)	30	150	170	161.73	4.927
BMI	30	18	25	21.00	1.759

The average age for Group 2 participants was 48.50 years and the average weight was 58.30 Kg. The participants had an average height of 161.57 cm and correspondingly the average for Group-2 BMI was calculated to be 22.33. This reflects that average participant were in the normal category in Group-2.

Table 2: Showing descriptive data for Group 2: BAPS BOARD

	N	Minimum	Maximum	Mean	Std. Deviation
age	30	22	68	48.50	13.098
weight	30	47	71	58.30	5.609
height	30	151	172	161.57	5.263
body mass index	30	19	27	22.33	1.846

Graph 1: It shows the mean variance between Age, Weight, Height and BMI between Group 1 and Group 2.



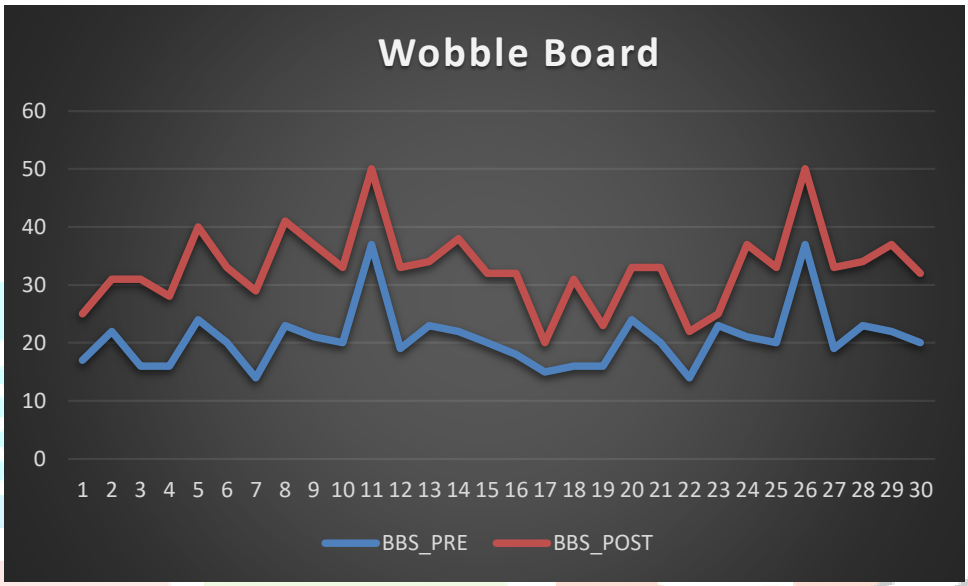
While analyzing the Group 1 data it has been found that Wobble Board was significant in improving the Balance with Mean (±SD) of 12.267 (±3.610). after calculating the t-value was 18.613 with p value of 0.000, which shows that Wobble Board was significant at the 95% confidence level. The table 3 represents the pre and post treatment values of group 1 and group 2 participants and table 4 shows within the group analysis with t value and p value for the group 1 participants.

Table 3: showing the data of Berg Balance Scale rating as pre and post treatment of Group 1 and Group 2.

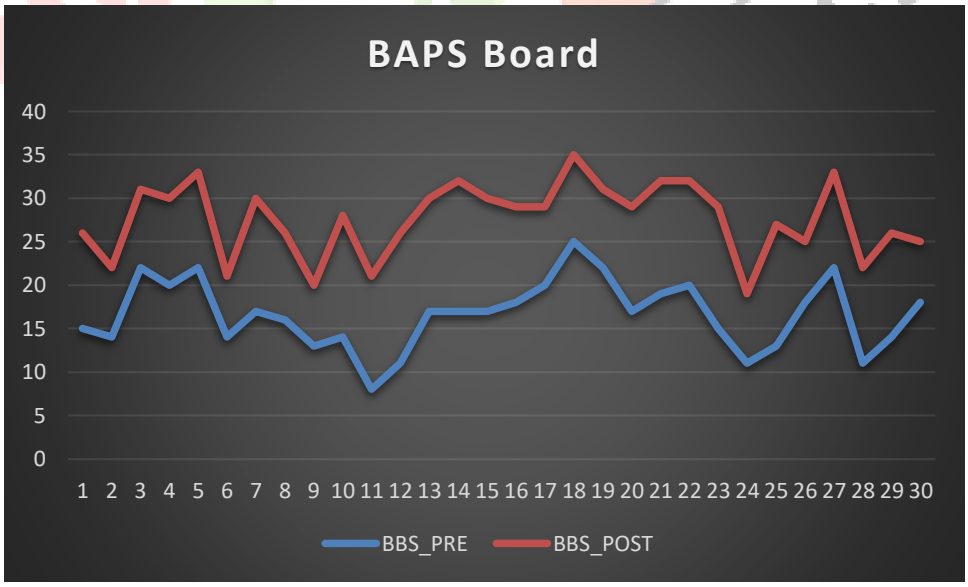
S. No	GROUP 1		GROUP 2	
	Pre	Post	Pre	Post
1.	17	25	15	26
2.	22	31	14	22
3.	16	31	22	31
4.	16	28	20	30
5.	24	40	22	33
6.	20	33	14	21
7.	14	29	17	30
8.	23	41	16	26
9.	21	37	13	20
10.	20	33	14	28
11.	37	50	8	21
12.	19	33	11	26
13.	23	34	17	30
14.	22	38	17	32
15.	20	32	17	30
16.	18	32	18	29
17.	15	20	20	29
18.	16	31	25	35
19.	16	23	22	31
20.	24	33	17	29
21.	20	33	19	32
22.	14	22	20	32
23.	23	25	15	29
24.	21	37	11	19
25.	20	33	13	27
26.	37	50	18	25

27.	19	33	22	33
28.	23	34	11	22
29.	22	37	14	26
30.	20	32	18	25

Graph 2: Represents the comparison of data of pre and post treatment rating of Berg Balance Scale rating of Group 1



Graph 3: Represents the comparison of data of pre and post treatment rating of Berg Balance Scale rating of Group 2.



While analyzing the Group 2 data it has been found that BAPS Board was significant in improving the Balance with Mean (±SD) of 10.967 (±2.484). after calculating the t value was 24.180 and p value was 0.000, which shows that the BAPS Board was significant at the 95% confidence level. The table 3 represents the pre and post treatment values of group 1 and group 2 participants and table 4 shows within the group analysis with t value and p value for the group 1.

Table 4: Showing the pre (baseline) and post-treatment (after 6 weeks) scores for WOBBLE BOARD (Group- 1) and BAPS BOARD (Group-2)

	Mean	Std. Deviation	t-value	df	p value
Pre- Post (Group 1)	12.267	3.610	18.613	29	.000
Pre- Post (Group 2)	10.967	2.484	24.180	29	.000

The analysis shows that both the treatment groups i.e., WOBBLE BOARD and BAPS BOARD were found effective in improving balance in Stroke patients. A comparison of the mean for both groups was done using paired samples t-testing. The score for the t-value was to be 1.681 with the p value of .103, hence was found to be non-significant.

Table 4: Showing comparison of the mean between the treatment groups.

	t-value	p-value
Group1- Group2	1.681	.103

V – RESULT

This study reveals that the Balance can be improved with the Wobble Board and BAPS Board exercises both in patients with Stroke. The significance of the difference in the mean between post-treatment for the group was checked using a paired sample t-test. For Group-1 the t-value was found to be 12.267 and was significant at the p-value of 0.000 (95% Confidence Interval). Hence the Wobble Board was found to be significant in improving balance in patients with Stroke. For Group-2 the t-value was found to be 10.967 and was also found to be significant at the p-value of 0.000. Hence the BAPS Board was found to be significant in improving balance in patients with Stroke.

Thus, both the treatment groups Wobble Board and BAPS Board were found to be significantly effective in treating Balance in Stroke with 95% confidence interval. Whereas there was no significant difference found between Wobble Board and BAPS Board exercises, hence the null hypothesis is accepted.

VI – CONCLUSION

As per the result, it has been concluded that Wobble Board and BAPS Board exercises both can be used to treat the Balance in Stroke patients. While both the treatment protocols were effective, there was slight significant improvement found in group 1 treatment over group 2. Hence it has been concluded that both the treatments can be used for the treatment of balance issue in Stroke patients.

VII – DISCUSSION

The present study was done to determine the efficacy of Wobble Board and BAPS Board on Balance in Stroke patients. Stroke is the subject for this study. The pre and post effect of Wobble Board and BAPS Board exercises is taken by Berg Balance scale. The collected data analysis shows that null hypothesis is accepted, which means both technique Wobble Board and BAPS Board were effective in treating balance in stroke patients. The present study also shows that the average mean of both groups technique i.e., Wobble Board and BAPS Board is concluded that Wobble board is found statistically better over BAPS Board.

Shoeb M. *et al* suggested that BAPS board and Frenkel's exercises both can be used to treat the impaired balance in CVA patients. While both the treatment protocols were effective but there was no significant improvement found in any single treatment over another. Hence it has been concluded that both the treatments can be used for the treatment of balance issue in CVA patients.[13]

K.D AHARI. *et al* suggested This study has indicated that a combination of BAPS and VBF training program of proprioceptive training demonstrated on improvement in postural balance control. The major finding of this study is: significant improvement in the post BBS score in male and female, insignificant difference between post BBS score in male and female.[14]

Md. Abdul Alim *et al* suggested that result of this experimental study has identified the effectiveness of conventional physiotherapy with BAPS training are better treatment than the conventional physiotherapy alone for improving balance among stroke patient. Participants of the conventional physiotherapy with BAPS training showed no statistically significant value but a small separate comprises improvement than those in the only conventional physiotherapy group, which indicate that the conventional physiotherapy with BAPS training can be an effective therapeutic approach for stroke patients with balance problem.[15]

ANTHONY D.J *et al* suggested that Wobble board exercises, when combined with the conventional physiotherapy, are safe and effective in restoring functional balance in patients with hemiplegia following ischemic strokes.[16]

The current study is very unique in its type, so we can do a lot in future research. This study was conducted for a short period of time and with small sample size; future research involving long time period and larger sample size and compariing of two different intervention is also possible.

The result of this study will help the physiotherapist to choose whether which intervention is best for the treatment of coordination in cerebral palsy patient.

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