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Early Physiotherapy After Total Hip Replacement: A Case Report

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Abstract

Background: Early physiotherapy following total hip replacement (THR) is important to reduce postoperative complications, improve mobility, and support functional recovery. However, evidence describing physiotherapy management during the acute postoperative phase remains limited.

Objective: To describe early physiotherapy management and short term clinical outcomes in a patient following THR.

Methods: This case report followed CARE guidelines and was based on an inpatient clinical record. A 65 year old woman underwent left THR using the anterolateral approach after a traumatic femoral head fracture. Physiotherapy was initiated on postoperative day 2 and conducted over three consecutive sessions (T1–T3). Outcomes included the Numeric Rating Scale (NRS), manual muscle testing (MMT), hip range of motion (ROM), modified Trendelenburg assessment, and Harris Hip Score (HHS). Interventions were structured using the FITT principle and included breathing exercises, muscle activation, balance training, gait training, and education.

Results: Pain decreased across sessions, with rest pain reducing from 2 to 1 and active exercise pain from 10 to 6. Sagittal hip ROM improved from 8°–0°–85° to 12°–0°–90°, while frontal ROM improved from 0°–0°–0° to 20°–0°–5°. Weight bearing tolerance progressed to approximately 40% partial weight bearing. Muscle strength improved from grade 3 to grade 4, and HHS increased from 18 to 28.

Conclusion: Early physiotherapy was associated with reduced pain, improved mobility, and increased weight bearing tolerance, supporting safe mobilization and initial functional recovery after THR.

Keywords
Total Hip Replacement; Physical Therapy Modalities; Rehabilitation; Early Ambulation; Musculoskeletal Physiotherapy

Introduction

Total hip arthroplasty (THA) is a well-established surgical intervention for relieving pain and restoring function in patients with severe hip pathology, including fractures and degenerative joint conditions.[1] Advances in surgical techniques and perioperative care have significantly improved patient outcomes.[2,3] However, the postoperative period remains a critical phase that determines the success of functional recovery.[4] Contemporary rehabilitation frameworks emphasize early mobilization, structured exercise, and patient education as essential components of enhanced recovery pathways.[5,6]

Early physiotherapy plays a crucial role in preventing complications associated with postoperative immobilization, including deep vein thrombosis, muscle atrophy, joint stiffness, and respiratory dysfunction.[7,8] Prolonged inactivity during the acute postoperative phase may increase pain, inhibit neuromuscular activation, and delay recovery of functional mobility.[9] Previous studies have demonstrated that early mobilization is both safe and effective in reducing postoperative complications and improving clinical outcomes.[10] In addition, early rehabilitation has been associated with improved mobility, shorter hospital stays, and better overall quality of life.[11]

Recent evidence indicates that physiotherapy following THA should be considered an active and progressive process rather than a purely protective approach.[12] Structured rehabilitation programs that include strengthening exercises, range of motion training, balance exercises, and gait re-education have been shown to improve physical function and patient-reported outcomes.[12,13] Moreover, individualized rehabilitation strategies that consider surgical approach, patient tolerance, and functional capacity are increasingly recommended to optimize recovery.[14]

Despite these advances, the optimal timing, intensity, and combination of early physiotherapy interventions remain inconsistent across clinical settings.[15] Systematic reviews have reported substantial variability in rehabilitation protocols, including differences in exercise type, progression strategies, and outcome measures.[16] This lack of standardization highlights the importance of detailed clinical reporting to support evidence-based decision making in real-world practice.

In particular, evidence describing physiotherapy management within the first 72 hours after THA remains limited.[17] Although early mobilization is widely recommended, practical implementation during the acute phase is often influenced by pain, muscle weakness, hemodynamic stability, and patient confidence.[10,18] Clinical decisions regarding weight-bearing progression, movement precautions, and exercise prescription therefore require careful individualization based on patient condition and surgical factors.[19] This case is clinically relevant because it provides a detailed description of physiotherapy management within the first 72 hours after surgery, a phase that remains underreported despite its importance in determining early recovery outcomes.

Therefore, this case report aims to describe early physiotherapy management and short-term clinical outcomes in a patient following total hip replacement during the acute postoperative phase. This report is expected to provide clinically relevant insight into early rehabilitation strategies and contribute to the existing evidence on postoperative physiotherapy management after THA.

Methods

This study was designed as a single-patient case report following the CARE (Case Report) guidelines. The report was developed from an anonymized inpatient clinical record obtained during a physiotherapy professional clinical placement at a general hospital. The case report design was selected to provide a detailed description of early physiotherapy management and clinical decision-making during the acute postoperative phase, particularly within the first 72 hours after surgery, where standardized protocols remain variable across clinical settings.

The patient was a 65-year-old woman who underwent left total hip replacement (THR) using the anterolateral approach following a traumatic fracture of the femoral head. Physiotherapy intervention was initiated on postoperative day 2 and conducted over three consecutive days (T1–T3). At the time of initial assessment, the patient reported intermittent groin pain, limited lower-limb mobility, and shortness of breath during prolonged sitting. Documented comorbidities included diabetes mellitus and hypertension. Baseline anthropometric data and pre-injury functional status were not available in the source record, which represents a limitation of the dataset. Baseline anthropometric data, including body weight, height, and body mass index, were not available in the clinical record. Pre-injury functional status and lifestyle-related factors were also not documented. The diagnosis of femoral head fracture was established based on clinical evaluation and radiological examination prior to surgery. Detailed radiographic findings were not available in the clinical record. Differential diagnosis was not considered, as the indication for surgical intervention had been clearly established by the orthopedic team.

Clinical assessment was performed using standard physiotherapy examination procedures, including observation, palpation, and functional movement evaluation. Pain intensity was measured using the Numeric Rating Scale (NRS), a widely used and reliable tool for clinical pain assessment.[20] Muscle strength was evaluated using manual muscle testing (MMT), and joint mobility was assessed using goniometric measurement of hip range of motion in the sagittal and frontal planes.[21] Functional status was evaluated using the Harris Hip Score (HHS), which assesses pain, function, deformity, and range of motion in patients undergoing hip arthroplasty.[22] Postural stability and weight-bearing capacity were assessed using a modified Trendelenburg and weight-shifting evaluation. To facilitate clarity in clinical reasoning and ensure reproducibility, baseline clinical findings and their physiotherapy implications are summarized in Table 1.

Table 1. Baseline Clinical Findings and Physiotherapy Implications

Domain	Clinical Findings	Physiotherapy Implications
Chief complaint	Intermittent left groin pain, limited limb movement, dyspnea during prolonged sitting	Indicates need for pain control, respiratory management, and early mobilization
Comorbidities	Diabetes mellitus, hypertension	Requires careful monitoring of tolerance and progression
Observation	Right-sided trunk lean, kyphotic posture, local swelling	Suggests postural imbalance and limited functional tolerance
Palpation	Tenderness around left hip, hip flexor muscle spasm	Indicates local irritation and protective muscle guarding
Pain (NRS)	Rest 2/10; movement 8–10/10	Movement-related pain as primary barrier to activity
Range of motion	Limited hip ROM; sagittal 8–0–85°, frontal 0–0–0°	Requires gradual mobility restoration within safe limits
Muscle strength	Hip flexion and extension 3/5; abduction and adduction 2/5	Indicates reduced stability and need for strengthening
Stability	Positive modified Trendelenburg	Suggests impaired pelvic control during weight bearing
Functional status	HHS 18 (poor)	Severe limitation in functional mobility

From an International Classification of Functioning, Disability, and Health (ICF) perspective, the patient's impairments involved reduced joint mobility, decreased muscle strength, impaired joint stability, and pain in the lower limb. Activity limitations included difficulties in transfers, sitting, standing, and walking, while participation restrictions affected daily functional activities. A structured summary of these findings is presented in Table 2.

Table 2. ICF-Based Clinical Classification

ICF Domain	Description	Clinical Interpretation
Body structure/function	Hip joint structures, thigh muscles	Postoperative structural changes and muscle disruption
Pain (b28015)	Pain in lower limb	Limits movement and functional activity
Joint mobility (b7101)	Reduced hip mobility	Affects range of motion and transfers
Joint stability (b715)	Decreased stability	Increased risk during weight-bearing activities
Muscle power (b7301)	Reduced muscle strength	Limits functional mobility and gait
Respiration (b440)	Dyspnea during sitting	Indicates reduced tolerance to activity
Activity limitation (d410–d450)	Difficulty in sitting, standing, walking	Reduced independence in mobility
Participation restriction	Daily functional activities	Limited engagement in ADL

From a functional perspective, the patient's impairments were further categorized using the International Classification of Functioning, Disability, and Health framework to provide a structured overview of body functions, activity limitations, and participation restrictions. To provide a clear overview of the sequence of clinical events and intervention timing, the patient timeline is presented in Figure 1.

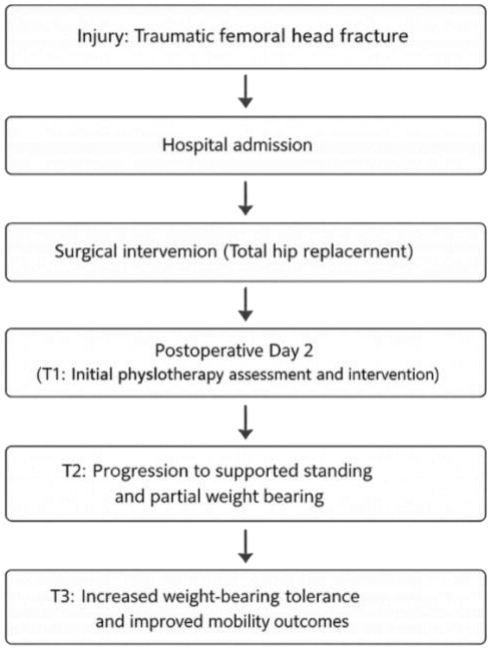

Figure 1. Patient Clinical Timeline

The overall clinical timeline, including injury, surgical intervention, initiation of physiotherapy, and early outcomes, is summarized in Figure 1. Physiotherapy began on postoperative day 2 and was conducted over three consecutive sessions, with progressive changes documented at each time point.

The physiotherapy intervention program was structured using the FITT principle to ensure systematic progression and reproducibility. The program included diaphragmatic breathing exercises, muscle activation and strengthening, balance and proprioception training, gait training using a walker, and patient education. Exercise intensity for strengthening was prescribed at approximately 40 to 50 percent of estimated maximal voluntary contraction, based on clinical observation of the patient's ability to perform active movement against gravity with minimal resistance. Intensity and progression were adjusted according to pain response, fatigue, and overall tolerance.

Breathing exercises were implemented to improve respiratory function and reduce discomfort associated with prolonged inactivity. Muscle activation exercises included heel slides, assisted hip flexion, and bridging to facilitate early neuromuscular recruitment. Balance and stability training were initiated in supported sitting and progressed to standing with weight shifting. Gait training was introduced gradually using a walker, beginning with assisted standing and progressing to short-distance ambulation.

Weight-bearing progression followed a protective approach, increasing from limited tolerance to approximately 40 percent partial weight bearing by the third session, based on patient tolerance and stability. Education was provided in each session, focusing on safe movement strategies, use of assistive devices, adherence to home exercises, and hip precautions.

Outcome measures were recorded across three time points (T1–T3). Pain was assessed as rest pain, passive movement pain, and active exercise pain using the NRS. Joint mobility was recorded in degrees, muscle strength using MMT grading, and functional status using the HHS. Stability was evaluated through clinical observation during weight-bearing activities. Changes were analyzed descriptively by comparing values across sessions to determine the direction of clinical improvement.

No inferential statistical analysis was performed due to the single-case design. This descriptive approach is consistent with methodological standards for case reports. The patient received standard pharmacological management prescribed by the attending physician, including analgesics and antibiotics. Physiotherapy sessions were scheduled to coincide with optimal analgesic effects to maximize participation. The presence of a surgical drain was considered during mobilization to ensure safety.

The patient provided written informed consent for the use of anonymized clinical data for publication. All identifying information was removed to ensure confidentiality and privacy in accordance with ethical standards for clinical case reporting. To ensure clarity and reproducibility of the intervention, the physiotherapy program and its progression are summarized in Table 3.

Table 3. Physiotherapy Intervention Program (FITT-Based)

Intervention	Prescription	Clinical Objective
Breathing exercise	2 sets × 10 repetitions daily	Improve ventilation and reduce respiratory discomfort
Muscle activation	Heel slides, assisted hip flexion, bridging; 2 sets × 8 repetitions	Activate lower limb and core muscles
Strengthening	~40–50% MVC, progressed as tolerated	Improve muscle strength and stability
Balance training	Sitting and standing balance with support	Improve postural control
Gait training	Walker-assisted ambulation, gradual progression	Restore safe mobility
Weight bearing	Progressed to ~40% PWB	Improve load tolerance
Education	Every session	Improve safety and adherence

The physiotherapy intervention program was structured using the FITT principle to ensure systematic progression and reproducibility. The program included diaphragmatic breathing exercises, muscle activation and strengthening, balance and proprioception training, gait training using a walker, and patient education. The intervention program was progressively modified across sessions. At T1, exercises were limited to low-intensity activation and supported movements due to pain and limited tolerance. At T2, the program was progressed to include supported standing and initial weight-bearing activities. At T3, further progression included increased weight-bearing tolerance and more active participation in functional mobility tasks.

Results

This section presents the clinical findings and short-term outcomes of early physiotherapy management across three consecutive sessions (T1–T3) during the acute postoperative phase. At baseline (T1), the patient presented with multiple impairments affecting mobility and function. The primary complaints included intermittent pain in the left groin, limited hip movement, and difficulty performing basic transfers. Clinical observation revealed a right-sided trunk lean in sitting, localized swelling around the surgical site, and muscle spasm involving the hip flexor group. The patient also reported shortness of breath during prolonged sitting. Functional mobility was severely limited, with dependence on assistance for basic activities. To provide a clear overview of outcome progression, the measured clinical variables across T1–T3 are summarized in Table 4.

Table 4. Outcome progression across three physiotherapy sessions (T1–T3)

Outcome	T1	T2	T3
Rest pain (NRS)	2	2	1
Passive movement pain (NRS)	8	8	6
Active exercise pain (NRS)	10	9	6
Hip ROM sagittal (°)	8–0–85	8–0–85	12–0–90
Hip ROM frontal (°)	0–0–0	15–0–5	20–0–5
Partial weight bearing (%)	Not tolerated	~20%	~40%
Muscle strength (MMT)	~3/5	~3/5	~4/5
Functional status (HHS)	18	18	28

At T1, physiotherapy was limited to low-intensity activities due to pain and reduced tolerance. The patient was able to perform supported sitting exercises, assisted lower-limb activation, and breathing exercises. Hip range of motion was restricted, particularly in the frontal plane, and weight-bearing activities were not tolerated.

At T2, slight changes were observed in selected outcomes. Active-exercise pain showed a reduction compared with baseline, while rest and passive pain remained unchanged. Frontal plane hip motion improved, and the patient was able to initiate supported standing using a walker. Partial weight bearing of approximately 20 percent was tolerated without observable instability. Muscle strength remained at a similar level to baseline, and exercise endurance was still limited.

At T3, further changes were documented across multiple domains. Pain levels decreased in all categories, including rest, passive movement, and active exercise. Hip range of motion improved in both sagittal and frontal planes, with flexion approaching 90 degrees. The patient demonstrated improved tolerance to weight-bearing activities, progressing to approximately 40 percent partial weight bearing during supported standing and weight shifting. Muscle strength increased to approximately grade 4 out of 5 for the quadriceps and hamstring groups. Functional status, as measured by the Harris Hip Score, increased from 18 to 28.

In addition to these measurable outcomes, clinical observation indicated improved tolerance for exercise and greater participation during physiotherapy sessions. The patient was able to perform repeated movements with less fatigue and demonstrated improved cooperation with assisted mobility tasks. A simplified representation of the patient's clinical timeline is provided below to clarify the sequence of events and interventions: No adverse events or complications related to physiotherapy intervention were recorded during the three treatment sessions. These changes indicate a consistent trend toward improved physical capacity during the early postoperative phase.

Discussion

This case report describes the short-term clinical response to early physiotherapy following total hip replacement during the acute postoperative phase. Across three consecutive sessions, the patient demonstrated consistent improvement in pain intensity, joint mobility, weight-bearing tolerance, and early functional capacity. Although the magnitude of change remained modest, these findings reflect a clinically favorable trajectory within the expected limitations of the early postoperative period. However, it is important to consider that early improvements observed in this case may also be influenced by natural postoperative recovery processes, including reduction of inflammation and spontaneous pain resolution, in addition to the physiotherapy intervention.

The observed reduction in movement-related pain represents an important clinical outcome. Pain is a primary limiting factor in postoperative rehabilitation, as it can inhibit neuromuscular activation, restrict voluntary movement, and reduce patient participation in therapeutic exercises.[14,20] The decrease in active and passive pain observed in this case is consistent with previous evidence indicating that early mobilization and structured physiotherapy can reduce postoperative pain and improve tolerance to movement.[4,5,14] This improvement likely facilitated progressive engagement in functional activities, including transfer training and weight-bearing tasks.

Improvements in hip range of motion and muscle performance further support the role of early physiotherapy in restoring basic mobility. In this case, sagittal plane motion approached 90 degrees of hip flexion by the third session, which is commonly considered a functional threshold for early mobility tasks.[9,21] The progression of muscle strength from grade 3 to grade 4 suggests improved neuromuscular activation, particularly in the quadriceps and hip stabilizers, which are essential for maintaining postural control during standing and gait.[13,21] These findings align with randomized and systematic evidence demonstrating that early strengthening and functional exercise interventions after total hip arthroplasty contribute to improved muscle performance, gait quality, and overall physical function.[15,18]

The gradual increase in weight-bearing tolerance observed in this case also reflects appropriate clinical progression during the acute phase. The transition from limited tolerance to approximately 40 percent partial weight bearing over three sessions indicates improved load acceptance and postural stability. Early weight-bearing progression remains a clinically sensitive decision that must balance safety and functional recovery.[4,14] Current evidence suggests that early mobilization, when appropriately monitored, is safe and may accelerate functional outcomes without increasing complication risk.[10,11] The use of a walker and controlled weight-bearing progression in this case represents a conservative yet evidence-informed approach that prioritizes stability and patient confidence.

Functional improvement, as measured by the Harris Hip Score, showed a modest increase from 18 to 28. Although this change remains within the "poor" category, it should be interpreted within the context of the acute postoperative phase. The HHS is influenced by multiple domains, including pain, gait, use of assistive devices, and ability to perform daily activities, many of which are inherently limited during the early recovery period.[10,22] Therefore, even small improvements in HHS during this phase may reflect meaningful clinical progress rather than insufficient recovery.[22] This highlights the importance of interpreting outcome measures in relation to the timing of assessment.

The inclusion of breathing exercises in the intervention program addresses an often overlooked component of postoperative rehabilitation. The patient reported dyspnea during prolonged sitting, indicating reduced tolerance to activity and possible respiratory

compromise related to inactivity. Early physiotherapy interventions that include respiratory exercises may contribute to improved ventilation and reduce the risk of pulmonary complications, particularly in older patients with limited mobility.[4,5,14] This integrated approach supports the concept of physiotherapy as a comprehensive intervention targeting both local and systemic postoperative impairments.

Another important aspect of this case is the role of patient education and behavioral engagement in facilitating recovery. Progressive improvement in cooperation and participation across sessions suggests that education regarding safe movement, assistive device use, and activity pacing may enhance adherence and confidence. Previous studies have emphasized that behavior-oriented physiotherapy and patient education can improve rehabilitation outcomes by increasing self-efficacy and promoting active participation in recovery.[6,15,19]

Despite these positive findings, several limitations must be acknowledged. First, this report is based on a single patient and a short observation period limited to three sessions, which restricts the generalizability of the findings. Second, the absence of baseline anthropometric data and pre-injury functional status limits the ability to fully contextualize the magnitude of recovery. Third, outcome assessment relied primarily on clinical measures without the inclusion of comprehensive patient-reported outcome measures, which may have provided additional insight into perceived recovery. In addition, potential measurement bias and observer dependency cannot be excluded, as assessments were conducted within a clinical setting without blinding.

Furthermore, the lack of longer-term follow-up prevents evaluation of whether early improvements were sustained over time. Future research should include longitudinal case series or controlled studies examining early physiotherapy protocols within the first 72 hours after surgery, with standardized outcome measures and extended follow-up periods. Comparative studies evaluating different rehabilitation intensities and progression strategies may also help establish clearer clinical guidelines.

From a clinical perspective, this case supports the feasibility and potential benefits of early, structured physiotherapy in the acute postoperative phase following total hip replacement. The findings highlight the importance of individualized intervention, careful progression of weight-bearing activities, and integration of functional and respiratory components in rehabilitation programs. Although further evidence is required, early physiotherapy appears to play a critical role in initiating recovery and preparing patients for subsequent stages of rehabilitation.

The patient reported gradual improvement in comfort and mobility across the physiotherapy sessions. She expressed increased confidence in performing assisted movements and standing activities. The patient also reported that the education provided during therapy sessions helped her feel more secure when attempting movement.

Conclusion

This case report demonstrates that early physiotherapy initiated during the acute postoperative phase following total hip replacement was associated with reductions in pain, improvements in joint mobility, increased weight-bearing tolerance, and modest gains in functional status over three consecutive sessions. Although overall function remained limited, the observed changes indicate a favorable early recovery trajectory.

From a clinical perspective, these findings support the implementation of structured and progressive physiotherapy interventions during the early postoperative period. A program incorporating breathing exercises, muscle activation, balance training, and guided weight-bearing progression may facilitate safe mobilization and enhance readiness for subsequent rehabilitation stages. Given the limited duration and single-case design, these findings should be interpreted with caution. Future studies with larger samples, standardized protocols, and longer follow-up periods are recommended to further evaluate the effectiveness and optimal parameters of early physiotherapy after total hip replacement.

However, these findings should be interpreted within the limitations of a single-case design and short observation period, which restrict generalizability. Future studies are needed to confirm these findings in larger populations and to establish standardized early rehabilitation protocols.

Author Contribution

Aida Nur Faizah: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing Original Draft Preparation.
Totok Budi Santoso: Supervision, Validation, Methodology, Writing Review and Editing.
Galih Adhi Ishak Setiawan: Investigation, Resources, Clinical Supervision, Writing Review and Editing.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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Ethics Statement

This case report was prepared in accordance with the CARE guidelines for clinical case reporting. The patient provided written informed consent for the use of anonymized clinical data for publication. All identifying information has been removed to ensure confidentiality and privacy.

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