

Physiotherapy Management After Distal Humerus ORIF With a Pathological Scar: A Case Report

Andi Mutiara Zalzabilah¹, Nurhikmawaty Hasbiah², Masfufah³

^{1,2}Department of Physiotherapy, Faculty of Nursing, Hasanuddin University, Makassar, Indonesia

³Department of Physiotherapy, Tajuddin Chalid Hospital, Makassar, Indonesia

Corresponding author:

Name: Andi Mutiara Zalzabilah

E-mail: zalzabilahandimutiara@gmail.com

Phone: +62 812-5662-2087

Received 14 August 2026; Revised 22 August 2026; Accepted 23 August 2026; Published 29 September 2026

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Abstract

Background: Pathological postoperative scarring may coexist with pain, edema, weakness, restricted movement, and activity limitations after distal humerus fixation.

Objective: To describe the clinical assessment, physiotherapy management, and short term documented changes in a patient with a pathological postoperative scar and upper limb dysfunction after distal humerus open reduction and internal fixation.

Methods: This single case report involved a 47-year-old woman who received physiotherapy at Tajuddin Chalid Hospital, Makassar, on 30 March, 1 April, and 10 April 2026. Assessment included pain using the Visual Analog Scale, muscle strength, range of motion, scar characteristics using the Vancouver Scar Scale, incision length, arm circumference, and clinical observations. The multimodal program included transcutaneous electrical nerve stimulation, range of motion and strengthening exercises, proprioceptive neuromuscular facilitation, and scar mobilization.

Results: At baseline, movement pain was 8, pressure pain was 9, and resting pain was 0 on the Visual Analog Scale. Right shoulder and elbow muscle strength were 2/5 and 3/5, respectively, and the Vancouver Scar Scale score was 5. After three documented sessions, movement and pressure pain were both 4, while resting pain remained 0. Post treatment measurements for range of motion, muscle strength, scar characteristics, arm circumference, incision length, and quantitative daily activity were unavailable.

Conclusion: The multimodal physiotherapy program was temporally followed by a short-term reduction in documented pain. The single case design, absence of a comparator, incomplete intervention details, lack of follow up, and unavailable post treatment measurements for several outcomes preclude conclusions regarding treatment effectiveness or the effects of individual intervention components.

Keywords

Humeral Fractures; Fracture Fixation, Internal; Physical Therapy Modalities; Range of Motion, Articular; Pain Measurement; Cicatrix.

Introduction

Pathological scars represent an abnormal tissue response that may develop after surgery or other forms of cutaneous injury. Keloids and hypertrophic scars are associated with excessive extracellular matrix deposition and altered wound healing, but they are clinically distinct entities. Keloids characteristically extend beyond the original wound margins, whereas hypertrophic scars generally remain within the boundaries of the initial injury.^{1,2} Accurate clinical characterization is therefore important because scar appearance alone does not establish a specific diagnosis.

The Vancouver Scar Scale provides a structured description of vascularity, pigmentation, pliability, and height.³ However, the scale was originally developed for burn scars and should not be interpreted as a definitive diagnostic instrument for keloid. Contemporary literature also emphasizes that assessment of pathological scars should consider clinical characteristics together with symptoms and functional consequences reported by the patient.⁴ Consequently, a scar score alone cannot establish the pathological subtype when diagnostic criteria or a documented medical diagnosis are unavailable.

Distal humerus fractures are clinically important injuries because the distal humerus contributes directly to elbow stability and upper limb function. Operative management using open reduction and internal fixation may be required according to fracture characteristics, soft tissue conditions, fixation requirements, and patient factors.^{5,6} Recovery after surgery may involve pain, edema, restricted joint movement, muscle weakness, and limitations in upper limb activities. Outcomes reported after distal humerus fractures commonly include pain, range of motion, strength, and patient reported upper limb function, although considerable heterogeneity exists in the measurement methods used across studies.⁷

The coexistence of a postoperative scar and upper limb dysfunction may create a rehabilitation problem involving several interrelated clinical domains. Local pain or tissue restriction may influence movement, whereas reduced movement may contribute to stiffness and difficulty performing daily activities. Scar massage and mobilization have been investigated primarily in burn related hypertrophic scars. Available systematic reviews suggest possible short-term benefits for pain and selected scar characteristics, although the certainty and applicability of the evidence are limited by heterogeneity in intervention procedures and outcome assessment.^{8,9} These findings cannot be directly extrapolated to postoperative scars following fracture fixation.

The present case also requires careful consideration of diagnostic terminology. The source documentation referred to the lesion as a keloid scar, but the subsequent author confirmation indicated that this diagnosis was not specifically documented in the medical record. The available clinical description reported a pink to slightly red scar, minor pigmentation changes, somewhat reduced but preserved pliability, and scar elevation, with a Vancouver Scar Scale score of 5. These findings describe scar characteristics but do not independently establish a diagnosis of keloid. Therefore, the term pathological postoperative scar is used throughout this report.

The clinical contribution of this case is descriptive rather than confirmatory. It documents the assessment profile and available details of a multimodal physiotherapy program in a patient with pain, weakness, movement limitation, and reported activity difficulties after right distal humerus open reduction and internal fixation. The report does not attempt to demonstrate the effectiveness of a specific modality or establish a causal relationship between treatment and clinical change.

Accordingly, the objective of this case report was to describe the clinical assessment and multimodal physiotherapy management of a patient with a pathological postoperative scar and upper limb dysfunction following right distal humerus open reduction and internal fixation, and to report the short-term clinical changes that were documented after three treatment sessions. Particular attention was given to pain because it was the only outcome with available baseline and post treatment values.

Methods

This study was a single case report based on a physiotherapy case managed at the Physiotherapy Clinic of Tajuddin Chalid Hospital, Makassar, Indonesia. Three physiotherapy sessions were documented on 30 March, 1 April, and 10 April 2026. The source documentation did not include a prospective case report protocol, comparator, sample size calculation, or inferential statistical analysis.

The patient was a 47-year-old woman. According to the author confirmation, she experienced a road traffic accident on 22 January 2026 while taking laundry and was struck from behind by a motorcycle. Surgery and radiological examination were reportedly performed on the same date. The documented diagnosis was right distal humerus fracture status post open reduction and internal fixation. The available radiological information confirmed the presence of internal fixation extending from the distal region near the olecranon toward the proximal humerus. However, the specific fracture classification, plate or screw configuration, and documented radiological status of bone union were unavailable. The patient had not received physiotherapy before the first documented session on 30 March 2026. The main complaint was discomfort and pain during movement around the operative scar and right upper limb. The history also described swelling, restricted movement, and difficulty with sleep, dressing, self-care, toileting, household activities, and other daily tasks. No standardized patient reported functional instrument was available, and no separate documented patient perspective describing treatment goals or perceived treatment benefit was obtained.

The clinical assessment included vital signs, inspection, palpation, pain intensity, muscle strength, joint range of motion, incision length, arm circumference, radiological information, and scar assessment. Pain was measured using the Visual Analog Scale and was documented separately for resting pain, movement pain, and pressure pain. Pain was considered the primary outcome because it was the only outcome with both baseline and post treatment values. Muscle strength was assessed using Manual Muscle Testing. Range of motion was clinically assessed, although numerical values were not available in the source record. The Vancouver Scar Scale was used to describe vascularity, pigmentation, pliability, and scar height.⁸ The baseline score was used only as a description of scar characteristics and was not considered diagnostic evidence of keloid. Secondary clinical measures and descriptors included muscle strength, range of motion, incision length, arm circumference, scar characteristics, radiological information, and reported activity difficulties.

The documented program combined transcutaneous electrical nerve stimulation, range of motion exercise, isometric exercise, active assisted movement, proprioceptive neuromuscular facilitation, and scar mobilization. Transcutaneous electrical nerve stimulation was applied for 10 minutes at a documented intensity of 15 mA. According to the author confirmation, the electrodes were positioned over the anterior and posterior deltoid regions and around, rather than directly on, the operative scar, with positioning adjusted to the area where the patient reported pain. Range of motion exercise was documented as eight repetitions per set for three sets. Isometric exercise focused on the deltoid, biceps, and triceps. Proprioceptive neuromuscular facilitation aimed to facilitate movements relevant to activities that the patient found difficult, including combing the hair and putting on clothes, with three sets documented. Scar mobilization was performed for approximately 2 minutes using two fingers in a zigzag direction. Patient position, standardized PNF pattern, total session duration, complete intervention sequence, exercise progression criteria, scar mobilization pressure, and provider characteristics were not documented and were not inferred.

Clinical physiotherapy was provided on 30 March, 1 April, and 10 April 2026. The intervals between sessions were 2 days and 9 days. A home program included active range of motion, upper limb and shoulder strengthening, and squeeze ball exercises. The exercises were instructed for daily performance, with eight repetitions and three sets documented. No adherence monitoring or progression record was available.

Findings were presented descriptively because this was a single case report without inferential statistical analysis. No *p* values, confidence intervals, or effect sizes were calculated. The documented change in pain was described by comparing baseline Visual Analog Scale values with the values recorded after the third treatment session. No causal attribution was made to any individual component of the multimodal program.

Results

The patient experienced a road traffic accident on 22 January 2026 and, according to the author confirmation, underwent surgery and radiological examination on the same date. The available record identified the condition as a right distal humerus fracture treated with open reduction and internal fixation. The first documented physiotherapy session was performed on 30 March 2026, followed by sessions on 1 April and 10 April 2026. The exact fracture classification, fixation configuration, detailed radiological findings, and postoperative bone healing status were unavailable. No physiotherapy treatment before 30 March 2026 was reported. There was no documented follow up after 10 April 2026.

At baseline, blood pressure was 140/90 mmHg, pulse rate was 99 beats per minute, respiratory rate was 20 breaths per minute, oxygen saturation was 99%, and body temperature was 36.7°C. Resting pain was 0, movement pain was 8, and pressure pain was 9 on the Visual Analog Scale. Manual Muscle Testing showed right shoulder strength of 2/5 and right elbow strength of 3/5. The incision length was 10 cm. Arm circumference was 28 cm on the right and 26 cm on the left. Range of motion was clinically assessed, but numerical measurements were not available. The postoperative scar was described as pink to slightly red, with minor pigmentation changes, somewhat reduced but preserved pliability, and slight elevation. The Vancouver Scar Scale score was 5. The patient also reported difficulty with dressing, self care, toileting, sleep, and household activities. The available baseline and post treatment findings are presented in Table 1.

The baseline assessment included vital signs, pain, muscle strength, limb circumference, incision length, scar characteristics, and reported activity limitations. The available baseline clinical findings are summarized in Table 1.

Table 1. Baseline clinical assessment

Clinical variable	Baseline finding
Blood pressure	140/90 mmHg
Pulse rate	99 beats/minute
Respiratory rate	20 breaths/minute
Oxygen saturation	99%
Body temperature	36.7°C
Resting pain, VAS	0
Movement pain, VAS	8
Pressure pain, VAS	9
Right shoulder strength, MMT	2/5
Right elbow strength, MMT	3/5
Range of motion	Assessed; numerical values unavailable
Incision length	10 cm
Arm circumference	Right 28 cm; left 26 cm
Vancouver Scar Scale	5
Activities of daily living	Difficulty reported; no quantitative score

Abbreviations: MMT, Manual Muscle Testing; VAS, Visual Analog Scale.

The multimodal physiotherapy program included electrotherapy, therapeutic exercise, proprioceptive neuromuscular facilitation, scar mobilization, and a home exercise program. The available treatment parameters are presented in Table 2.

Table 2. Documented physiotherapy intervention protocol

Intervention	Documented parameters
Transcutaneous electrical nerve stimulation	10 minutes; intensity 15 mA; electrodes positioned over the anterior and posterior deltoid regions and around, rather than directly on, the operative scar
Range of motion exercise	8 repetitions per set; 3 sets
Isometric exercise	Focused on deltoid, biceps, and triceps; 8 repetitions per set
Active assisted movement	Included; detailed parameters unavailable
Proprioceptive neuromuscular facilitation	3 sets; aimed at facilitating movements relevant to combing hair and putting on clothes; exact pattern unavailable
Scar mobilization	Approximately 2 minutes; two fingers; zigzag direction
Home exercise program	Daily active range of motion, upper limb and shoulder strengthening, and squeeze ball exercises; 8 repetitions and 3 sets documented
Clinical session dates	30 March, 1 April, and 10 April 2026

Only pain had complete numerical measurements before and after the documented treatment period. The available changes after three physiotherapy sessions are presented in Table 3.

Table 3. Available changes in clinical outcomes after three sessions

Outcome	Baseline, 30 March 2026	After third session, 10 April 2026
Resting pain, VAS	0	0
Movement pain, VAS	8	4
Pressure pain, VAS	9	4
Right shoulder strength, MMT	2/5	Not available
Right elbow strength, MMT	3/5	Not available
Range of motion	Assessed; numerical values unavailable	Not available
Incision length	10 cm	Not available
Arm circumference	Right 28 cm; left 26 cm	Not available
Vancouver Scar Scale	5	Not available
Activities of daily living	Difficulty reported; no quantitative score	Not available

After the three documented physiotherapy sessions, resting pain remained 0. Movement pain decreased from 8 to 4, and pressure pain decreased from 9 to 4 on the Visual Analog Scale. The author confirmed that post treatment measurements for range of motion, muscle strength, arm circumference, and incision length were not available. A post treatment Vancouver Scar Scale score and standardized assessment of daily activities were also unavailable. No evaluation was documented after 10 April 2026.

Discussion

The principal documented finding was a short-term reduction in pain after three physiotherapy sessions. Movement pain decreased from 8 to 4 and pressure pain decreased from 9 to 4, whereas resting pain remained 0. Because complete pre and post treatment data were unavailable for the other assessed domains, pain was the only outcome for which a numerical change could be directly described.

The patient presented with a broader postoperative rehabilitation problem involving pain, mild edema, weakness, restricted movement, a pathological postoperative scar, and reported difficulty performing daily activities. Recovery after distal humerus fracture fixation may depend on fracture complexity, fixation stability, surrounding tissue condition, postoperative healing, and restoration of upper limb movement and function.^{5,6} However, the available documentation did not provide the fracture classification, detailed fixation configuration, or radiological status of bone healing.

The baseline Vancouver Scar Scale score of 5 provided a structured description of scar characteristics but should not be interpreted as confirmation of keloid.³ The author confirmed that a specific diagnosis of keloid was not documented in the patient's medical record. Therefore, the term pathological postoperative scar is methodologically more appropriate for this report.^{1,2} Scar mobilization was included as part of the multimodal intervention. Previous systematic reviews have reported possible benefits of scar massage for pain and selected physical scar characteristics, particularly in burn related hypertrophic scars, although methodological heterogeneity and variable study quality limit interpretation.^{8,9} Such evidence provides clinical context but does not

establish that scar characteristics improved in the present patient because no post treatment Vancouver Scar Scale measurement was available.

The program also incorporated transcutaneous electrical nerve stimulation, range of motion exercise, isometric exercise, active assisted movement, proprioceptive neuromuscular facilitation, and scar mobilization. Because the interventions were delivered as a combined program, the reduction in pain cannot be attributed to any individual modality. It is also not possible to separate the potential contribution of treatment from spontaneous recovery, medication use, variation in symptoms, or other factors.

The treatment schedule provides an additional limitation because only three clinical sessions were documented and the intervals were unequal. Although a home exercise program was prescribed, adherence was not documented. Several intervention elements required for exact replication also remained unavailable, including patient positioning, a standardized PNF pattern, total session duration, complete intervention sequence, exercise progression criteria, scar mobilization pressure, and provider characteristics.¹⁰

The case demonstrates the importance of matching conclusions to outcomes that are actually available. Distal humerus fracture research commonly considers pain, range of motion, strength, and patient reported upper limb function, although outcome measurement remains heterogeneous.⁷ In this case, several domains were assessed at baseline, but only pain had complete numerical data before and after treatment. The reported activity difficulties were clinically relevant but were not measured using a standardized instrument.

The main strength of this report is its multidimensional description of the postoperative presentation. The case incorporated pain, muscle strength, movement, limb circumference, scar characteristics, and activity related complaints. Important limitations include the single case design, absence of a comparator, only three documented sessions, no follow up, unavailable post treatment measurements for several outcomes, uncertain scar diagnosis, and incomplete intervention documentation.

Future studies should use clearly defined postoperative rehabilitation protocols, standardized intervention reporting, consistent treatment schedules, complete baseline and follow up assessments, validated functional outcomes, and detailed reporting of fracture and fixation characteristics. Postoperative scar assessment should combine clinician observed characteristics with patient reported symptoms and functional impact.⁴

Conclusion

This case report describes the physiotherapy management of a 47 year old woman with a right distal humerus fracture treated with open reduction and internal fixation who presented with a pathological postoperative scar, pain, weakness, edema, movement limitation, and reported difficulty with daily activities.

After three documented physiotherapy sessions, movement pain decreased from 8 to 4 and pressure pain decreased from 9 to 4, while resting pain remained unchanged at 0. These pain changes represent the principal short term outcomes that could be directly verified from the available clinical documentation.

Complete post treatment measurements were unavailable for range of motion, muscle strength, arm circumference, incision length, scar characteristics, and quantitative daily activity. Therefore, improvement in these domains cannot be concluded. Because the intervention was multimodal, the treatment intervals were unequal, several procedural details remained unavailable, and no subsequent follow up was documented, the observed reduction in pain cannot be attributed to any individual intervention component or interpreted as evidence of overall treatment effectiveness.

The case supports the importance of comprehensive assessment and cautious outcome reporting in postoperative physiotherapy. Future studies should use standardized intervention protocols, complete pre and post treatment measurements, validated functional outcomes, detailed reporting of surgical and rehabilitation context, and adequate follow up.

Author Contribution

Andi Mutiara Zalzalilah: Conceptualization, Formal Analysis, Investigation, Resources, Data Curation, Writing Original Draft, Visualization.

Nurhikmawaty Hasbiah: Conceptualization, Methodology, Validation, Writing Review and Editing, Supervision.

Masfufah: Conceptualization, Validation, Writing Review and Editing, Supervision.

Acknowledgments

The authors would like to express their sincere gratitude to the patient for allowing the clinical case to be documented and reported. The authors also acknowledge the physiotherapy staff at Tajuddin Chalid Hospital, Makassar, for their support during the clinical management and documentation of this case.

Conflict of Interest Statement

The authors declare no conflict of interest.

Funding Sources

This research received no external funding.

Ethics Statement

This case report was prepared based on clinical documentation from a patient who received physiotherapy management. The patient provided verbal permission for the case to be used for academic reporting. No written informed consent for publication was documented. The ethical review status, including whether formal ethical approval, exemption, or waiver is required, should be confirmed with the relevant institution before submission.

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