

Effectiveness of Task Oriented Exercise on Lower Limb in Post Stroke Patient with Lateral Medullary Syndrome: A Case Series

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Abstract

Background: Stroke has such a significant socioeconomic impact worldwide. Stroke is gaining ground in terms of public awareness, patient and carer knowledge, service improvements, and research.

Purpose: The aim of the study is to determine the effectiveness of task-oriented exercise on lower limb in post stroke patients with lateral medullary syndrome.

Result: Comparing the outcomes of the FIM and BBS pre- and post-tests, there is a positive change seen in all the 10 participants after giving a task-oriented approach as a treatment. The post-scores ($P < 0.05$) of FIM have shown a significant difference in all the participants. The post-scores ($p > 0.05$) of BBS also have shown betterment in the balance and reduction of fall risk.

Keywords: task-oriented exercises, functional training, stroke rehabilitation and balance training.

Introduction

Stroke has such a significant socioeconomic impact worldwide. Stroke is gaining ground in terms of media coverage, patient and carer knowledge, service improvements, and research. Millions of stroke victims suffer from persistent neurological abnormalities, primarily motor and psychological, making stroke a major cause of disability. The severity of the stroke, the diseases it was linked with, the patient's age, the amount of time after the stroke, and the start of rehabilitation are the main factors that determine how long-term interventions are needed for poststroke recovery in a multidisciplinary team¹. When patients are clinically stable and balanced,

particularly about cardiorespiratory functions, and finally, when the tasks can be understood and supported by the patients' participation and involvement in the rehabilitation programmed, post-stroke rehabilitation in the subacute phase can begin. It begins in the fifth week following a stroke and lasts for roughly three months³. The primary cause of Wallenberg syndrome, also known as lateral medullary syndrome (LMS), is a blockage of the posterior inferior cerebellar artery (PICA), which causes a lateral medullary infarction⁷.

Wallenberg gave his early reports in 1901 (autopsy findings) and 1895 (clinical descriptions). An infarct in the intracranial vertebral artery is what

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causes Wallenberg's syndrome; occasionally, PICA obstruction can also induce LMS. This syndrome also results in sensory impairments of the ipsilateral side of the cranial nerve and face, as well as sensory impairment in the contralateral side's limbs and trunk. The crossover phase discovery allows for the diagnosis of the syndrome⁸. The ability for movement requires the integrity of both hemispheres⁹.

The validity and reliability of the FIM tool for stroke patients have a long history¹⁰. Patients who have suffered from strokes experience significant balance issues¹¹. Balance deteriorates over time following a stroke; therefore, it is critical to have a quantitative indicator that clinicians may use to monitor these changes and adjust treatment as appropriate. The Berg Balance Scale (BBS) was initially designed to quantitatively assess balance in older individuals. Recent studies of physical therapists working in stroke rehabilitation revealed that the BBS was the most often used diagnostic tool across the continuum from acute care to community-based care. Understanding the BBS's significance in population analysis is essential given how frequently it is used after a stroke¹².

Aim

The aim of the study is to determine the effectiveness of task-oriented exercise on lower limb function in post stroke patients with lateral medullary syndrome.

Methodology

It was a descriptive study conducted on 10 subjects with lateral medullary syndrome along with lower limb weakness. Samples were selected from the outpatient department of Saveetha Medical College Hospital, Thandalam, Chennai, according to the inclusion and exclusion criteria. Total study duration was about 5 months (June 2022 – October 2022).

Inclusion Criteria:

- Both genders are included
- Participants were aged between 50 - 70 years.
- Unilateral or bilateral affected lower limbs in stroke
- Subject with FIM (48 to 60) were included

- Subject with BBS (30 to 41) were included
- MRI findings impression on mainly (posterior inferior cerebral artery, vestibular artery)

Exclusion Criteria:

- Patient is on DVT protocol
- Subjects with lower limb fracture
- Other neurological disease
- Previous physiological disorders
- Psychological problems.

Study Procedure

Participants were selected from Saveetha Medical College and Hospital based on inclusion and exclusion standards. Complete information about the study procedure was explained to the participants and an informed consent sheet was signed by all the participants before starting the study procedure. The sample collection is done by convenient sampling. The sample size was 10. Both genders are included. Participants were aged between 50 years to 70 years. Unilateral or bilateral affected lower limbs in stroke MRI findings impression on mainly (posterior inferior cerebral Artery, vestibular artery). The FIM instrument is used for assessing patient function at the beginning and end of a beneficial episode for rehabilitation. The motor and cognition subscale scores stated together determine that the FIM instrument's total score will range from 18 to 126. The BBS is a 14-item scale that uses direct performance observation to assess the risk of falling and balance function in older and balance-impaired people.

All the participants of the group received 30 minutes of therapy. There were six sessions in a week, Group of 10 patients received task-oriented exercises. Task oriented training includes, and that relates to his/her ADL activity, such as: walking, Treadmill walking, Ground exercises, Lower limb training with practical activities like reaching objects, constraint-induced (movement)therapy, and mental imagery are also used. Other methods include cycling events, aerobic training, sit-to-stand exercises, and reach tasks for balance improvement. And it was given to the patient for 8 weeks. Six workstations were made for the participants to perform tasks: 1. Reaching for objects in different directions that are out of reach in standing position, which improves in

load-shifting ability and to activate the muscles of lower limb; 2. Stepping up sideways/laterally onto blocks of different heights; 3. Sitting to standing up movements using different chair heights, this focus on strengthening the extensor muscles of leg; 4. Stepping up backward and forward onto blocks of varied sizes; 5. forward step-up and step-down onto a block; and 6. elevating and lowering the heel(s) in standing position (calf raise exercise), this is mainly to strength train the gastrocnemius muscle which is the prime muscle for standing. A statistical test used to obtain the result is Wilcoxon signed rank test with the median value.

Data Analysis:

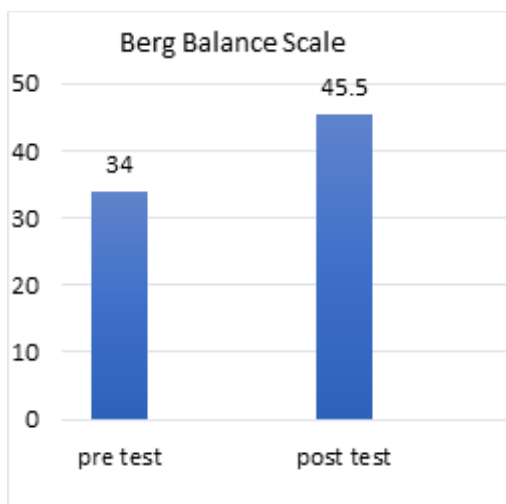


Fig 1: Pre and Post intervention Mean values of Berg Balance Scale

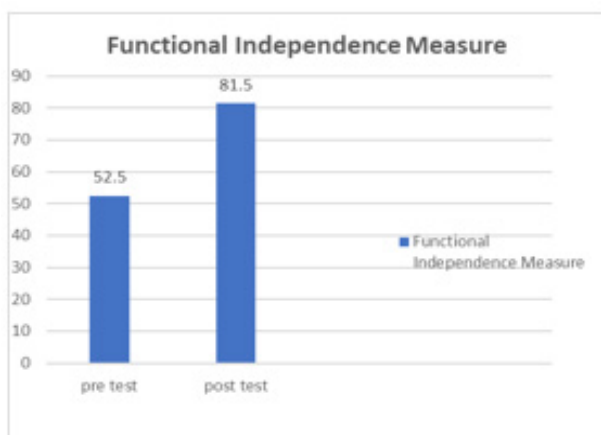


Fig 2: Pre and Post intervention Mean values of Functional Independence Measure

Results

Comparing the outcomes of the FIM and BBS pre- and post-tests, there is a positive change seen in all the 10 participants after giving a task-oriented approach as a treatment. The post-scores ($P < 0.05$) of FIM have shown a significant difference in all the participants. The post-scores ($p > 0.05$) of BBS also have shown betterment in the balance and reduction of fall risk. The Z-value of FIM and BBS is a 2.807 and 2.818 denoting the standard deviation of the values. The mean difference of BBS (Fig 1) and FIM (Fig 2) is 11.5 and 29 which gives a statistical proof for the significant difference in their balance function and functional independence after the intervention.

Discussion

The activities were also customized to the progress of each participant. Furthermore, this group carried out lower-extremity strength training according to the Carr and Shepherd guidelines for stroke survivors¹³. For eight weeks, five times a week over 30 minutes, the experimental group's participants engaged in task-oriented training. Subjects completed practice at a succession of workstations in the training program, which was intended as a circuit class. The workstations were created with the goal of effectively strengthening the lower limbs' bilateral muscles.

Six workstations were made for the participants to perform tasks: 1. Reaching for objects in different directions that are out of reach in standing position, which improves in load-shifting ability and to activate the muscles of lower limb; 2. Stepping up sideways/laterally onto blocks of different heights; 3. Sitting to standing up movements using different chair heights, this focus on strengthening the extensor muscles of leg; 4. Stepping up backward and forward onto blocks of varied sizes; 5. forward step-up and step-down onto a block; and 6. elevating and lowering the heel(s) in standing position (calf raise exercise), this is mainly to strength train the gastrocnemius muscle which is the prime muscle for standing. Each participant is given 5 min to complete a workstation. Each participant is given one-to-one therapy i.e., treatment is conducted only between participant and therapist.

Chenkin J, Day GS, Shamji AI, Frost DW and Swartz RH offered a case study and review of the

literature. The identification of lateral medullary syndrome symptoms and indicators is essential for patient care. Affected people should get rapid neuroimaging to be able to rule out other acute stroke diagnoses and therapies that are illegal. Neurovascular imaging must be continuously performed to rule out vascular pathology. The prognosis for lateral medullary syndrome was favorable in comparison to other posterior circulation strokes, which was stated in a pilot study Conducted by Fernandes B, Batista F, Ferreira MJ, Evangelista I. An effective physiotherapy technique for the management of post-stroke postural dysfunctions is better in the combination of task-oriented training and strength training of affected lower limb. The two strategies complement one another since repetition of the activity necessitates some type of strength training, and strength training should be programmed according to the task human beings use in everyday life.

An Experienced and qualified physical therapist was in-charge of supervising each session and making sure that the functional level of each participant was considered when calculating intensity and time duration of exercise at every station. Subjects were instructed to give their full effort and perform as hard as possible while also hearing verbal commands, advice and corrections intended to boost their performance. The complexity of the exercise done at each workstation was also increased, including the distance walked while standing, the height of the chair when performing getting up exercises, and the size of the blocks. The number of repetitions able to perform in five minutes was also increased as a progression¹⁴.

Conclusion

Task oriented approach seems to improve lower limb function after stroke. Progressive repetitive training of task-oriented exercise programs also benefits and enhances the functional recovery of patients with lateral medullary syndrome after stroke.

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Conflict of interest: Nil

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