

# Effectiveness of Repetitive Task Training on Balance Among Patients with Stroke

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**Abstract**—Stroke is a common neurological condition that often results in impairments in balance, mobility, and functional independence, significantly affecting the quality of life of affected individuals. Balance dysfunction increases the risk of falls and limits participation in activities of daily living among stroke patients. The aim of the study is to find out the effectiveness of repetitive task training on balance among stroke patients. This study adopts a quasi-experimental research design, and convenient sampling was employed. A population of 30 subjects aged between 40 to 60 years who were diagnosed with stroke were selected for the study. The subjects were divided into two groups: Group A (experimental group) and Group B (control group). The Berg Balance Scale was administered to all subjects to evaluate the pre-test balance levels in both groups. Group A received repetitive task training along with conventional occupational therapy for 24 sessions (3 sessions per week) with a duration of 60 minutes per session for 2 months. Participants in the control group received only conventional occupational therapy for the same duration. Post-test assessment was carried out using the Berg Balance Scale. The collected data were statistically calculated and analysed, and the results showed a significant improvement in balance among the experimental group when compared to the control group.

**Index Terms**—Stroke, Balance, Berg Balance Scale, Occupational Therapy, Repetitive Task Training.

## I. INTRODUCTION

Stroke is a major neurological condition characterized by sudden disruption of blood supply to the brain, often resulting in long-term impairments in motor control, balance, and functional independence. One of the core challenges faced by stroke patients is difficulty in maintaining balance, which leads to an increased risk of falls, reduced mobility, and limitations in performing activities of daily living.

Balance impairments significantly affect the physical, psychological, and social well-being of stroke survivors.

Repetitive Task Training (RTT) has emerged as an effective therapeutic intervention to address balance deficits in stroke patients. RTT involves repeated practice of functional, goal-oriented tasks that are relevant to daily activities. This approach is based on the principles of motor learning and neuroplasticity, which suggest that repetitive practice can strengthen neural pathways and improve postural control, coordination, and balance.

Repetitive task training can have a significant impact on balance recovery by providing stroke patients with structured, task-specific practice in a controlled environment. Structured and repetitive practice is essential for stroke patients, as it enhances sensory-motor integration, reduces movement variability, and promotes automatic postural responses. By engaging patients in repetitive functional activities such as sit-to-stand transitions, reaching, stepping, and walking, RTT may improve static and dynamic balance, thereby enhancing functional independence and quality of life. The need for balance-focused interventions arises from the clinical manifestations of stroke, which include muscle weakness, impaired coordination, altered proprioception, and postural instability. These impairments interfere with the patient's ability to maintain balance during functional activities. Therefore, interventions that emphasize repetition, task specificity, and progressive challenge are particularly beneficial in improving balance and reducing fall risk among stroke patients.

### Aim of the Study

To find out the effectiveness of repetitive task training on balance among stroke patients.

#### Objectives of the Study

- To assess balance using the Berg Balance Scale among stroke patients.
- To evaluate the effect of repetitive task training on balance in stroke patients.

#### Research Hypothesis

There is a significant improvement in balance among stroke patients following repetitive task training.

## II. METHODOLOGY

#### RESEARCH DESIGN:

This study adopts a quasi-experimental research design. The present study consists of two groups, namely the experimental group and the control group, and includes pre-test and post-test assessments.

#### SAMPLE TECHNIQUE, SIZE, AND SETTING:

The study employed a convenient sampling technique. A total of 30 stroke patients participated in the study, with 15 subjects allocated to the experimental group and 15 subjects to the control group. The study was conducted at the Occupational Therapy Outpatient Department of JKKMMRF College of Occupational Therapy and a rehabilitation center.

## III. VARIABLES UNDER THE STUDY

#### INDEPENDENT VARIABLE:

Repetitive Task Training

#### DEPENDENT VARIABLE:

Balance among stroke patients

#### DURATION OF THE STUDY:

The intervention was carried out for a duration of two months for both the experimental and control groups. The experimental group received 24 sessions of intervention, with three sessions per week, each session lasting 60 minutes.

#### SELECTION CRITERIA

#### INCLUSION CRITERIA

- Stroke patients aged between 40–60 years were selected for this study.
- Patients diagnosed with ischemic or hemorrhagic stroke.
- Stroke patients presenting with balance impairments.
- Both male and female patients were included.
- Patients who were able to understand and follow simple instructions.

#### EXCLUSION CRITERIA

- Patients who had received repetitive task training in the last 6 months.
- Patients below 40 years and above 60 years of age.
- Patients with other neurological conditions such as traumatic brain injury, Parkinson's disease, or multiple sclerosis.
- Patients with severe cognitive impairments or severe communication deficits.
- Patients with severe musculoskeletal, cardiac, or medical conditions that could interfere with participation in balance training.
- Patients who were unable to commit to therapy sessions and assessment procedures were excluded from the study.

## IV. INSTRUMENT USED

#### TOOL USED

Berg Balance Scale (BBS)

#### SOURCE OF DATA

The data for the present study were collected from Live Well Institute of Rehabilitation Center, Puvandi, Madurai, and the Occupational Therapy Outpatient Department of JKK Munirajah Medical Research Foundation (JKKMMRF) College of Occupational Therapy, Komarapalayam.

#### ETHICAL CONSIDERATION

Ethical approval for the study was obtained from the Head of the Department, JKKMMRF College of Occupational Therapy. Informed consent was obtained from all participants prior to the commencement of the study.

#### PROCEDURE

A sample of 30 stroke patients was selected based on the inclusion and exclusion criteria using the convenient sampling method. Informed consent was obtained from all participants before participation in the study. The subjects were divided into two groups: Group A (Experimental Group) and Group B (Control Group), with 15 subjects in each group. Pre-test assessment of balance was carried out for both groups using the Berg Balance Scale. Group A received Repetitive Task Training along with conventional occupational therapy for a total of 24 sessions (3 sessions per week), with each session lasting 60 minutes, over a period of 2 months. Group B received only conventional occupational therapy for the same duration. After completion of the intervention period, a post-test assessment was conducted for both Group

A and Group B using the Berg Balance Scale. The pre-test and post-test scores were collected, tabulated, and statistically analyzed to determine the effectiveness of

repetitive task training on balance among stroke patients.

TABLE 1: Comparison of pre-test values of control group and experimental groups by using Berg balance scale

GROUP	TEST	MEAN	SD	't' VALUE	'P' VALUE
Control group	Pre-test	24.20	1.70	0.4521	0.6546
Experimental group	Pre-test	24.53	2.29		

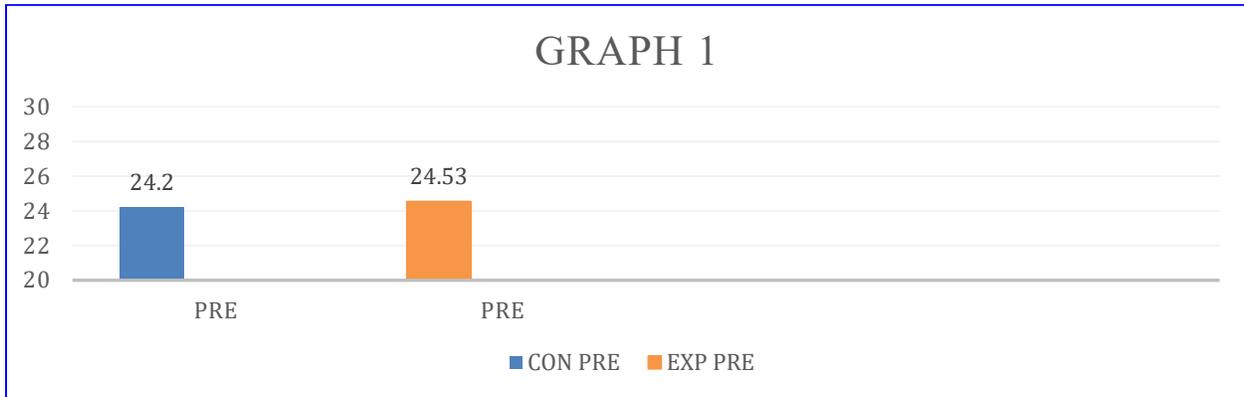


Table 1 and Graph 1 show the comparison of pre-test values of control group and experimental group mean value are 24.20,24.53 respectively. The calculated unpaired 't' test value is 0.4521 and 'p' value is 0.6546 which shows it is considered to be not statistically significant between the groups.

TABLE 2: Comparison of pre-test values of control group and experimental groups by using Berg balance scale

GROUP	TEST	MEAN	SD	't' VALUE	'P' VALUE
Control group	Pre-test	24.20	1.70	2.1366	0.0508
	Post-test	25.20	1.01		

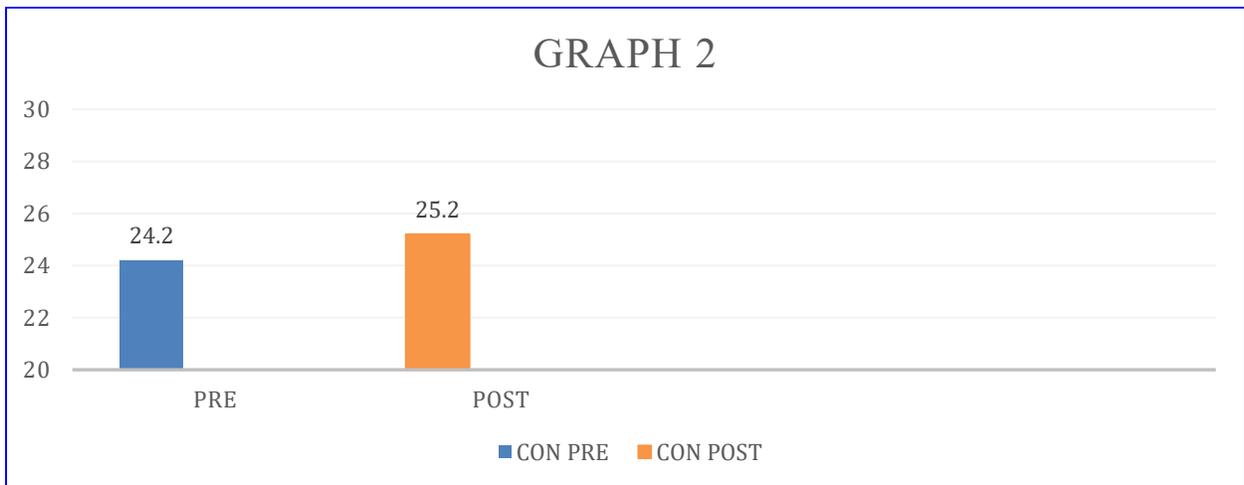


Table 2 and Graph 2 show the comparison of control group pre and post score mean value are 24.20,25.20 respectively. The calculated paired 't' test value is 2.1366 and 'p' value is 0.0508 which shows it is considered to be not quite statistically significant between the pre and post-test values of control groups.

TABLE 3: Comparison of pre and post-test values of experimental groups by using Berg balance scale

GROUP	TEST	MEAN	SD	't' VALUE	'P' VALUE
Experimental group	Pre-test	24.53	2.29	61.000	0.0001
	Post-test	28.60	2.35		

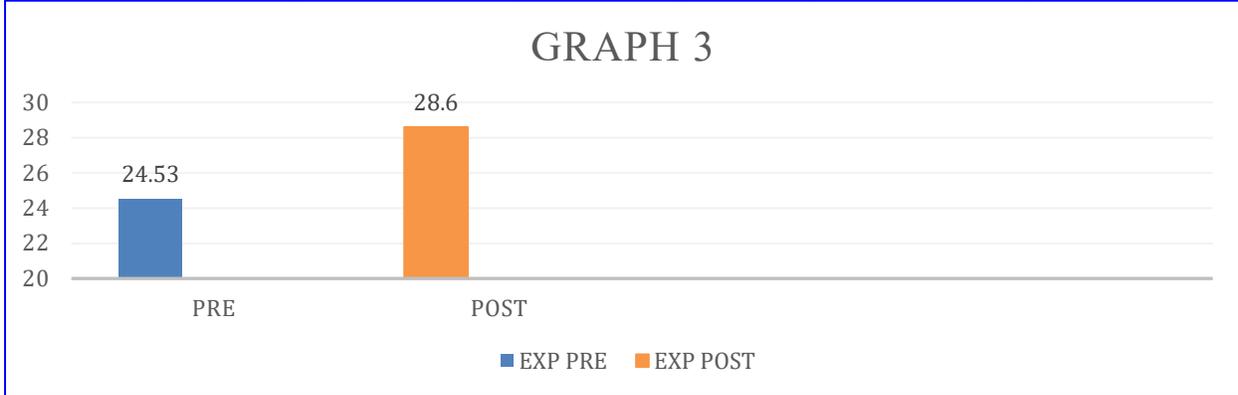


Table 3 and Graph 3 show the comparison of experimental group pre and post score mean values are 24.53,28.60 respectively. The calculated paired 't' test value is 61.000 and 'p' value is 0.0001 which shows it is considered extremely statistically significant experimental group has significant improvement.

TABLE 4: Comparison of post-test values of control and experimental groups by using Berg balance scale

GROUP	TEST	MEAN	SD	't' VALUE	'P' VALUE
Control group	Post-test	25.20	1.01	5.1368	0.0001
Experimental group	Post-test	28.60	2.35		

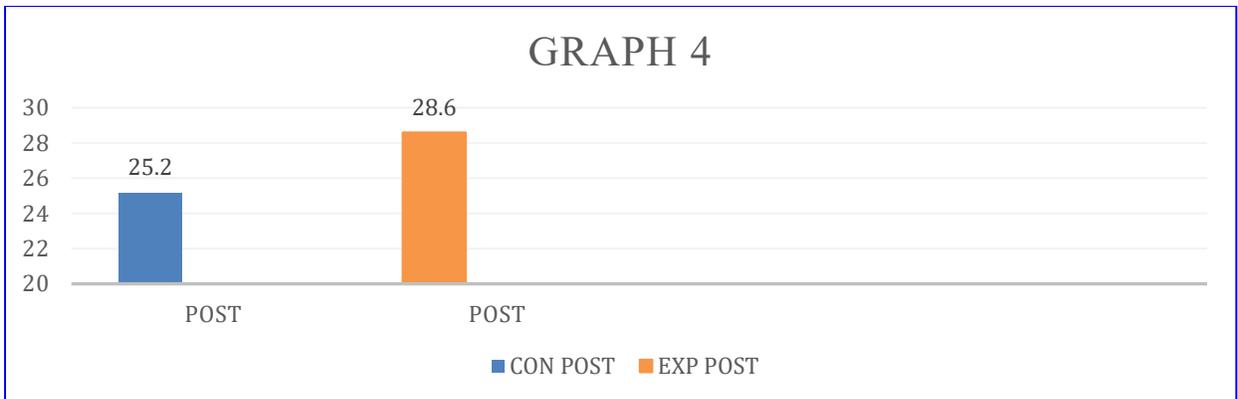


Table 1 and Graph 1 show the comparison of post-test values of control group and experimental group score mean value are 25.20,28.60 respectively. The calculated unpaired 't' test value is 5.1368 and 'p' value is 0.0001 which is lesser than 0.05 and shows it is considered to be statistically significant and the experimental group has significant improvement.

### V. DISCUSSION

The aim of the study was to find the effectiveness of repetitive task training on balance among stroke patients. A total of 30 stroke patients were selected based on the inclusion criteria using the convenient

sampling method. The samples were allocated into two groups: Experimental Group and Control Group (Conventional Therapy). The researcher obtained informed consent from all participants prior to the commencement of the study.

Totally 30 stroke patients in the age group of 40 to 60 years were selected based on the inclusion criteria. The subjects were divided into two groups, Group A (experimental group) and Group B (control group), with 15 subjects allotted to each group. Pre-test assessment was conducted for both groups using the Berg Balance Scale to assess baseline balance performance.

Group A (experimental group) received repetitive task training along with conventional occupational therapy for a total of 24 sessions (3 sessions per week), with each session lasting 60 minutes, for a duration of 2 months. Group B (control group) received only conventional occupational therapy for the same duration.

After completion of the intervention period, a post-test assessment was conducted for both Group A and Group B using the Berg Balance Scale. Based on the scores obtained in the pre-test and post-test assessments of both groups, the data were tabulated and statistically analyzed to determine the effectiveness of repetitive task training on balance among stroke patients.

#### VI. CONCLUSION

The statistical analysis showed that there was a significant improvement in balance by giving repetitive task training along with occupational therapy activities among stroke patients in the experimental group when compared with the control group.

#### VII. LIMITATIONS

- This study was conducted only on stroke patients.
- The intervention period was limited.
- The study was carried out with a small sample size.
- This study was not compared with other balance training protocols.

#### VIII. RECOMMENDATIONS

- The intervention period can be extended for better outcomes.
- The study can be conducted on other neurological conditions with balance impairments.
- Balance can be measured using other assessment tools in addition to the Berg Balance Scale.

- The study can be conducted for a longer duration with follow-up assessments.
- Other treatment protocols can also be implemented and compared.

#### REFERENCES

##### BOOKS:

- [1] Neurology and neurosurgery illustrated , 5th edition, author: Keneeth W lindsay, Ian Bone, Geraint Fuller. P.No: 241-265
- [2] Physical rehabilitation, author: Susan B. O'sullivan, Thomas J. Schmitz, George D. Fulk, 6th edition, stroke. P.No:645-720
- [3] Sunder, Textbook of rehabilitation, 3rd edition .P.No:351-361
- [4] Textbook of therapeutic exercises, author: S lakshmi narayanan. P.No: 182-194
- [5] Trombly, Occupational therapy for physical dysfunction, 6th edition. P.No:1001-1040

##### JOURNALS:

- [1] ANN HAMMER 11 JUL 2007 Balance training in stroke patients – a systematic review of randomized, controlled trials, Advances in Physiotherapy Volume 10 Issue 4 pg:163- 172 <https://doi.org/10.1080/14038190701757656>
- [2] BEATRIZ FERNANDES, MARIA JOSE FERREIRA, 03 APRIL 2015 Task-oriented training and lower limb strengthening to improve balance and function after stroke: A pilot study, European Journal of Physiotherapy Volume 17, 2015 -Issue 2 <https://doi.org/10.3109/21679169.2015.1028102>
- [3] BO HYUN KIM, SUK MIN LEE 12 FEB 2012 The Effect of a Task-oriented Training on Trunk Control Ability, Balance and Gait of Stroke Patients, Journal of Physical Therapy Science Volume 24: Issue 6 519–522, 2012 <https://doi.org/10.1589/jpts.24.519>
- [4] DAVIDE G DE SOUSA, OCT 2018, Interventions involving repetitive practice improve strength after stroke: a systematic review, Journal of Physiotherapy 64 (2018) 210–221 <https://doi.org/10.1016/j.jphys.2018.08.004>.
- [5] GULSEN BABACAN YILDIZ, 2016 validity and reliability stadies of modified minimal state examination, Turkish Journal of Psychiatry <https://doi.org/10.1011/120310122236>
- [6] JAE HYO PARK1 , YOUNG MI KIM,25 JUNE

- 2015, The Effects of Repetitive Sit-to- Stand Training with a Paretic side Asymmetrical Foot Position on the Balance of Chronic Stroke Subjects, The Journal Of Korean Physical Therapy Volume 27 Issue 3 Pages:169- 173 <https://koreascience.kr/article/JAKO201524453729561>
- [7] JIN PARKA, AND TAE-HO KIMB, 2 FEB 2019, The effects of balance and gait function on quality of life of stroke patients, Neuro Rehabilitation 44 (2019) 37–41 <https://doi.org/10.3233/NRE-182467>
- [8] KUMARESAN ARUMUGAM, 15 OCT 2020, Effect of Repetitive Task Training to Improve Sit to Stand Performance and Activities of Daily Living Skills in Patients with Stroke, Indian Journal of Physiotherapy and Occupational Therapy, Vol. 14, No. 4 <https://doi.org/10.37506/ijpot.v14i4.11300>
- [9] KUMARESAN ARUMUGAM, 15 OCT 2020, Effect of Repetitive Task Training to Improve Sit to Stand Performance and Activities of Daily Living Skills in Patients with Stroke, Indian Journal of Physiotherapy and Occupational Therapy, Vol. 14, No. 4 <https://doi.org/10.37506/ijpot.v14i4.11300> LISA BLUM, NICOL KORNER-BITENSKY, 1 MAY 2008, Usefulness of the Berg Balance Scale in Stroke Rehabilitation: A Systematic Review, Physical Therapy Volume 88, Issue 5, Pages 559–566, <https://doi.org/10.2522/ptj.20070205>
- [10] LI ZHANG, JIANGUO YANG 02 AUG 2024, Effectiveness of kneeling training in improving mobility and balance post-stroke , BMC Sports Science, Medicine and Rehabilitation Volume 16, article number 163, (2024) Zhang et al. BMC Sports Science, Medicine and Rehabilitation (2024) 16:163 <https://doi.org/10.1186/s13102-024-00953-y>
- [11] MISBAH GHOUS, ARSHAD NAWAZ MALIK, JULY 2017, Effects of activity repetition training with Salat (prayer) versus task-oriented training on functional outcomes of stroke, Journal of the Pakistan Medical Association Vol. 67(No 7) <http://61.8.75.226/>
- [12] NANCY M. SALBACH, NANCY E. MAY APRIL 2005, The Effect of a Task-Oriented Walking Intervention on Improving Balance Self-Efficacy Poststroke: A Randomized, Controlled Trial, Journal of the American Geriatrics Society Volume 53, Issue 4 pg:576- 582 <https://doi.org/10.1111/j.1532-5415.2005.53203.x>
- [13] SOODEH ARABZADEH,1 SAKINEH GOLJARYAN, JUNE 2016, Effects of a Task-Oriented Exercise Program on Balance in Patients with Hemiplegia Following Stroke, Iran Red Crescent Medical Journal. Issues:6. <http://10.5812/ircmj.38429/>
- [14] STEPHANIE P JONES, 11 JUNE 2021, Stroke in India: A systematic review of the incidence, prevalence, and case fatality, International Journal of Stroke 2022, Vol. 17(2) 132–140 <https://doi.org/10.1177/17474930211027834>
- [15] STEPHEN DOWNS, JODIE MARQUEZ, JUNE 2013, The Berg Balance Scale has high intra- and inter-rater reliability but absolute reliability varies across the scale: a systematic review, Journal of Physiotherapy Volume 59 Issue:2 [https://doi.org/10.1016/S1836-9553\(13\)70161-9](https://doi.org/10.1016/S1836-9553(13)70161-9)
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