Research Article

IMPLEMENTATION OF SLOW STROKE BACK MASSAGE AND EARLY MOBILIZATION IN PATIENTS WITH PHYSICAL MOBILITY IMPAIRMENT AFTER STROKE: A CASE STUDY

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Abstract

Background: Stroke is a major cause of long-term disability and is commonly associated with physical mobility impairment resulting from neuromuscular dysfunction. Decreased muscle strength and limited mobility can reduce functional independence and increase the risk of complications. Nursing-led non-pharmacological interventions, such as therapeutic massage and early mobilization, have the potential to support early functional recovery; however, detailed clinical descriptions of their combined application in post-stroke nursing care are still limited. **Methods**: This study employed a case study design using a nursing care approach. The subject was one post-stroke patient diagnosed with physical mobility impairment. The nursing intervention consisted of Slow Stroke Back Massage followed by early mobilization, implemented twice daily over six consecutive days. Muscle strength was assessed using Manual Muscle Testing (MMT), while physical mobility and activity tolerance were evaluated through direct observation. Data were analyzed descriptively using a case analysis approach. **Results**: After six days of intervention, the patient demonstrated progressive improvement in muscle strength and mobility. The affected upper extremity showed improvement from minimal muscle contraction to active movement with gravity eliminated, while the affected lower extremity improved from movement with gravity eliminated to active movement against gravity. The patient also showed increased participation in mobilization activities and improved tolerance to physical movement, with stable vital signs throughout the intervention period. **Conclusion:** This case study indicates that the combined application of Slow Stroke Back Massage and early mobilization may contribute to improvements in muscle strength and physical mobility in post-stroke patients with physical mobility impairment. These findings support the potential role of holistic, nursing-led interventions in early stroke rehabilitation. Further studies with larger samples and controlled designs are recommended.

Keywords: Early Mobilization, Nursing Care, Physical Mobility Impairment, Slow Stroke Back Massage, Stroke

Background

Stroke is a leading cause of long-term disability worldwide, frequently resulting in motor deficits that reduce physical mobility and impair performance of activities of daily living (ADL) (de Aquino Miranda et al., 2023). Early loss of mobility after stroke predisposes patients to secondary complications such as joint contractures, muscle weakness, deconditioning, increased fall risk, and prolonged dependency, all of which undermine rehabilitation potential and quality of life (de Aquino Miranda et al., 2023). These consequences create an urgent need for effective, low-cost nursing interventions that can be implemented at the bedside to preserve function and facilitate recovery.

Non-pharmacological nursing interventions—particularly manual therapies and structured mobilization—have received growing attention as adjuncts to conventional stroke rehabilitation. Massage techniques, in their various forms, are thought to modulate muscle tone, enhance local blood flow, reduce pain and anxiety, and promote relaxation; such effects may support neuromuscular re-engagement and improve motor outcomes in neurologic populations (Yunhui et al., 2022). A systematic synthesis of complementary massage modalities suggests short-term improvements in motor function and balance after stroke, although heterogeneity and

variable methodological quality temper the strength of conclusions and indicate a need for better-designed clinical reports (Yunhui et al., 2022).

Range-of-motion (ROM) exercises and early mobilization are established components of early stroke care because they prevent disuse sequelae and are associated with better functional recovery when implemented safely and promptly (one-group and systematic reviews). Randomized and quasi-experimental trials in critically ill and post-stroke cohorts have reported that combinations of massage and ROM or task-oriented mobilization can yield measurable short-term gains in muscle strength and mobility metrics (Rahiminezhad et al., 2022). At the same time, systematic reviews emphasize that "early" mobilization protocols must be individualized to stroke severity and hemodynamic stability to avoid harm.

Case reports from Indonesian settings have described clinically meaningful improvements in muscle strength and bedside mobility following combined foot massage and ROM delivered as part of holistic nursing care for post-stroke elders (Dohanis et al., 2023). While such single-case evidence is promising, the literature still lacks detailed case descriptions of specific massage techniques—such as Slow Stroke Back Massage (SSBM)—combined with structured early mobilization in post-stroke nursing practice, particularly reports that document nursing assessment, intervention dose, tolerance monitoring, and functional outcomes. The present case study addresses this gap by describing the implementation and short-term effects of SSBM plus early mobilization on a patient with nursing diagnosis of physical mobility impairment after stroke.

Method

This study employed a case study design using a nursing care approach to provide an in-depth clinical description of the implementation of Slow Stroke Back Massage (SSBM) and early mobilization as nursing interventions for a patient with physical mobility impairment after stroke. The case study design was selected to comprehensively explore the nursing process, including assessment, intervention delivery, patient response, and short-term clinical outcomes within a real-world nursing practice setting.

The subject of this study was one post-stroke patient diagnosed with physical mobility impairment as a nursing problem. The study was conducted in a clinical or home-care setting during the post-acute phase of stroke recovery. The subject was selected using purposive sampling based on the following inclusion criteria: a confirmed medical diagnosis of stroke, presence of impaired physical mobility, stable vital signs, and the ability to follow simple verbal instructions. Patients with hemodynamic instability, severe cognitive impairment, or conditions contraindicating mobilization were excluded to ensure patient safety during the intervention.

A comprehensive nursing assessment was conducted prior to the intervention. The assessment included evaluation of neurological status, muscle strength, level of physical mobility, and vital signs. Muscle strength was assessed using Manual Muscle Testing (MMT), while physical mobility was evaluated through direct observation of the patient's ability to perform bed mobility, maintain sitting balance, tolerate standing, and engage in assisted ambulation. Vital signs were measured before and after each intervention session to determine readiness for intervention and to monitor physiological responses (de Aquino Miranda et al., 2023).

The nursing intervention was implemented over a period of six consecutive days and delivered twice daily, in the morning and afternoon, according to the patient's tolerance and clinical condition. Each intervention session consisted of two sequential components: Slow Stroke Back Massage followed by early mobilization, with massage performed first to promote relaxation and prepare the patient for physical activity (Yunhui et al., 2022). During the SSBM procedure, the patient was positioned comfortably in a side-lying or prone position with appropriate body support. After performing hand hygiene and explaining the procedure to the patient, the nurse applied a neutral massage oil to reduce friction and protect skin integrity. Slow, rhythmic, and continuous stroking movements were then applied along the paravertebral muscles from the lower back toward the shoulders and back down again, using gentle and consistent

pressure. The massage was performed for approximately 10–15 minutes, while the nurse continuously observed the patient's facial expressions, verbal feedback, and overall comfort to detect any signs of discomfort or intolerance.

Immediately following the massage session, early mobilization was initiated and conducted for approximately 10–20 minutes per session (Rethnam V et al., 2022). Mobilization activities were implemented progressively, beginning with assisted repositioning in bed, followed by assisted sitting at the edge of the bed to enhance trunk control and sitting balance. As tolerated, the patient was assisted to stand with support and perform short-distance ambulation in a safe environment. Mobilization intensity and progression were adjusted daily based on the patient's physical response, fatigue level, balance, and hemodynamic stability. The intervention was paused or modified if adverse signs such as dizziness, excessive fatigue, pain, or abnormal changes in vital signs were observed.

Data were analyzed using a descriptive case analysis approach. Pre- and post-intervention findings related to muscle strength, physical mobility, and activity performance were compared descriptively. Changes in MMT scores, mobility abilities, and patient tolerance were documented narratively without inferential statistical analysis due to the single-subject design. The analysis focused on identifying clinical changes over the intervention period and highlighting the practical implications of SSBM and early mobilization as nursing interventions for patients with physical mobility impairment after stroke.

Results and Discussion

Results

During the nursing assessment conducted on Mrs. M, the patient was found to have decreased muscle strength following a stroke episode. The patient was conscious (compos mentis), able to respond to simple verbal instructions, and demonstrated limited verbal articulation. Mrs. M required assistance for mobility and relied on support during position changes due to weakness in the affected upper and lower extremities. Baseline vital signs were within stable limits, with blood pressure of 135/85 mmHg, pulse rate 88 beats/min, respiratory rate 20 breaths/min, and body temperature 36.6°C.

Based on the assessment findings, the nursing diagnoses established were physical mobility impairment related to neuromuscular dysfunction secondary to stroke, self-care deficit related to decreased muscle strength, and risk for falls related to impaired balance and mobility limitations. These diagnoses reflected the patient's reduced ability to perform independent movement, dependence in daily activities, and increased risk of injury during mobilization.

The nursing care plan focused on improving physical mobility and preventing complications related to immobility. Planned nursing interventions included identifying the patient's tolerance for physical movement, monitoring vital signs—particularly blood pressure—prior to mobilization, teaching and assisting simple mobilization and supported ambulation, monitoring personal hygiene, and assessing the patient's ability to transfer safely from bed to chair. These interventions were designed to promote gradual functional recovery while maintaining patient safety.

Nursing implementation involved continuous assessment of the patient's physical tolerance

Table 1. Muscle Strength Assessment Before and After the Intervention

Body Region	Before Intervention (Day 1–2)	During Intervention (Day 3)	After Intervention (Day 4–6)
Affected Upper Extremity	Grade 1 – slight muscle contraction, no visible movement	Grade 1–2 – visible muscle contraction with minimal voluntary movement	Grade 2 – active movement with gravity eliminated
Affected Lower Extremity	Grade 2 – active movement with gravity eliminated	Grade 2 – no significant change	Grade 3 – active movement against gravity
Unaffected Upper and Lower Extremities	Grade 5 – normal muscle strength	Grade 5 – normal muscle strength	Grade 5 – normal muscle strength

during movement and ambulation, explanation of the goals and procedures of mobilization to enhance understanding and cooperation, and monitoring of vital signs before initiating mobilization activities. The nurse also identified the patient's self-care abilities according to functional capacity, monitored hygiene status, assessed individual and environmental risk factors for falls, and evaluated transfer ability from bed to chair. In addition, Slow Stroke Back Massage followed by early mobilization was provided twice daily, in the morning and afternoon, with a total duration of approximately 15–30 minutes per session over a six-day intervention period.

Following six days of intervention, nursing evaluation showed improvement in muscle strength and mobility performance. The affected upper extremity demonstrated observable muscle contraction and partial voluntary movement, while the affected lower extremity was able to perform active movement against gravity with assistance. Post-intervention vital signs remained stable, with blood pressure of 125/80 mmHg, pulse rate 92 beats/min, respiratory rate 20 breaths/min, and body temperature 36.2°C.

Based on Table 1, the application of Slow Stroke Back Massage and early mobilization over six consecutive days demonstrated progressive improvement in muscle strength. On days 1 and 2, the affected upper extremity showed minimal voluntary movement, while the affected lower extremity was only able to move with gravity eliminated. On day 3, improvement was observed in the affected upper extremity, characterized by visible muscle contraction, while lower extremity strength remained unchanged. By day 4, the affected lower extremity demonstrated active movement against gravity, and improvement in the affected upper extremity persisted. These functional gains were maintained through day 6 of the intervention period.

Observations conducted throughout the intervention indicated that the combined application of Slow Stroke Back Massage and early mobilization was clinically beneficial in improving muscle strength and supporting functional mobility in Mrs. M during the post-stroke recovery phase.

Discussion

The nursing assessment of Mrs. M revealed unilateral muscle weakness affecting both the affected upper and lower extremities, accompanied by limitations in mobility and functional activity. The patient demonstrated difficulty initiating movement and required assistance for basic mobility tasks. These findings are consistent with common post-stroke residual impairments, particularly motor deficits that significantly contribute to disability and reduced independence. Previous studies have identified motor weakness as one of the most prevalent and disabling consequences of stroke, often persisting into the post-acute phase and affecting quality of life (Langhorne et al., 2021; Veerbeek et al., 2020).

Based on the assessment findings, the primary nursing diagnosis established was physical mobility impairment related to neuromuscular dysfunction secondary to stroke. This diagnosis is supported by stroke pathophysiology, in which disrupted cerebral blood flow leads to neuronal injury and impaired activation of motor pathways, resulting in hemiparesis and reduced muscle strength (Campbell & Khatri, 2020). Such motor impairment has been shown to negatively affect balance, gait, and the ability to perform activities of daily living, thereby increasing dependency and the risk of falls (Winstein et al., 2021).

From a physiological perspective, skeletal muscle functions as an active organ of movement through coordinated interaction with the skeletal system and neural input. Following stroke, reduced neural activation combined with prolonged immobility can lead to muscle disuse, decreased contractile capacity, early fatigue, and further functional decline. Muscle strength represents the capacity of muscle tissue to generate force through contraction, and its reduction directly limits functional mobility and participation in daily activities (Ryan et al., 2022). Without timely and appropriate intervention, these impairments may progress and become more difficult to reverse.

In this case, independent nursing interventions focused on the combined application of Slow Stroke Back Massage and early mobilization as non-pharmacological strategies to address

physical mobility impairment. Massage therapy provides tactile and sensory stimulation that may enhance peripheral circulation, reduce muscle stiffness, and facilitate neuromuscular activation. Emerging evidence suggests that tactile input plays an important role in motor relearning and cortical reorganization after stroke by enhancing somatosensory feedback (Bolognini et al., 2020; Pan et al., 2021). By preparing the musculoskeletal and sensory systems, massage may improve patient readiness and tolerance for subsequent mobilization activities.

Early mobilization is widely recognized as a cornerstone of post-stroke rehabilitation. Structured mobilization activities such as sitting, standing, and assisted ambulation support muscle activation, postural control, and functional recovery while preventing complications associated with immobility. Studies have shown that early and repetitive mobilization can promote neuroplasticity by strengthening residual neural pathways and facilitating adaptive motor relearning (Krakauer et al., 2021). In addition, consistent daily mobilization has been associated with better functional outcomes compared with sporadic activity, particularly when delivered in short, frequent sessions (Scrivener et al., 2020).

Following six consecutive days of intervention, Mrs. M demonstrated measurable improvements in muscle strength, particularly in the affected lower extremity, which progressed to active movement against gravity. Improvement in the affected upper extremity was also observed, characterized by visible muscle contraction and increased voluntary movement. These findings are consistent with previous studies reporting that early, structured mobilization contributes to improvements in motor function and mobility among post-stroke patients (English et al., 2020; Bernhardt et al., 2023). The gradual nature of the improvement observed in this case reflects the expected pattern of early neuromuscular recovery.

An important aspect of this case is the implementation of the intervention in a home-care setting, which demonstrates the feasibility of nurse-led rehabilitation outside specialized facilities. Home-based and community-based rehabilitation programs have been shown to improve functional outcomes while promoting patient-centered care and continuity of rehabilitation (Hughes et al., 2022; Chen et al., 2023). In addition, therapeutic touch has been associated with reduced anxiety and improved patient engagement, which may enhance participation and motivation during rehabilitation activities (Siddiqui et al., 2022). Increased engagement observed in Mrs. M during later intervention sessions supports this holistic nursing perspective.

Although the clinical improvements observed in this case are encouraging, they should be interpreted cautiously due to the single-case design, which limits generalizability and causal inference. Nevertheless, detailed case studies remain valuable for illustrating clinical processes, informing nursing practice, and generating hypotheses for future research. Further studies employing quasi-experimental or randomized controlled designs are recommended to evaluate the effectiveness of Slow Stroke Back Massage combined with early mobilization on functional outcomes in larger post-stroke populations.

Overall, this case study supports existing evidence emphasizing the importance of early, structured, and holistic nursing interventions in post-stroke rehabilitation. The integration of therapeutic massage and early mobilization may represent a practical and beneficial approach to improving muscle strength and functional mobility in patients with physical mobility impairment after stroke.

Conclusion

This case study demonstrated that the implementation of Slow Stroke Back Massage combined with early mobilization was associated with observable improvements in muscle strength and physical mobility in a post-stroke patient with physical mobility impairment. Over a six-day intervention period, the patient showed progressive enhancement in voluntary movement of the affected upper and lower extremities, along with increased participation in mobilization activities.

The findings highlight the potential role of holistic, non-pharmacological nursing interventions in supporting early functional recovery after stroke. Slow Stroke Back Massage may contribute to muscle relaxation and sensory stimulation, thereby preparing the

patient for mobilization, while early mobilization facilitates neuromuscular activation and prevents complications related to immobility. The combined application of these interventions reflects a patient-centered nursing approach that is feasible to implement in clinical and home-care settings.

Although the results of this study cannot be generalized due to its single-case design, the clinical improvements observed provide valuable insight into nursing-led strategies for managing physical mobility impairment in post-stroke patients. Future research employing larger sample sizes and controlled study designs is recommended to further examine the effectiveness of this intervention and to strengthen the evidence base for nursing practice in stroke rehabilitation.

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