



“EFFECT OF WIPPRACER TRAINING TO IMPROVE BALANCE IN STROKE PARTICIPANTS:A RANDOMIZED CONTROL TRIAL”

Physiotherapy

Dr. Pal Patel*

Intern, Nootan College of Physiotherapy, Sankalchand Patel University, Visnagar-384315, Gujarat, India. *Corresponding Author

Dr. Karishma Barot

Tutor, Nootan College of Physiotherapy, Sankalchand Patel University, Visnagar-384315, Gujarat, India.

ABSTRACT

Background: Balance capacity was defined as maintaining, achieving, or restoring a state of balance during any posture. Stroke can be ischemic and haemorrhagic and can be acute or chronic. Mainly causes altered sensations reduced muscle power and tone, reduced joint mobility and stability, balance and gait impairment. this causes paralysis of the whole body or partial body, i.e., quadriplegia, hemiplegic, hemiparesis, paraplegia, paraparesis. increase in muscle tone is responsible for the relative failure of muscle growth and may produce functional problems. deformities of the whole body affect ambulation, bed positioning, sitting, chair level activities, transfers, and standing up. The study aims to find out the effects of wippracer training on stroke participants for benefit of participants.

Methods: In a 6-week intervention study, a total of 30 participants of the middle age group were diagnosed with hemiparesis. The participants were divided into two groups; group A, who received a wippracer training with a conventional exercise program and group B received a conventional exercise program. Pre and post-treatment data were collected and analysed using SPSS 22.0. Paired t-test and unpaired t-test were used to find out the significance of the treatment.

Results: Wippracer training can be employed along with conventional exercise programs in the effective management with stroke participants in improving functional activity and balance. A significant improvement in balance and functional activity ($p < 0.05$) after the treatment was found in the intervention group.

Conclusion: The study concluded that wippracer training can be employed along with conventional exercise programs in the effective management of participants with stroke participants in improving functional activity and balance.

KEYWORDS

Fullerton Advanced Balance, Functional Reach Test, Berg Balance Scale, Hemiparesis, Wippracer Training

Background:

Stroke can be ischemic and haemorrhagic and can be acute or chronic. Mainly causes altered sensations reduced muscle power and tone, reduced joint mobility and stability, balance and gait impairment. This causes paralysis of the whole body or partial body, i.e., Quadriplegia, hemiplegic, hemiparesis, paraplegia, paraparesis. An increase in muscle tone is responsible for the relative failure of muscle growth and may produce functional problems. Deformities of the whole body affect ambulation, bed positioning, sitting, chair level activities, transfers, and standing up.^[1] Balance capacity was defined as the ability to maintain, achieve or restore a state of balance during any posture.^[2] The change of weight and controlling equilibrium at the same time and controlled swing movement translates the movement into the driving direction of the visual vehicle on the screen. If there is a lot of a car on the traces, additionally a clever use of tactics is required.^[3] Good postural balance and mobility are essential for the adequate performance of most daily tasks moreover recreational activities.^[4] Balance is a constantly adjusting process of joints and muscles, involving integration between different systems like detecting, transmitting, and processing sensorial and motor information, in the central nervous system and adapting motor responses to determine the body's posture regarding the environment, thus maintaining one's center of gravity within the support core.^[5] To maintain balance in activities of daily living (ADL), posture control is essential, while motor, sensory and higher brains cognitive functions contribute to postural control.^[6-10] Stroke is a major health problem in India. The prevalence of stroke in India was estimated as 203 per 100,000 populations above 20 years, amounting to a total of about 1 million cases.^[11] Balance is diminished in participants with hemiplegic and hemiparesis.^[12] The Berg balance scale (BBS) was developed to measure balance among people with impairment in balance function by assessing the performance of functional tasks. It is a valid instrument used for the evaluation of the effectiveness of interventions and quantitative descriptions of function in clinical practice and research. The BBS has been evaluated in several reliability studies.^[13] Among home-dwelling individuals with chronic stroke, balance problems, especially during the performance of complex tasks, have been identified as the strongest predictor of falling.^[14] Wippracer software in combination with the whippier does not only make it possible to develop participants' non-directional motor activities. The user does not react to changes in position. He has to cause them actively and planned. The wippsider appeals to the proprioceptors (kinaesthetic analysers for movement control, important because of their high data processing and guidance speed), also optical, acoustic,

and tactile analysers. It is thus outstanding for the employment with sport/ spare time, school, and kindergarten suitably. There are no studies on this device for the improvement of dynamic balance in stroke participants. (Hemiparesis) This study may help the physiotherapist to identify and use the best balance improvement for stroke participants and provide better insight to plan an effective balance training program for stroke participants.

Hypothesis

Null Hypothesis: There is no significant effect of WippRacer Training on stroke participants.

Alternative Hypothesis: There is a significant effect of WippRacer Training on stroke participants.

METHOD:

This study was a Randomized controlled trial. It was conducted in nootan college of physiotherapy from; September, 2021 to February, 2022. This study approved by the Institutional Committee of Nootan College of Physiotherapy. Written inform consent was obtained from all individual participants include in the study.

Participants:

Participant with H/O of Stroke with Hemiparesis, Age group are 36-55, Both male and female and BBS score is 21 To 56 were included into the study. The exclusion criteria are Non-cooperative participants, Wheelchair-bound, Unable to stand unassisted for a minimum of 1 minute and BBS Score is 00 to 20.

Participants were selected by Simple Random Sampling in A & B groups. A total of 30 participants for both groups include with demographic details [Table 1]. The pre evaluation included detailed neurological assessment, history of the participants and function assessment through BBS scale.

Randomization:

Participants were divided by simple random sampling in A and B groups. Randomization into two groups through the lottery method and participants were blinded in the study.

Treatment was given in experimental group [Group-A].

Post-intervention evaluation was done. Each participant was evaluated before the First session and after the last session.

All statistical analysis was done using SPSS 22 software for windows. Descriptive analysis was obtained by mean & standard deviation. Intergroup comparison between Group A & B of pre & post-treatment of BBS and FAB were done using unpaired t-test. Intra group comparison of pre & post-treatment scores of BBS and FAB within Group-A and B were done using paired t-test.

[5.14] TREATMENT PROTOCOL [For 6 weeks]

Group A: Experimental Group

Training with Wippracer Was Given to the Subjects in Group A:

WEEK	LEVEL	DAY 1 TO 5	DAY 6 TO 6	DURATION
Week-1	Level-1	WITH SUPPORT	WITHOUT SUPPORT	7 MINUTES
Week-2	Level-2			7 MINUTES
Week-3	Level-3			8 MINUTES
Week-4	Level-4			8 MINUTES
Week-5	Level-5			8 MINUTES
Week-6	Level-6			8 MINUTES

Table No.1 Training with Wippracer protocol for Group A

Conventional physiotherapy program

Week	Exercises	Repetition
Week-1	1. PUP (LL, UL)	10 Repetition: 1 set
Week-2	2. SLE	
Week-3	3. Bounding	
Week-4	4. Gait training	
Week-5	5. Sit to stand	
Week-6	6. Sit to stand	
	7. PROMS	

Table No.2 Conventional exercise protocol for Group A

GROUP B: CONTROL GROUP (CONVENTIONAL PHYSIOTHERAPY PROGRAM)

Week	Exercises	Repetition
Week-1	1. PUP (LL, UL)	10 Repetition: 1 set
Week-2	2. SLE	
Week-3	3. Bounding	
Week-4	4. Gait training	
Week-5	5. Sit to stand	
Week-6	6. Sit to stand	
	7. PROMS	

Table No.3 Conventional exercise protocol for Group B

Procedure for Group A:

- The Wippracer training will be first and foremost demonstrated to the participant.
- All the participants will be known and will be willingly signing the consent form.
- The participant's position will be standing on the Wippracer machine and the participant will be ready for maintaining balance and coordination.
- The training will be given 5 days a week for 6 weeks.

RESULTS:

As Shown in Diagram 1, a total of 43 participants were selected. Among them, 13 participants excluded from the study. So, 30 participants were selected. The result found in this study disclosed that after 6 weeks treatment program. A significant difference was found in the FAB score, BBS score, and FR in both the groups, but Group A (Experimental Group) showed greater improvement in the outcomes.[Table 4 & Graph 1]

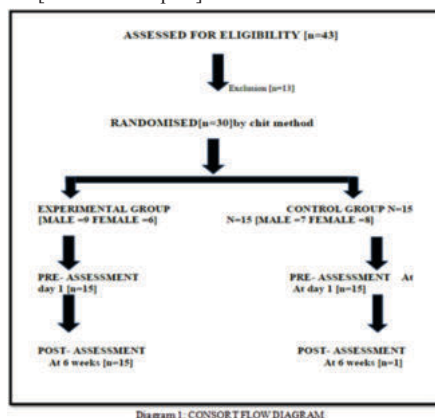
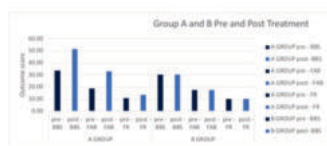


Diagram 1: CONSORT FLOW DIAGRAM

Outcome	Group A				Group B			
	Pre-Treatment	Post-Treatment	L. value	R. value	Pre-Treatment	Post-Treatment	L. value	R. value
BBS	Mean: 33.53 SD: 8.06	Mean: 51.47 SD: 2.475	0.00	0.00	Mean: 30.20 SD: 6.167	Mean: 40.20 SD: 6.020	0.00	0.004
FR	Mean: 10.520 SD: 1.00	Mean: 13.300 SD: 0.669	-17.60	0.00	Mean: 9.90 SD: 1.369	Mean: 13.341 SD: 1.740	0.00	0.004
FAB	Mean: 18.87 SD: 7.039	Mean: 33.97 SD: 6.453	0.00	0.00	Mean: 17.53 SD: 4.764	Mean: 27.53 SD: 4.673	0.00	0.004



Graph 1: Intragroup comparison of pre-post treatment of both groups

The present study was carried out to find out the effectiveness of wippracer training to improve balance in stroke participants. As the participants usually have a balance problem. Total participants of middle age group; i.e., 36-55 years old male and female with balance problem were selected for the study as per the inclusion and exclusion criteria they were divided into 2 groups with 15 participants each; of which one was the experimental group and the other was the controlled group. They were all evaluated on the initial day and then after 6 weeks of the intervention period. We found a significant markdown in the symptoms of the Intervention group then the controlled group. This could be due to improved functional activity and balance.

The results found in this study disclosed that after a six-week treatment program, both groups, group A, who received a wippracer training program with a conventional exercise program, and group B received a conventional exercises program. Group A attained a significant improvement of wippracer training on stroke participants for balance.

According ImreCikajloet.al (2012) conducted a comparative study on "telerehabilitation using virtual reality task can improve balance in patients with stroke" they have concluded the telerehabilitation approach in VR supported balance training improved balance in stroke participants and had a similar effect on participants postural functional improvement as conventional balance training in clinical settings. However, when balance training is continued in participants' homes instead of the hospital, it would eventually decrease the number of participant visits reduce related costs, and enable treatment of a larger number of participants. (18)

A study conducted by Madhuranga PV et.al. (2019) said that wobble board exercises, when combined with conventional physiotherapy, are safe and effective in restoring functional balance in participants with hemiplegia following ischemic strokes. (19)

The participants were divided into two groups; group A, who received a wippracer training program with a conventional exercise program and group B received a conventional exercise program for 1 session/day and 5 days/week for 6 weeks. In this study berg balance scale (BBS), Fullerton advanced balance (FAB), and functional reach test (FR) were used as outcome measures.

The results showed a significant improvement in the outcome measures in the post-treatment stage as compared to the pre-treatment stage.

Though a significant improvement was found after treatment in group A. Group A showed greater improvement in the FAR score, BBS score, and FR score. (P-value < 0.05).

Thus, the null hypothesis is fail to accept[H0].

The above-exposed statement suggests that wippracer training can be employed along with conventional exercise programs in the effective management of participants with stroke participants in improving functional activity and balance.

LIMITATIONS of this study were Regular follow-up is not possible after the intervention period, study intervention period was 6 weeks only, which is comparatively less, study setting, Change in the functional capacity of the participant may alter the result and sample size

RECOMMENDATIONS of this study can be done with long-term follow-up, large sample size and elder age group, pediatric and college students.

CONCLUSION:

The study concluded that wippracer training has an improving functional outcome for stroke participants. Experimental group shows significant improvement in BBS and improve coordination when compared to the control group.

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Conflicts of interest: There are no conflicts of interest.

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