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A Case Report

Effect of Task-Oriented Gait Training on Functional Mobility in a Post-Stroke Patient: A Case Report

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ABSTRACT

Background: Stroke is a leading cause of long-term disability worldwide, frequently resulting in impaired balance, hemiparesis, and gait abnormalities. Rehabilitation strategies focusing on functional recovery are critical, and task-oriented training (TOT) has emerged as an effective approach to enhance mobility and independence in post-stroke patients. Objective: To evaluate the effect of a structured task-oriented gait training program on functional mobility and balance in a patient 12 weeks post-stroke. Methods: A 58-year-old male with right hemiparesis following a left middle cerebral artery infarct underwent a 12-week physical therapy program, comprising task-oriented gait training, strengthening, balance exercises, and range of motion activities. The intervention was delivered five days per week, 45 minutes per session. Functional outcomes were assessed at baseline and post-intervention using the 10-Meter Walk Test (10MWT), Berg Balance Scale (BBS), and Functional Ambulation Category (FAC). Results: Following the intervention, walking speed improved from 0.32 m/s to 0.68 m/s on the 10MWT. The BBS score increased from 21/56 to 38/56, while the FAC improved from 2 (requiring assistance) to 4 (independent with supervision). The patient reported enhanced confidence in ambulation and no adverse events occurred during therapy. Conclusion: Task-oriented gait training demonstrated clinically meaningful improvements in mobility, balance, and independence in this post-stroke patient. These findings support the role of TOT as a feasible, low-cost, and effective rehabilitation strategy, particularly in resource-limited healthcare settings.

Keywords: Stroke rehabilitation; Task-oriented training; Gait; Balance; Functional mobility; Case report

INTRODUCTION

Stroke is a major cerebrovascular event that occurs following disruption of cerebral blood flow, either due to arterial occlusion or hemorrhage, resulting in neuronal death and functional impairment (1). Globally, stroke is a leading cause of mortality and long-term disability, with an estimated incidence of 15 million cases per year; among these, approximately 40% of survivors experience persistent functional deficits, and 15–30% suffer from severe motor, sensory, or cognitive impairments (2,3). Ischemic stroke constitutes nearly 80% of all cases and is a predominant cause of disability and socioeconomic burden worldwide (4,5). Post-stroke motor dysfunction commonly manifests as hemiparesis, balance deficits, gait abnormalities, and reduced independence in activities of daily living (6).

Rehabilitation remains the cornerstone of post-stroke management, and several approaches have been implemented, including the Bobath concept, constraint-induced movement therapy, and circuit training (7,8). However, contemporary evidence emphasizes the role of neuroplasticity in recovery, shifting the focus from compensatory strategies toward activity-based, task-specific interventions that enhance functional reorganization within the central nervous system (9,10). Task-oriented training (TOT) is an evidence-based rehabilitation strategy centered on repetitive practice of functional tasks, aiming to restore motor control and improve participation in real-world activities (11,12). Previous studies have demonstrated its efficacy in enhancing gait speed, mobility, and balance among stroke survivors, yet its implementation remains limited in low-resource rehabilitation settings (13,14).

The present case report describes the application of a structured task-oriented gait training program in a patient 12 weeks post-ischemic stroke. The report aims to highlight the clinical utility of TOT in improving functional mobility and independence, while also emphasizing its feasibility and importance in resource-constrained contexts such as Pakistan, where standardized stroke rehabilitation protocols are underdeveloped (15).

PATIENT INFORMATION

The patient was a 58-year-old male, a retired schoolteacher, who presented to the outpatient physical therapy and rehabilitation unit with complaints of difficulty walking and maintaining balance following an ischemic stroke. His medical history included hypertension, well controlled with pharmacological treatment over the past 10 years. There was no history of diabetes, smoking, or alcohol consumption. Socially, the patient lived with his spouse and children in a supportive household environment, which was an important facilitator for rehabilitation adherence. The ischemic event occurred 12 weeks earlier and involved the left middle cerebral artery (MCA) territory, as confirmed on magnetic resonance imaging (MRI). There was no record of previous neurological illness, trauma, or psychiatric comorbidities.

The patient reported loss of independence in daily activities and fear of falling when attempting unsupported ambulation. Prior to the stroke, he was functionally independent and engaged in community activities. The current referral was made for targeted physical rehabilitation to address persistent gait dysfunction, reduced balance, and weakness of the right side.

CLINICAL FINDINGS

At baseline assessment, the patient exhibited right-sided hemiparesis, with muscle strength graded as 3/5 in the upper extremity and 2/5 in the lower extremity using the Medical Research Council (MRC) scale. Spasticity was noted in the right lower limb, particularly in the ankle plantar flexors, graded as 2 on the Modified Ashworth Scale. Functional performance was markedly impaired, with a Berg Balance Scale (BBS) score of 21/56 and a 10-Meter Walk Test (10MWT) speed of 0.32 m/s, both indicative of a high risk of falls and severely limited mobility. The Functional Ambulation Category (FAC) score was 2, suggesting the need for continuous assistance during walking. Cognitive status was grossly intact, with no evidence of aphasia or perceptual deficits on clinical screening. Vital signs, cardiovascular parameters, and overall systemic examination were unremarkable, and no contraindications to physical rehabilitation were identified.

These findings confirmed the diagnosis of right hemiparesis secondary to ischemic stroke in the left MCA territory. The clinical presentation highlighted the need for intensive task-specific rehabilitation, with particular emphasis on gait retraining and balance improvement to restore independence in mobility.

TIMELINE

The patient was initially evaluated on 11 March 2025, twelve weeks following the ischemic stroke. A comprehensive baseline physical therapy assessment was conducted, including functional mobility and balance measures. The structured rehabilitation program commenced on the same day and was implemented over a 12-week period, with sessions held five days per week. The final re-evaluation was completed on 11 June 2025, at the conclusion of the intervention phase.

The therapeutic journey followed a progressive framework. Early sessions emphasized range of motion (ROM) maintenance and assisted mobility, while subsequent weeks focused on graded strengthening, balance retraining, and task-specific gait activities. Progressive adjustments were made based on tolerance and demonstrated improvements. The intervention was completed without interruption, and no adverse events were reported throughout the treatment period.

DIAGNOSTIC ASSESSMENT

Neuroimaging confirmed a left middle cerebral artery (MCA) infarct with associated right hemiparesis. Magnetic resonance imaging (MRI) was used to establish the lesion site and extent, and no additional intracranial pathology was identified. The clinical diagnosis was consistent with post-stroke motor impairment and functional disability.

Stroke severity was assessed using standardized measures. The patient demonstrated motor deficits as reflected by the MRC grading of 3/5 in the right upper limb and 2/5 in the right lower limb. Spasticity of the ankle plantar flexors was graded as 2 on the Modified Ashworth Scale. Functional impairments were quantified using validated outcome tools, including the Berg Balance Scale (BBS), 10-Meter Walk Test (10MWT), and Functional Ambulation Category (FAC). These assessments confirmed marked deficits in mobility, balance, and independence, warranting intensive task-oriented rehabilitation.

THERAPEUTIC INTERVENTION

The intervention protocol was collaboratively designed by the treating physiotherapists following initial assessment and tailored to the patient's needs. The program spanned 12 weeks, with five sessions per week, each lasting approximately 45 minutes. The central component was task-oriented gait training (TOT), which included overground walking with verbal cueing, obstacle crossing, and stepping over foam blocks. Sit-to-stand practice was incorporated to facilitate transfer independence. To complement this, range of motion (ROM) and strengthening exercises were provided, including passive and active-assisted lower limb ROM activities and progressive resistance training for the quadriceps and ankle dorsiflexors. Balance training was delivered through both static and dynamic tasks on stable and unstable surfaces, progressing in difficulty according to patient tolerance and clinical improvement. Progression of exercises was monitored weekly, with incremental challenges added to optimize functional gains. The intervention was conducted under continuous supervision to minimize fall risk and ensure patient safety. The program was completed as planned, with no dropouts or medical complications.

FOLLOW-UP AND OUTCOMES

At the end of the 12-week rehabilitation program, the patient demonstrated significant functional recovery. The 10MWT improved from 0.32 m/s at baseline to 0.68 m/s, representing a clinically meaningful increase in walking speed. The BBS score increased from 21/56 to

38/56, indicating substantial improvement in balance and a reduced risk of falls. Similarly, the FAC score improved from 2 to 4, reflecting greater independence in ambulation, requiring only minimal supervision.

Table 1. Functional outcomes before and after 12 weeks of task-oriented gait training

Outcome Measure	Baseline Value	Post-Intervention Value	Change/Improvement
10-Meter Walk Test (m/s)	0.32	0.68	+0.36 m/s (↑ walking speed)
Berg Balance Scale (0–56)	21	38	+17 points (↑ balance, reduced fall risk)
Functional Ambulation Category (0–5)	2 (requires assistance)	4 (independent with supervision)	+2 levels (↑ independence)

In addition to objective measures, the patient reported increased confidence in walking indoors, reduced fear of falling, and improved ability to perform activities of daily living. Importantly, no adverse events such as falls, musculoskeletal injuries, or cardiovascular complications were observed during therapy. These outcomes highlight the clinical utility of task-oriented gait training in post-stroke rehabilitation, demonstrating its capacity to enhance mobility and independence within a relatively short intervention period.

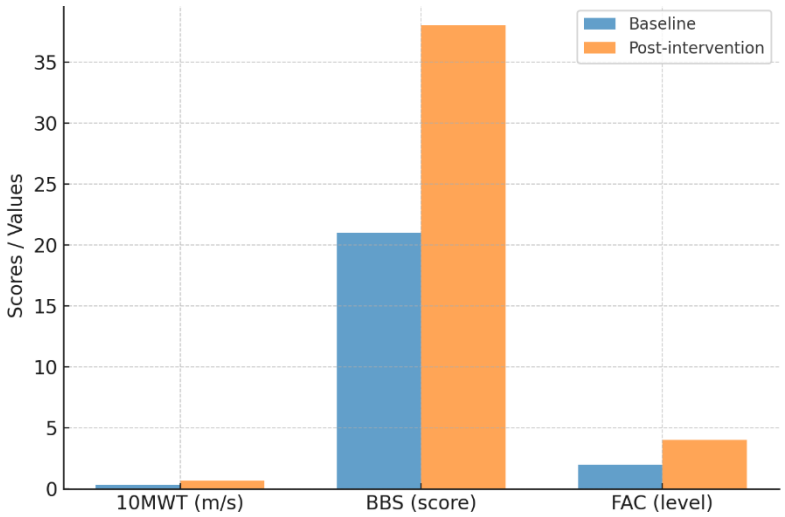

Figure 1. Functional outcomes before and after task-oriented gait training

The bar graph illustrates the changes in functional outcomes following 12 weeks of task-oriented gait training. At baseline, the patient demonstrated markedly low performance, with a walking speed of 0.32 m/s on the 10-Meter Walk Test (10MWT), a Berg Balance Scale (BBS) score of 21/56, and a Functional Ambulation Category (FAC) score of 2, indicating dependence on assistance for mobility. After the intervention, substantial improvements were observed across all measures. Walking speed increased to 0.68 m/s, reflecting more than a two-fold improvement. The BBS score rose to 38/56, indicating enhanced postural stability and a reduced risk of falls. Similarly, the FAC improved to 4, signifying the patient's ability to ambulate independently with only minimal supervision. Collectively, the visual representation highlights the clinically meaningful gains achieved through task-oriented gait training, particularly in mobility, balance, and independence in ambulation.

DISCUSSION

This case demonstrates that task-oriented gait training can significantly improve mobility and balance in a post-stroke patient, reinforcing the growing body of evidence supporting task-specific rehabilitation strategies. Post-stroke impairments in gait and balance remain among the most disabling sequelae, contributing to dependency and reduced quality of life (1,2). Conventional rehabilitation approaches, such as the Bobath concept, have traditionally emphasized facilitation of normal movement patterns but often rely on compensatory strategies rather than directly engaging neuroplastic mechanisms (3). In contrast, task-oriented training leverages repetitive, functional tasks to enhance motor control, providing an ecologically valid pathway to restore independence (4,5).

The observed improvements in walking speed and balance in this case align with findings from randomized controlled trials, which report that TOT enhances lower limb motor recovery and promotes functional independence when compared with non-task-specific training (6,7). Notably, the patient nearly doubled his walking speed and demonstrated a 17-point increase in the Berg Balance Scale, which are both considered clinically meaningful changes associated with reduced fall risk and improved community ambulation (8). Such outcomes are particularly significant in the context of Pakistan, where access to structured rehabilitation programs remains limited and stroke-related disability places a considerable burden on patients and caregivers.

While the results are encouraging, some limitations should be acknowledged. This is a single case, limiting generalizability, and the patient was relatively cooperative, educated, and highly motivated, factors which may have influenced adherence and outcomes. Additionally, follow-up beyond the intervention phase was not conducted, preventing assessment of long-term retention of gains. Future research should include larger samples and explore the cost-effectiveness and scalability of TOT in resource-constrained environments. Nonetheless, this

case highlights the clinical relevance of adopting task-oriented strategies within standard rehabilitation frameworks, offering an accessible and effective approach to enhance recovery in post-stroke populations.

PATIENT PERSPECTIVE

The patient expressed satisfaction with the therapy and emphasized improved confidence in performing daily activities. He reported that before rehabilitation he was afraid of falling and reluctant to walk even within his home environment. Following therapy, he noted greater independence, stating: "I feel more confident after the treatment in walking around my house now. Before the treatment, I was afraid of falling, but after physical therapy I can walk with little help. I strongly recommend physical therapy treatment after stroke for everyone." This perspective underscores the importance of incorporating patient-centered outcomes in rehabilitation, as functional gains translate directly into improved quality of life.

INFORMED CONSENT AND ETHICS

Written informed consent was obtained from the patient for participation in the rehabilitation program and for publication of this case report. Confidentiality of patient information was maintained throughout. No ethical conflicts were identified, and the intervention followed established clinical rehabilitation guidelines for post-stroke management.

CONCLUSION

Task-oriented gait training proved to be an effective intervention in improving walking speed, balance, and functional mobility in a post-stroke patient. The results support existing evidence that repetitive, task-specific practice enhances neuroplasticity and promotes recovery of motor function. This case highlights the potential of TOT as a practical, low-cost, and clinically relevant rehabilitation strategy, particularly in low-resource healthcare settings where access to advanced rehabilitation technologies may be limited. Broader implementation and further research are warranted to validate its long-term impact and applicability across diverse populations.

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