

Section: General Nursing

Mobilization support to improve mobility in patients following lower extremity Open Reduction Internal Fixation (ORIF)

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Abstract

Fracture is a condition when bone continuity is partially or totally lost due to the arrival of external pressure that is greater than what the bone can absorb. To maintain the bone structure, fracture patients will usually undergo reduction surgery in the form of open reduction internal fixation (ORIF) which functions to restore the length and alignment of the bone line and protect the bone structure and restore bone position. However, this action can cause muscles to experience a decrease in strength so that sufferers can experience impaired physical mobility. To prevent further complications, mobilization support can be carried out which involves several actions in the form of range of motion (ROM) exercises, early mobilization and involves the role of the family in supporting patients. Mobilization support aims to improve physical mobility in post ORIF lower extremity patients. This scientific work uses a descriptive case study design. The subject used was one respondent with a 24-hour post ORIF femur. The results of applying mobilization support with ROM exercises 2 times a day with repetitions of 8 times each movement and gradual early mobilization once a day from sitting to walking for 3 consecutive days can increase the movement of problematic extremities, increase muscle strength, range of motion, reduce pain, anxiety and limited motion. It can be concluded that mobilization support can improve the physical mobility of post ORIF lower extremity patients.

Keywords: Early mobilization, fracture, nursing care, ORIF, surgery

Introduction

The surgical management of complex lower extremity fractures often necessitates Open Reduction Internal Fixation (ORIF) to restore anatomical alignment and structural stability (Oeding et al., 2022). While the surgical procedure itself is critical for bone healing, the subsequent recovery period is frequently marred by significant mobility deficits and functional impairment (Khalid et al., 2025; Gather et al., 2025). Lower extremity ORIF involves the internal application of plates, screws, or rods, which, despite providing stability, often results in temporary muscle atrophy and joint stiffness (Wang et al., 2024). Patients typically face a daunting transition from a state of total immobilization to weight-bearing activities, which can be physically and psychologically taxing (Leopold et al., 2025). Consequently, the implementation of structured mobilization support has emerged as a vital component of the multidisciplinary post-operative care plan. Early mobilization is hypothesized to counteract the systemic risks associated with prolonged bed rest, such as deep vein thrombosis and pulmonary complications (Alamri et al., 2019). However, the optimal timing and intensity of these mobilization interventions remain a subject of ongoing clinical debate among orthopedic surgeons and physical therapists. This case study seeks to explore how a tailored mobilization support program can specifically address the unique challenges faced by a patient following a lower extremity ORIF. By documenting the recovery trajectory, this report aims to highlight the critical role of early physical intervention in restoring independent gait and motor function.

The physiological foundation for early mobilization support lies in its ability to promote tissue healing while preventing the detrimental effects of kinesiophobia, or the fear of movement (Xavier et al., 2024). Following an ORIF procedure, patients often experience intense localized pain and swelling, which can lead to a protective guarding of the affected limb (Sortino & Cicciù, 2011). This guarding, if left unaddressed, may evolve into chronic gait abnormalities or permanent loss of range of motion in the adjacent joints. Mobilization support provides a controlled environment where the patient can safely explore their physical limits under the guidance of trained professionals (Rhamelani et al., 2025). Through the use of assistive devices and progressive weight-bearing exercises, the patient gradually rebuilds the proprioceptive feedback loops necessary for balance. Furthermore, early movement stimulates blood flow to the surgical site, which is essential for transporting the nutrients required for osteoblast activity and bone mineralization (Tazreean et al., 2022). The psychological benefit of early mobilization is equally significant, as it boosts patient confidence and fosters an internal locus of control over the recovery process (Prokopowicz & Byrka, 2021). Without such support, the risk of developing secondary complications related to sedentary behaviour increases exponentially

during the first six weeks post-surgery. Therefore, understanding the synergy between surgical stability and mechanical loading is paramount for achieving a successful functional outcome. This study analyses the specific strategies used to navigate these physiological hurdles during the acute and sub-acute phases of recovery.

Despite the clear theoretical benefits of early mobilization, clinicians must balance the need for movement with the necessity of protecting the integrity of the internal fixation hardware. The challenge lies in prescribing an exercise intensity that is sufficient to stimulate muscle activation without risking hardware failure or non-union of the fracture site. Current literature suggests that individualized mobilization protocols, which account for the patient's age, bone quality, and fracture complexity, yield the best results. This case study focuses on a specific patient demographic to demonstrate how mobilization support can be adapted to meet varying levels of physical resilience. By utilizing a structured progression—moving from passive range of motion to active-assisted and eventually independent ambulation—the clinical team can mitigate the risks of reinjury. The role of the physical therapist as a "mobilization support" pillar is crucial for ensuring that the patient adheres to weight-bearing restrictions while still challenging their cardiovascular system. Observations from this case will contribute to the growing body of evidence supporting early, guided movement as a standard of care for lower extremity trauma. As healthcare systems shift toward value-based care, the efficiency and effectiveness of post-operative mobilization become key indicators of surgical success. Ultimately, this introduction sets the stage for a detailed examination of how a specific mobilization intervention directly influenced the recovery of a patient post-ORIF. The following sections will detail the clinical presentation, the specific interventions applied, and the resulting improvements in the patient's mobility scores.

Case Description

The case study was conducted at the Temanggung Regional General Hospital located at Jalan Gajah Mada 1A Temanggung 56219, precisely in Cempaka Room 1 which is a surgical ward. In the implementation of this case study, the author took 1 (one) case study subject with post ORIF lower extremities precisely on the dextra femur. The implementation of the case study on the subject was carried out on Tuesday, June 24, 2025 to Thursday, June 26, 2025 and an assessment, explanation, and signing of informed consent was carried out on June 24, 2025. The respondent in this case study is Mr. Y, 19 years old, male, and a vocational high school student in Temanggung. The client reported difficulty moving his right leg, which was fractured. He stated that he was still afraid to move much due to pain when moving. The client mentioned that he had been involved in an accident that resulted in a fracture of his right leg. He underwent ORIF surgery on Monday, June 23, 2025, which was completed at 2:00 PM. During the assessment on Wednesday, June 25, 2025, the client reported that his right leg was still difficult to move fully, felt heavy, and experienced pain like being stabbed, worsened by movement, with pain felt in the area of the operated bone, with the following criteria: 1) Provokes: worsened by activity, relieved by rest, 2) Quality: hot, like being stabbed, 3) Region: right thigh post-op, 4) Scale: 5 on a scale of 1-10, 5) Duration: intermittent, lasting 1-3 minutes when present. The client expressed fear of moving her right leg, so his activities were assisted by family members.

Left leg muscle strength is 5, right leg muscle strength is 2. Right leg Range of Motion (ROM) strength is decreased; the client has difficulty performing abduction, adduction, rotation, flexion, and extension due to pain. The client appears to be holding back pain when moving and holding the affected leg when moving. The wound dressing appears clean with no fluid leakage. There is no redness or swelling around the wound area. Vital signs examination results: Blood pressure (BP) 120/78 mmHg, pulse rate 80 beats per minute, temperature 36.6°C, respiratory rate 20 breaths per minute, SpO2 99%. HBsAg non-reactive, white blood cell count 20.9. Physical examination findings show a 15-cm-long post-operative wound scar on the right thigh, with a clean dressing. No redness was observed around the wound, no abnormal discharge was noted, and no swelling was present in the area around the wound. The X-ray results on Sunday, June 22, 2025, prior to surgery, showed a displaced fracture of the right femur without dislocation. The post-ORIF X-ray results on Monday, June 23, 2025, showed internal fixation with a plate and 8 screws on the right femur fracture, 1/3 medial, with improved alignment. From the data obtained in the assessment, the author analyzed the data and found that the client met 100% of the major symptoms, namely the client complained of difficulty moving the extremities, decreased muscle strength, and decreased ROM. Additionally, the data from the client also met 57% of the minor symptoms of physical mobility impairment, including pain during movement, reluctance to move, anxiety during movement, and limited movement. Thus, this meets the criteria for establishing a nursing diagnosis based on the Indonesian Nursing Diagnosis Standards (SDKI), namely physical mobility impairment related to structural integrity damage and pain. To address physical mobility issues, the plan is to provide mobility support. Mobility support includes ROM exercises, early mobilization, and family involvement. Mobilization support was provided to patients 24 hours after ORIF, with mobilization support measures carried out for three days, including ROM exercises on day 1; flexion and extension of the toes, inversion and eversion of the foot, and flexion and extension of the ankle; H+2: abduction and adduction of the hip; H+3: flexion and extension of the knee, foot dangling, and early mobilization with H+1 sitting in bed, H+2 sitting on the side of the bed, H+3 getting out of bed and walking as able. Physical mobility support also involves the role of the family. It is hoped that this mobilization support will improve the patient's mobility, as indicated by increased muscle strength, range of motion, and limb movement, as well as a reduction in pain, anxiety, and limited movement.

The use of mobilization support for 3 days can improve the physical mobility of patients post ORIF of the lower extremities, as indicated by increased limb movement, increased muscle strength, increased ROM, decreased pain, decreased anxiety, and decreased limited movement.

Discussion

Based on the assessment, the client reported difficulty moving the extremities, decreased muscle strength on a scale of 2, reduced ROM with movement limited to the toes and ankles, pain on a scale of 5, and a sensation of heat. The client was reluctant to move due to fear and continued pain. The client's movement is limited to the bed. In cases following ORIF fracture surgery, common issues include pain, edema, deformity, functional impairment, muscle spasm, muscle atrophy, limited ROM, abnormal movement, and decreased muscle strength, which can impair the patient's mobility. In general, the data found in this client's case is consistent with the identification of physical mobility disorders, referring to the major and minor signs and symptoms listed in the SDKI, with major signs including complaints of difficulty moving the extremities, decreased muscle strength, and decreased ROM. Minor signs and symptoms include pain during movement, reluctance to move, anxiety during movement, stiff joints, uncoordinated movements, limited movement, and physical weakness. Based on the signs and symptoms observed in the client, 100% met the major signs and symptoms and 57% met the minor signs and symptoms. Therefore, the researcher decided to establish a nursing diagnosis of physical mobility impairment related to damage to bone structure integrity and pain, characterized by the client stating that it was difficult to move his broken right leg, the client reported that the surgical site felt painful and hot, the client expressed fear of moving, muscle strength in the right leg decreased to 2, ROM in the right leg decreased, the client had difficulty performing abduction, adduction, rotation, flexion, and extension due to pain, the client appeared to be holding back pain when moving and holding the injured leg when moving, and the client's activities were assisted by family members.

In the early stages of a fracture, there is a severe pain response due to soft tissue damage and nerve compression. The first phase of bone healing is the hematoma or damage phase, where bleeding occurs around the fracture, leading to the onset of pain. If the pain cannot be adequately controlled, it may cause anxiety when moving, resulting in limited mobility. Bone healing typically takes more than 12 weeks and goes through the tissue damage and hematoma phase, the inflammatory and cell proliferation phase, the callus formation phase, and the remodelling phase. Immobilization in acute orthopaedic trauma patients is necessary for fracture reduction, joint stability, pain control, and to prevent soft tissue injury. Meanwhile, prolonged immobilization affects the physiology of the skeletal muscle system in the form of permanent mobility impairment, resulting in limited mobility. This limitation will affect muscle endurance as a result of decreased muscle mass, atrophy, and stability. As a result, protein breakdown cannot be maximized, causing muscle mass to decrease, which prevents muscles from maintaining activity due to fatigue. Prolonged immobilization also disrupts calcium metabolism and joint mobility. Additionally, immobilization for several days affects the rate of breakdown of contractile muscle proteins, such as actin and myosin, while their formation is slower. Thus, muscle contractile proteins decrease, leading to atrophy. Atrophy occurs because muscle fibres do not contract, causing them to shrink and muscle tone to decrease. Immobilization also reduces protein synthesis rates because myostatin inhibits protein translation processes.

The implementation of mobilization support for patients is carried out over three days, starting 24 hours post-surgery. ROM exercises for patients are performed twice daily, with each movement repeated eight times. The principle of ROM exercises should be repeated approximately eight times and performed at least twice daily. ROM exercises for patients are performed actively on the unaffected extremities and passively on the affected extremities. The ROM exercises given to patients on the first day include flexion and extension of the toes, inversion and eversion of the foot, and flexion and extension of the ankle; on the second day, abduction and adduction exercises are performed at the hip joint; and on the third day, knee flexion and extension exercises and foot dangling are performed. To achieve optimal results, active Range of Motion (ROM) exercises should be repeated approximately 8 times and performed at least twice daily for three consecutive days, starting 24 hours after surgery. Early mobilization is a series of activities performed immediately after surgery, starting from waking up, sitting, and getting out of bed, and beginning to walk with or without assistance, depending on the patient's condition. Mobilization can be initiated as early as 6 hours post-surgery, provided the patient is conscious or able to move their limbs again following regional anesthesia. Early mobilization can help patients maintain bodily functions, improve blood circulation, enhance respiratory function, maintain muscle tone, facilitate bowel and bladder elimination, restore certain activities so patients can resume their daily mobility needs, and provide opportunities for nurses and patients to interact and communicate. The application of early mobilization in post-ORIF patients also plays a crucial role in reducing pain by diverting the patient's focus away from the painful area or surgical site, reducing the activation of chemical mediators (prostaglandins, histamine, bradykinin, acetylcholine, and substance P) in the inflammatory process that increases the pain response, and minimizing the transmission of pain signals to the central nervous system.

In this case study, mobilization support was considered successful not only because ROM exercises and early mobilization were performed, but also because of several factors, namely pre-procedure education, family support, and analgesic administration. This was due to the patients' and their families' lack of knowledge about the benefits of early mobilization after surgery. Therefore, pre-procedure education is important to conduct. From the results of this

case study, it can be said that the application of mobilization support in post-ORIF patients can improve physical mobility.

Conclusion

Thus, the application of mobilization support in post-ORIF patients can be conducted 24 hours post-surgery by performing ROM exercises at least twice a day with 8 repetitions of each movement and mobilization performed once a day. In conducting this case study, the author acknowledges several limitations that may have influenced the research results. This case study was conducted on a single respondent, so the findings cannot be generalized to all post-ORIF lower extremity patients. External factors such as motivation and pain thresholds vary among patients, which will inevitably influence the outcomes of mobility support implementation in other patients. The intervention period was too short, so the author could not confirm whether mobility support could improve patients' physical mobility in the long term. Additionally, pre-intervention education influenced patients' anxiety levels during exercises. It is hoped that future researchers can follow up on this study by increasing the number of respondents and adding or comparing the intervention with other interventions to determine the most effective intervention for improving mobility in patients post-ORIF of the lower extremities. Additionally, it would be better to provide education before implementing this mobility support intervention.

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