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Physiotherapy Management of Grade III Pressure Ulcer: A Case Report

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Abstract

Background: Pressure ulcers are common complications in patients with prolonged immobility and significantly impair rehabilitation outcomes and quality of life.

Objective: This study aimed to describe the effects of physiotherapy management in a patient with a grade III pressure ulcer in the sacral and gluteal regions.

Methods: This case report followed CARE guidelines and involved a 45-year-old male with stage IVB lung adenocarcinoma and upper motor neuron (UMN) paraparesis. Physiotherapy assessment included Numeric Rating Scale (NRS), range of motion (ROM), Manual Muscle Testing (MMT), Modified Ashworth Scale (MAS), Braden Scale, and wound inspection. The intervention consisted of three sessions including passive range of motion (PROM), active-assisted range of motion (AAROM), bed mobility training, low-intensity stretching, positioning strategies, and caregiver education.

Results: The patient presented with a grade III pressure ulcer measuring 5 × 3 cm with slough, exudate, and pus. Pain during movement decreased from NRS 2 to 1 (50% reduction), while tenderness decreased from 3 to 2 (33% reduction). ROM showed slight improvements in shoulder flexion (increase up to 3°). Muscle strength (MMT = 2 in upper limbs; 0 in lower limbs) and spasticity (MAS = 1+) remained unchanged. No progression in ulcer grade was observed during the intervention period.

Conclusion: Physiotherapy contributed to pain reduction, maintenance of joint mobility, and prevention of secondary complications. However, due to the short intervention duration and complex medical condition, no improvement in ulcer grade was observed.

Keywords
Pressure Ulcer; Physical Therapy Modalities; Immobility; Range of Motion; Case Reports

Introduction

Pressure ulcers are a significant clinical complication in patients with prolonged immobility and represent a major challenge in rehabilitation settings. These lesions develop due to sustained pressure over bony prominences, leading to impaired blood flow, tissue ischemia, and eventual necrosis.[1] The presence of pressure ulcers not only delays the rehabilitation process but also contributes to increased morbidity, healthcare costs, and reduced quality of life.

The global burden of pressure ulcers has increased substantially over the past decades, rising from approximately 300,442 cases in 1990 to 645,588 cases in 2021.[2] In Asia, the cumulative prevalence of chronic wounds has been reported at 32.1%, with Southeast Asia showing even higher rates compared to other developing regions.[3] In Indonesia, the prevalence of pressure ulcers remains relatively high, reaching approximately 33%, indicating a persistent clinical and public health concern.[4] Although pressure ulcers are more common among elderly populations, particularly those over 70 years of age, the risk is also significantly elevated in patients with neurological impairments and acute medical conditions.[5]

Pressure ulcers vary in severity depending on the depth of tissue involvement. Grade III pressure ulcers are characterized by full-thickness skin loss extending into subcutaneous tissue, often accompanied by necrotic tissue and signs of infection.[6] These lesions are most frequently observed in the sacrum, heels, elbows, and hips, especially in individuals with limited mobility, poor nutritional status, impaired continence, and chronic disease conditions.[7]

The development of pressure ulcers is closely associated with immobility, which contributes to a cascade of functional impairments, including reduced joint range of motion, muscle weakness, contractures, and decreased functional independence. This condition creates a vicious cycle in which immobility exacerbates tissue damage, further limiting the patient's ability to recover functional capacity.[8]

Physiotherapy plays a critical role in both the prevention and management of pressure ulcers through interventions such as positioning, mobilization, transfer training, and therapeutic exercise.[9] Early mobilization strategies, including passive and active-assisted range of motion (ROM) exercises, as well as regular repositioning, have been widely recommended to reduce prolonged pressure, improve circulation, and prevent secondary complications.[10]

Despite the availability of these interventions, the incidence of pressure ulcers remains high, particularly among patients with complex medical conditions and prolonged bed rest. This suggests that the implementation and short-term clinical impact of physiotherapy interventions in such populations are not yet fully understood or consistently documented in the literature.

Existing studies predominantly focus on prevention strategies or general rehabilitation outcomes, with limited detailed reporting on short-term physiotherapy management in patients with advanced (grade III) pressure ulcers accompanied by severe systemic conditions. Therefore, this case report aims to describe the clinical outcomes of physiotherapy management in a patient with a grade III pressure ulcer in the sacral and gluteal regions.

Methods

This study was conducted as a single-case report following the CARE (CAse REport) guidelines to ensure transparency, completeness, and reproducibility in reporting clinical findings and interventions. The patient was a 45-year-old male diagnosed with stage IVB lung adenocarcinoma accompanied by upper motor neuron (UMN) type paraparesis. Due to prolonged immobilization, the patient developed a grade III pressure ulcer located in the sacral and bilateral gluteal regions. The ulcer measured approximately 5 × 3 cm and was characterized by the presence of slough, exudate, and pus. The patient experienced significant functional limitations, particularly in mobility and bed positioning, and was categorized as high risk for pressure ulcer progression based on the Braden Scale assessment.

A comprehensive physiotherapy assessment was performed prior to intervention. Pain intensity was evaluated using the Numeric Rating Scale (NRS), a valid and reliable tool for subjective pain assessment. Joint range of motion (ROM) was measured using a standard goniometer to detect movement limitations and prevent contracture development. Muscle strength was assessed using Manual Muscle Testing (MMT), while muscle tone was evaluated using the Modified Ashworth Scale (MAS), which is widely used for assessing spasticity in patients with UMN lesions. In addition, wound inspection was conducted to assess ulcer size, tissue characteristics, exudate, and signs of infection. The Braden Scale was used to evaluate the patient's risk of pressure ulcer progression. To ensure compliance with CARE guidelines, the clinical course of the patient is summarized in Table 1.

Table 1. Timeline of Clinical Events and Interventions

Time Point	Clinical Events and Findings	Interventions
Day 0 (T1)	Initial assessment: Grade III ulcer (5 × 3 cm), pain on movement (NRS 2), tenderness (NRS 3), limited ROM, MMT 2 (upper limbs), MAS 1+	Baseline physiotherapy assessment
Day 1 (T1)	First physiotherapy session	PROM, AAROM, bed mobility, positioning, education
Day 2 (T2)	Second session evaluation: stable wound, slight ROM improvement	Continued intervention
Day 3 (T3)	Third session evaluation: reduced pain, stable ulcer grade	Continued intervention and monitoring

Note: PROM = Passive Range of Motion; AAROM = Active-Assisted Range of Motion.

The physiotherapy intervention was delivered over three consecutive sessions, tailored to the patient's clinical condition. The intervention protocol is detailed in Table 2. Before referring to the table, it is important to note that all interventions were designed to maintain joint mobility, improve circulation, reduce prolonged pressure, and prevent secondary complications associated with immobility.

Table 2. Physiotherapy Intervention Protocol

Component	Description	Dosage
PROM	Passive movement of upper and lower limb joints	10–15 repetitions per joint, 2 sets/session
AAROM	Assisted active movement to stimulate muscle activation	8–12 repetitions, 2 sets/session
Bed mobility	Rolling, repositioning, and pressure redistribution	Every session
Stretching	Low-intensity stretching of major muscle groups	15–30 seconds hold, 2–3 repetitions
Positioning	Repositioning (supine, lateral, semi-Fowler)	Every 2 hours
Education	Caregiver training on positioning and exercise	Daily

Note: All exercises were performed within the patient's tolerance level.

In addition to physiotherapy, the patient received standard medical wound care managed by the clinical team, including wound cleaning, dressing changes, and infection control measures. Physiotherapy interventions were integrated as supportive management to enhance circulation, reduce pressure, and prevent further complications.

The selection of physiotherapy interventions was based on current evidence supporting the role of mobilization and therapeutic exercise in pressure ulcer management. Passive and active-assisted movements facilitate venous and lymphatic return, improve microcirculation, and help maintain tissue perfusion. Low-intensity stretching contributes to maintaining tissue elasticity and preventing contracture formation, while regular repositioning reduces sustained pressure and prevents ischemic tissue damage.

Outcome measures were recorded at three time points (T1, T2, and T3) to evaluate the patient's clinical progression throughout the intervention period. The primary outcomes included pain intensity assessed using the Numeric Rating Scale (NRS), joint range of motion (ROM) measured with a goniometer, muscle strength evaluated through Manual Muscle Testing (MMT), muscle tone assessed using the Modified Ashworth Scale (MAS), as well as ulcer grade and wound characteristics based on clinical observation. To enhance the robustness of the analysis, changes in these outcomes were examined descriptively by calculating percentage differences and identifying clinical trends across the three evaluation points.

Given the single-case design, no inferential statistical analysis was performed. Data were analyzed descriptively, focusing on changes across time points (T1–T3), including absolute differences and percentage changes where applicable. This study was approved by the Health Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta (Approval No. 2080/KEPK-FIK/IV/2026). Written informed consent was obtained from the patient prior to participation.

Results

A total of three physiotherapy sessions were completed over three consecutive days. Clinical outcomes were evaluated at baseline (T1), after the second session (T2), and after the third session (T3). The results are presented in Tables 1–5 and Figures 1–2. Pain intensity was assessed using the Numeric Rating Scale (NRS) across three conditions: rest, tenderness, and movement. The results are presented in Table 3.

Table 3. Pain Assessment Using Numeric Rating Scale (NRS)

Parameter	T1	T2	T3	Change (T1–T3)	% Change
Rest pain	0	0	0	0	0%
Tenderness	3	3	2	−1	−33%
Movement pain	2	2	1	−1	−50%

Pain at rest remained stable (NRS = 0) throughout the intervention. Tenderness decreased by 33%, while pain during movement showed a 50% reduction from baseline to the final session. To better illustrate the trend of pain reduction, Figure 1 presents the changes in tenderness and movement pain over time.

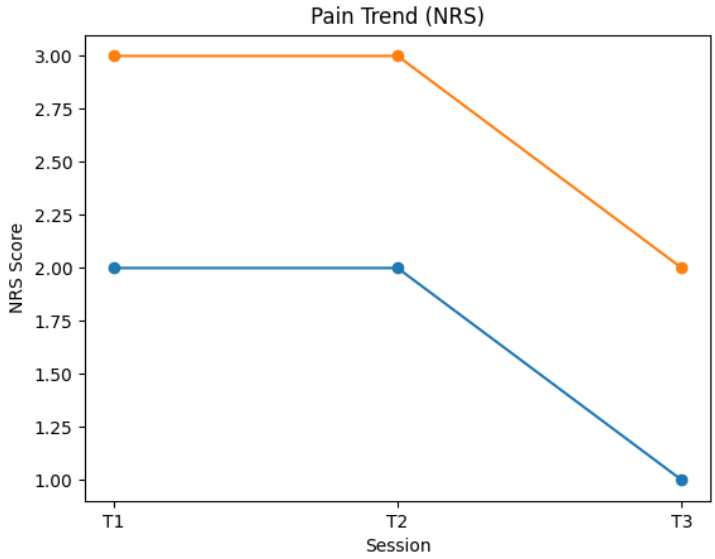

Figure 1. Trend of Pain Reduction (NRS) Across Sessions

ROM was measured using a goniometer across multiple joints of the upper extremities. Selected representative data are summarized in Table 4.

Table 4. Range of Motion (ROM) Evaluation (Degrees)

Joint Movement	T1	T2	T3	Change	% Change
Shoulder flexion (R)	40°	43°	43°	+3°	+7.5%
Shoulder flexion (L)	45°	45°	47°	+2°	+4.4%
Shoulder abduction (R)	80°	78°	82°	+2°	+2.5%
Shoulder abduction (L)	55°	55°	57°	+2°	+3.6%
Elbow flexion (R)	95°	95°	95°	0	0%
Elbow flexion (L)	95°	93°	93°	−2°	−2.1%

ROM measurements demonstrated slight improvements in shoulder movements, particularly in flexion and abduction. Elbow ROM remained relatively stable with minimal variation. The overall trend of ROM improvement is illustrated in Figure 2.

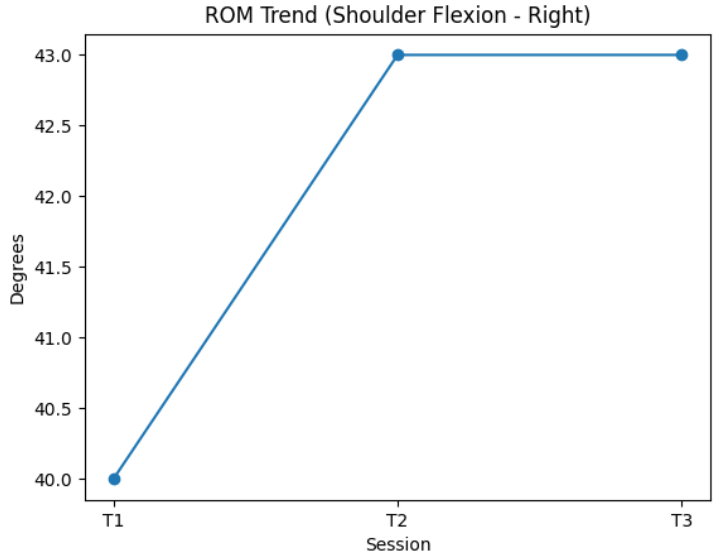

Figure 2. Trend of Range of Motion (ROM) Changes

Muscle strength was assessed using Manual Muscle Testing (MMT), and the results are presented in Table 5.

Table 5. Muscle Strength Assessment (MMT Scale)

Region	T1	T2	T3	Change
Upper limbs	2	2	2	0
Lower limbs	0	0	0	0

No changes in muscle strength were observed during the intervention period. Upper limb strength remained at grade 2, indicating active movement without resistance, while lower limbs remained at grade 0, indicating no detectable muscle contraction. Muscle tone was evaluated using the Modified Ashworth Scale (MAS), as shown in Table 6.

Table 6. Muscle Tone Assessment (MAS)

Region	T1	T2	T3	Interpretation
Upper limbs	1+	1+	1+	Mild spasticity
Lower limbs	1+	1+	1+	Mild spasticity

Muscle tone remained stable across all sessions, indicating no progression or reduction in spasticity. The progression of the pressure ulcer was monitored clinically and is presented in Table 7.

Table 7. Pressure Ulcer Grade Evaluation

Time Point	Ulcer Grade
T1	Grade III
T2	Grade III
T3	Grade III

The ulcer grade remained unchanged throughout the intervention period, indicating a stable wound condition without deterioration or improvement in severity. The overall clinical outcomes indicated that the physiotherapy intervention contributed to a reduction in pain intensity, with improvements reaching up to 50% in movement-related pain. In addition, slight improvements were observed in joint range of motion, while muscle strength and muscle tone remained stable throughout the intervention period. The condition of the pressure ulcer also remained stable, with no evidence of progression in ulcer grade. These findings suggest that short-term physiotherapy interventions primarily played a role in preventing further clinical deterioration rather than achieving significant functional recovery, particularly within the limited duration of the intervention.

Discussion

This case report aimed to describe the clinical outcomes of physiotherapy management in a patient with a grade III pressure ulcer in the sacral and gluteal regions. The findings demonstrated that short-term physiotherapy interventions contributed to pain reduction, maintenance of joint range of motion (ROM), and prevention of further clinical deterioration. However, no significant improvement was observed in muscle strength, spasticity, or ulcer grade.

The reduction in pain, particularly during movement (50%) and tenderness (33%), may be attributed to improved pressure redistribution and enhanced circulation resulting from repositioning strategies and therapeutic exercises. Regular repositioning every two hours is widely recognized as a key intervention in reducing prolonged mechanical pressure, thereby minimizing ischemia and nociceptive stimulation.[11] In addition, passive and active-assisted movements likely contributed to improved microcirculation and reduced tissue stiffness, which can indirectly influence pain perception.[12]

The observed improvements in ROM, although modest, are clinically relevant in the context of prolonged immobilization. Maintenance and slight increases in joint mobility, particularly in shoulder movements, indicate that PROM and AAROM were effective in preventing joint stiffness and contracture formation. These findings are consistent with previous studies demonstrating that ROM exercises support joint integrity and facilitate venous and lymphatic return, thereby contributing to tissue health.[13,14] However, the magnitude of improvement was limited, likely due to the short duration of intervention and the patient's underlying neurological impairment.

In contrast, no changes were observed in muscle strength (MMT) or muscle tone (MAS). This outcome is consistent with the pathophysiology of upper motor neuron lesions, where muscle weakness and spasticity are primarily driven by central nervous system damage rather than peripheral factors. Therefore, short-term physiotherapy interventions are unlikely to produce measurable changes in muscle strength within a limited timeframe, particularly in patients with severe systemic conditions such as advanced malignancy.[15] This finding underscores the importance of setting realistic rehabilitation goals, focusing on maintenance and prevention rather than recovery in acute or complex cases.

Importantly, the grade of the pressure ulcer remained unchanged throughout the intervention period. This finding warrants careful interpretation. The absence of wound progression suggests that physiotherapy interventions, particularly repositioning and mobility exercises, were effective in preventing further deterioration. However, the lack of improvement in ulcer grade may be explained by several factors.[16]

First, the duration of intervention (three sessions) was insufficient to induce meaningful tissue regeneration, as wound healing is a complex and time-dependent process involving inflammation, proliferation, and remodeling phases. Second, the presence of systemic factors, including advanced cancer and prolonged immobility, likely impaired the patient's healing capacity. Third, wound management was primarily handled through medical care, and physiotherapy played a supportive rather than primary role in tissue repair. These findings are consistent with existing literature indicating that physiotherapy contributes indirectly to wound healing by improving circulation, reducing pressure, and preventing secondary complications, rather than directly accelerating tissue regeneration.[17–19]

From a clinical perspective, this case highlights the importance of a multidisciplinary approach in managing pressure ulcers. While physiotherapy interventions are essential for maintaining functional capacity and preventing complications, optimal outcomes require integration with medical wound care, nutritional support, and overall patient management. Despite its clinical relevance, this study has several limitations. As a single-case report, the findings cannot be generalized to broader populations. The short duration of intervention limits the ability to observe long-term outcomes, particularly in wound healing and functional recovery. In addition, the absence of advanced outcome measures, such as wound surface area reduction or validated functional scales, may restrict the depth of clinical interpretation.

Potential sources of bias should also be considered. Measurement bias may arise from subjective assessment tools such as NRS and MMT. Observer bias cannot be excluded, as assessments were conducted within a clinical setting without blinding. Furthermore, the lack of a control condition limits causal inference regarding the effectiveness of the intervention. Nevertheless, this study provides valuable clinical insight into the role of physiotherapy in managing pressure ulcers in patients with complex medical conditions.

The findings emphasize that, in such cases, the primary goal of physiotherapy is often to maintain function, prevent deterioration, and enhance patient comfort rather than achieve rapid functional recovery. Future research should focus on longer intervention periods, larger sample sizes, and the use of standardized outcome measures to better evaluate the effectiveness of physiotherapy in pressure ulcer management. In addition, studies exploring the integration of physiotherapy with advanced wound care techniques may provide further insight into optimizing clinical outcomes.

Conclusion

This case report demonstrates that short-term physiotherapy interventions, including passive and active-assisted range of motion exercises, low-intensity stretching, positioning strategies, and caregiver education, contributed to pain reduction and maintenance of joint mobility in a patient with a grade III pressure ulcer in the sacral and gluteal regions. However, no significant changes were observed in muscle strength, muscle tone, or ulcer grade during the intervention period. These findings are likely influenced by the short duration of intervention and the patient's complex medical condition, including advanced malignancy and prolonged immobility.

As this study is limited to a single case, the findings cannot be generalized to broader populations. Nevertheless, the results highlight the supportive role of physiotherapy in preventing further deterioration, maintaining functional capacity, and improving patient comfort in individuals with severe pressure ulcers. Future studies with larger sample sizes, longer intervention periods, and standardized outcome measures are needed to better evaluate the effectiveness of physiotherapy in pressure ulcer management.

Author Contribution

Qori'ah Titin Masyitoh: conceptualization, data collection, intervention implementation, and manuscript drafting.
Arin Supriyadi: supervision, methodology design, critical review, and manuscript editing.
Made Pradnya Paramita: clinical supervision, validation of intervention procedures, and data interpretation.

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Conflict of Interest Statement

The author declares no conflict of interest.

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Ethics Statement

This study was approved by the Health Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta (Approval No. 2080/KEPK-FIK/IV/2026). Written informed consent was obtained from the patient prior to participation.

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