



# INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact Factor: 6.078

(Volume 7, Issue 6 - V7I6-1224)

Available online at: <https://www.ijariit.com>

## Reliability and validation of the tools used for sitting balance in neurological conditions

Rakesh Kumar Singh

[physiorakesh17@hotmail.com](mailto:physiorakesh17@hotmail.com)

Jaipur Physiotherapy College,  
Maharaj Vinayak Global University,  
Jaipur, Rajasthan

Dr. Ajeet Kumar Saharan

[ajeetphysio@gmail.com](mailto:ajeetphysio@gmail.com)

Jaipur Physiotherapy College, Maharaj  
Vinayak Global University, Jaipur,  
Rajasthan

Swati Sharma

[rusty.khus@gmail.com](mailto:rusty.khus@gmail.com)

Jaipur Physiotherapy College,  
Maharaj Vinayak Global University,  
Jaipur, Rajasthan

Anuja Choudhary

[reach4star2011@ymail.com](mailto:reach4star2011@ymail.com)

Jaipur Physiotherapy College,  
Maharaj Vinayak Global University,  
Jaipur, Rajasthan

Manoj Jadiya

[dr.manojkumarjadiya@gmail.com](mailto:dr.manojkumarjadiya@gmail.com)

Jaipur Physiotherapy College,  
Maharaj Vinayak Global University,  
Jaipur, Rajasthan

### ABSTRACT

*A balance disorder is a condition that makes you feel unsteady on your feet and dizzy. Dizziness is a general term for different symptoms of imbalance. Balance tests are a group of tests that check for balance disorders. Trunk control in NMD is impaired by progressive muscle weakness which is exacerbated by resulting inactivity. Given that the TCT has a good correlation with Balance is a complex motor skill that depends on interactions between multiple sensorimotor processes and environmental and functional contexts. This is a methodological research design this study is a correlation study design, which intends correlate the sitting balance and walking within the sample. All the subject performed trunk control test and follow the sitting balance scale and the results were observed for correlation with pre-specified functional activities performed by the subjects. Trunk control in NMD is impaired by progressive muscle weakness which is exacerbated by resulting inactivity. The most important finding of our study, in which we draw attention to the assessment of trunk control in NMD, is the fact that the TCT is a reliable and valid test which can yield results related to a patient's functional level and guide clinicians during the clinical intervention period. The tools which we have used for the study is now validated and reliable.*

**Keywords**— Physiotherapy, Health Care, Rehabilitation

### 1. INTRODUCTION

A balance disorder is a condition that makes you feel unsteady on your feet and dizzy. Dizziness is a general term for different symptoms of imbalance. Balance tests are a group of tests that check for balance disorders. Trunk control in NMD is impaired by progressive muscle weakness which is exacerbated by resulting inactivity. Given that the TCT has a good correlation with Balance is a complex motor skill that depends on interactions between multiple sensorimotor processes and environmental and functional contexts. Stroke can affect different functions independently or in combination, causing heterogeneous neurological impairments and compensatory strategies. Because of such diversity, individualized rehabilitation is likely to benefit from precise assessment of each patient's impairments in motor, sensory, and cognitive aspects of postural control, as well as the functional implications. Different tools for balance assessment have been validated and should be chosen according to individual characteristics of patients with stroke. Although laboratory measurements are not widely available, they can provide precise information and should be combined with clinical evaluation whenever possible to enhance comprehension of postural impairments and disabilities in hemiparetic stroke patients. Further studies are necessary to investigate whether the use of particular tools of evaluation to guide balance rehabilitation affects function, activity, and participation outcomes. Good sitting balance control is essential for such people because they are often confined to the sitting position when performing the activities of daily living (ADLs). Activities that require sitting activities (such as feeding, grooming, and bathing), dynamic activities (such as propelling their wheelchair up or down ramps) as well as the ADLs require different degrees of sitting balance control.

Therefore, we aimed to identify correlation between sitting balance and functional independency along with quality of life in neurological condition.

**2. OBJECTIVES**

To validation and reliability of the tools used for sitting balance.

**3. METHODOLOGY**

The study would be duly approved by the institutional ethics committee. The participant fulfilling inclusion-exclusion criteria would be explained about the study. Written informed consent would be obtained from the participants. The baseline readings for Sitting balance scale, trunk control test at the beginning of the study from the participants and the same would be documented again at the end of their treatment plan. The scale sitting balance scale and trunk control test would be used for data collection after obtaining permission for administration for the purpose from the concern authorities.

Study design: This is a methodological research design this study is a correlation study design, which intends correlate the sitting balance and walking within the sample. All the subject performed trunk control test and follow the sitting balance scale and the results were observed for correlation with pre-specified functional activities performed by the subjects.

Participants: All adults age group 18 year to 55-year male and female patients having all neurological conditions.

Inclusion criteria: Study includes the patients who can independently transfer from wheel chair also paraplegic patients with the history of 2 years problems.

Exclusion criteria: Patient with any psychiatric co-morbidity and/or hemiplegic conditions, also have sever sensory loss condition. An active or terminal illness that may interfere with participation. Spinal deformity like kyphosis, scoliosis, Pressure sores, Any pain in the shoulder Problem, Any other complication like heterotropic ossification

Sample size: This was a study of 46 patients. Sitting balance control scale and trunk control test was used to assess sitting balance and walking independence of neurological patients.

**4. RESULTS**

Trunk control in NMD is impaired by progressive muscle weakness which is exacerbated by resulting inactivity. The most important finding of our study, in which we draw attention to the assessment of trunk control in NMD, is the fact that the TCT is a reliable and valid test which can yield results related to a patient’s functional level and guide clinicians during the clinical intervention period. Therefore, the TCT was carried out in the absence of the trunk assessment method in the rehabilitation of NMD. While previous studies have assessed construct validity of the TCT by comparing it with FIM and the Barthel index, in this study, construct validity was assessed by comparing the TCT with MFM and MFM trunk. MFM was chosen primarily for its good psychometric properties in the assessment of impairment of motor function in adult NMD and also because it has a high-level of validity and inter-rater reliability. Given that the TCT has a good correlation with the MFM and MFM trunk, our study suggests that trunk control disorders parallel problems in a patient’s general motor function level. Testing done by patient lying on bed: (1) roll to weak side (2) roll to strong side (3) balance in sitting position on the edge of the bed with the feet off the ground for at least 30 seconds (4) sit up from lying down Scoring Each Test Points unable to do without assistance 0 able to do so using nonmuscular help or in an abnormal style; uses arms to steady self when sitting 12 able to complete task normally 25 trunk control test = SUM(points for all 4 tests) Interpretation: • minimum score: 0 • maximum score: 100 • If the test is done at 6 weeks after stroke a score >= 50 predicts recovery of the ability to walk by 18 weeks.

	<i>Domain1</i>	<i>DOMAIN2</i>	<i>DOMAIN3</i>	<i>Domain4</i>
Domain1	1.0			
DOMAIN2	0.8	1.0		
DOMAIN3	0.8	0.9	1.0	
Domain4	0.8	1.0	0.9	1.0
Eating	-0.1	-0.1	-0.2	-0.1
Grooming	-0.1	0.0	-0.1	0.0
Bathing	-0.1	0.0	-0.1	0.0
U.L.dressing	-0.1	0.0	0.0	0.0
L.L.dressing	-0.1	0.0	0.0	0.0
Toileting	-0.1	0.0	0.0	0.0
Bladder	-0.1	0.0	0.0	0.0
Bowel	-0.1	0.0	-0.1	0.0
Bed, chair, wheelchair	-0.2	-0.1	-0.1	-0.1
Toilet	-0.2	-0.1	-0.1	-0.1
Tub, Shower	-0.1	0.0	0.0	0.0
Walk/wheelchair	-0.2	-0.1	-0.1	-0.1
Stairs	-0.1	0.0	-0.1	0.0

Comprehension	0.0	0.1	0.1	0.1
Expression	-0.2	-0.1	-0.1	-0.1
Social interaction	0.0	0.0	0.0	0.0
Problem solving	0.0	0.0	0.0	0.0
Memory	0.0	0.0	0.1	0.1

## 5. DISCUSSION

The Trunk Control Test can be used to assess the motor impairment in a patient who has had a stroke. It correlates with eventual walking ability. Testing done by patient lying on bed: (1) roll to weak side (2) roll to strong side (3) balance in sitting position on the edge of the bed with the feet off the ground for at least 30 seconds (4) sit up from lying down Scoring Each Test Points unable to do without assistance 0 able to do so using non-muscular help or in an abnormal style; uses arms to steady self when sitting 12 able to complete task normally 25 trunk control test = SUM(points for all 4 tests) Interpretation: • minimum score: 0 • maximum score: 100 • If the test is done at 6 weeks after stroke a score  $\geq 50$  predicts recovery of the ability to walk by 18 weeks.

In previous study showed that the quality of life doesn't affect in the patient with neurological problem also their sitting balance don't affect their quality of life on other hand in my study I found that the quality of life is much more affected in the patients have sitting balance, this is may be the population of the the different country. In other country the patient were much more able and financially strong and they might be used the different assistive device which is high quality materials for their sitting balance but in our county the condition is different .Patient in India are not much more sound in their financial situation and they can't effort the costly chair or assistive device so in my study I found that the sitting balance is much more affect the patients quality of life.

## 6. CONCLUSIONS

The tools which we have used for the study is now validated and reliable.

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