

Effect of different arm and foot positions on sit to stand performance in stroke



Abstract

Background: : One of the most common functional activities, which is essential to maintain an individual's independence is Sit to Stand movement (STS). STS task requires an adequate postural control and appropriate strategy in order to be performed successfully. Previous studies have identified that stroke survivors use compensation mechanisms and adopt inappropriate movement strategies during the STS maneuver. This study aimed to investigate the effect of biomechanical factors of altered foot and arm positions on STS performance in stroke population. Analyzing these aspects may enhance our understanding of the mechanisms that underlie dysfunctions in postural control and help in designing appropriate therapeutic strategies for stroke patients.

Methodology: It was an experimental study using repeated measures within-subject design. Stroke patients with unilateral hemiplegia in the age group of 20-60 years with ability to perform STS independently were included. 20 patients attending physiotherapy department at a tertiary care center were conveniently recruited after obtaining informed consent for participation in the study. Each participant was required to perform STS with two different arm and foot positions viz. 1) Hands on thighs with normal foot placement; 2) Arms in augmented position with normal foot placement; 3) Hands on thighs with posterior foot placement; and 4) Arms in augmented position with posterior foot placement. STS performance was assessed on NeuroCom® Balance Master® System (version 8.6) and the parameters analyzed were Weight transfer time (in seconds), Rising index, Weight bearing asymmetry (percentage) and COG sway velocity (degrees/second).

Results: The mean age of the participants was 46.85 ± 9.3 years with mean duration of stroke as 2.055 ± 0.99 years and equal distribution of right and left sided hemiplegia. As per the normality distribution of the data, Friedman test was used for weight transfer time, rising index and COG sway velocity whereas, one-way ANOVA was used for Weight Bearing Symmetry in all four different arm and foot positions. No significant difference was observed for different arm and foot positions on any of the parameters of sit to stand task.

Conclusion: The findings of this study suggest that the different arm and foot positions did not alone have an effect on sit to stand performance in stroke patients and various factors like initial position, perception, lower limb muscle strength, dominance of foot, chair height, etc. must also be taken into consideration. In view of the limited and controversial evidence in the literature more research is needed to determine the complex interaction of position of arms on foot during STS movement.

Key words: Stroke, Movement strategy, Sit to stand, Balance manager system

Isha Akulwar-Tajane

K J Somaiya College of Physiotherapy, India

Biography

Dr. Isha S. Akulwar has completed her Masters in Neurosciences Physiotherapy from the Maharashtra University of Health Sciences, India. She is an Associate Professor in Neurosciences Physiotherapy and Guide for postgraduate studies and In charge of pediatric neurorehabilitation unit at K. J. Somaiya College of Physiotherapy, Mumbai, India. She has published and presented many papers in various national and international conferences and has been serving as a reviewer for journals of repute. She has authored three books namely on 'Visual Perception'; 'Virtual Reality in Cerebral Palsy'; and 'Reflex maturation in pediatric evaluation'. She is well versed with the advanced technological equipment used for assessment and therapy in neurological conditions. She has served as an international faculty for balance and mobility academy, USA.

