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Physiotherapy Management of Shoulder Osteoarthritis with Functional Limitation: A Case Report

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Abstract

Introduction: Shoulder osteoarthritis (OA) can significantly impair daily functional activities in older adults, leading to reduced quality of life and independence. Population-based studies report that 16.1%–20.1% of adults over 65 years show radiographic evidence of glenohumeral OA. Physiotherapy plays an important role in reducing pain and improving joint function.

Objective: This case report aimed to describe the effects of a short course of physiotherapy on pain, muscle strength, and functional ability in an elderly patient with long-standing shoulder OA.

Methods: This case report used quantitative and qualitative approaches. Quantitative assessments included Manual Muscle Testing (MMT), the Shoulder Pain and Disability Index (SPADI), the Visual Analog Scale (VAS), and the Human Rating Scale for Activities (HRS-A). Qualitative data were obtained through clinical observation and patient interviews.

Results: An 87-year-old woman with a five-year history of shoulder OA presented with chronic pain, limited range of motion, and muscle weakness (MMT 3/5). Physiotherapy interventions included Transcutaneous Electrical Nerve Stimulation (TENS) and exercise therapy consisting of strengthening exercises, roll-gliding and traction-translation mobilization, and proprioceptive neuromuscular facilitation (PNF). After intervention, VAS scores decreased from 4 to 2 for palpation pain and from 8 to 5 for movement pain. Muscle strength improved to MMT grade 4, and SPADI scores decreased from 68 to 59.

Conclusion: A short course of physiotherapy combining TENS and targeted exercise therapy effectively reduced pain and improved functional capacity in a very elderly patient with long-standing shoulder OA.

Keywords
Osteoarthritis; Shoulder Joint; Physical Therapy Modalities; Exercise Therapy; Recovery of Function; Electric Stimulation Therapy

Introduction

Shoulder osteoarthritis (OA) can significantly impair daily functional activities in older adults, leading to reduced quality of life and independence. Shoulder OA is a degenerative condition of the glenohumeral joint characterized by cartilage damage, subchondral sclerosis, and commonly involves the superior two-thirds of the humeral head in contact with the glenoid during abduction between 60°–100°. Its etiology primarily includes two mechanisms: overuse and repetitive stress, which damage the articular cartilage surface, and congenital cartilage weakness, which predisposes to degeneration. Although less common than OA in weight-bearing joints such as the knee and hip, the prevalence of shoulder OA in individuals over 60 years can reach 20%.[1]

This case is unique as it involves a very elderly patient (87 years) with a five-year history of chronic shoulder OA who demonstrated significant improvements over a short period through a combination of Transcutaneous Electrical Nerve Stimulation (TENS) and targeted exercise therapy, an outcome rarely reported in this age group. OA most frequently affects the knee, foot, shoulder, hand, spine, and hip. Data from the National Centers for Health Statistics indicate that approximately 15.8 million individuals aged 25–74 years are affected by OA. In Indonesia, prevalence rates increase with age: 5% at 40 years, 30% between 40–60 years, and up to 65% in individuals over 61 years.[2] According to Khasanah, the prevalence of knee OA in Indonesia is higher among women (14.9%) compared to men (8.7%).[3] Furthermore, population-based studies have shown that 16.1%–20.1% of adults over 65 years exhibit radiographic evidence of glenohumeral OA.[4]

The main clinical manifestations of OA include pain, stiffness, and movement limitations, often accompanied by crepitus, joint deformity, and swelling due to bone remodeling and excessive osteophyte formation.[5] OA is generally classified into several severity grades. According to the Kellgren–Lawrence (KL) scale, the grading system ranges from 0 to 4: grade 0 indicates no joint space narrowing or reactive changes (normal); grade 1 shows doubtful narrowing of joint space and possible osteophyte formation; grade 2 demonstrates definite osteophytes with possible joint space narrowing; grade 3 presents with moderate osteophytes, definite joint space narrowing, sclerosis, and possible bone deformity; and grade 4 indicates large osteophytes, marked joint space narrowing, severe sclerosis, and definite bony deformity.[6]

Treatment of OA includes both pharmacological and non-pharmacological approaches. While pharmacological management involves the use of medications, non-pharmacological strategies include physiotherapy interventions. Physiotherapy plays a pivotal role in reducing pain, improving joint function, and optimizing patients' ability to perform functional activities. In this case, treatment modalities were tailored to the patient's symptoms. TENS was selected due to its proven efficacy in reducing pain. As a non-pharmacological method, TENS delivers electrical currents across the skin to stimulate sensory nerve fibers, thereby modulating pain perception through the activation of endogenous inhibitory systems and reducing central pain transmission.[7] The objective of this case report is to describe the physiotherapy management of a patient with shoulder OA presenting with functional activity limitations.

Methods

This case report was conducted at the Emphysio Physiotherapy Clinic in Makassar between 11 and 22 November 2025. The subject was an 87-year-old woman, a housewife, diagnosed with shoulder osteoarthritis for the past five years. She presented with right shoulder pain that worsened during activities such as lifting her arm or combing her hair, accompanied by restricted range of motion (ROM). The patient had previously received pharmacological management with analgesics and injection therapy. Informed consent was obtained from the patient and her guardian, including approval for publication of this case as a scientific report.

Data collection included structured interviews, clinical examination, and functional assessment using validated physiotherapy tools and procedures. The inclusion criterion was older adults (≥60 years) diagnosed with shoulder OA, while exclusion criteria included a history of fracture or neurological conditions affecting shoulder function. The subject was selected based on case relevance to the study objectives.

Two types of data were collected: subjective and objective. Subjective data included patient anamnesis and standardized questionnaires: the Visual Analog Scale (VAS) for pain, the Shoulder Pain and Disability Index (SPADI) for disability, and the Hamilton Rating Scale for Anxiety (HRS-A) for psychological status. Objective data were obtained through inspection, palpation, assessment of basic functional movements, manual muscle testing (MMT) for strength, goniometric measurement of ROM, and the crepitus test to detect joint surface changes.

At baseline, the patient reported a VAS score of 4 for pressure pain and 8 for movement-related pain. MMT indicated grade 3 strength. ROM assessment showed marked restrictions (Shoulder: flexion 60°, extension 0°, abduction 90°; internal rotation 80°, external rotation 0°; rotation 70°, 0°, 60°). The SPADI score was 68 (severe disability). The crepitus test was positive, indicating articular changes. Diagnosis was established clinically without radiographic confirmation, based on specific physical tests.

Data were collected as primary data through structured interviews, clinical observation, and the use of validated assessment instruments. Quantitative data obtained from Manual Muscle Testing (MMT), the Shoulder Pain and Disability Index (SPADI), the Visual Analog Scale (VAS), and the Hamilton Rating Scale for Anxiety (HRS-A) were analyzed numerically to evaluate the level of dysfunction and monitor patient progress throughout the rehabilitation process. Qualitative data derived from patient interviews and clinical observations were analyzed descriptively to identify symptom patterns and patient responses to the physiotherapy intervention.

The interpretation of each assessment tool followed established scoring criteria. Pain intensity was assessed using the VAS, which ranges from 0 to 10, with higher scores indicating greater pain intensity. Muscle strength was evaluated using the MMT, scored from 0 to 5, where higher values represent stronger muscle performance. Functional disability was measured using the SPADI, with total scores ranging from 0 to 100, and higher scores indicating greater shoulder-related disability. Psychological status was assessed using the HRS-A, which ranges from 0 to 56, with higher scores reflecting more severe levels of anxiety or depressive symptoms.

Intervention planning integrated quantitative and qualitative data in accordance with clinical case study methodology. The treatment program focused on pain reduction, improvement of muscle strength and ROM, reduction of anxiety, and restoration of activities of daily living (ADL). A total of three therapy sessions were provided. Interventions included therapeutic communication to reduce anxiety, TENS for pain modulation, exercise therapy for muscle weakness, shoulder traction–translation to improve ROM, and proprioceptive neuromuscular facilitation (PNF) to support ADL recovery.

TENS was administered for 15 minutes to the right shoulder using 40 Hz frequency and 36 mA intensity. Stretching was prescribed with 15-second holds for 8 repetitions. Strengthening exercises (10 counts × 8 repetitions) included shoulder flexion with a stick, rotator cuff strengthening with load, and isometric exercises, with progressive additions of pendulum exercises and front raise with elastic band in subsequent sessions. Traction–translation mobilization was performed to increase ROM, while PNF exercises simulated daily activities such as eating and combing hair

Results

The physiotherapy program was delivered over three treatment sessions. A detailed timeline of interventions and corresponding clinical outcomes is presented in Table 1**.**

Table 1. Timeline of Physiotherapy Interventions

Date	Intervention	Clinical Outcomes
Sat, 16 Nov 2025	TENS, muscle release, stretching, traction–translation, strengthening (shoulder flexion with stick, rotator cuff strengthening with load, isometric exercise), PNF	Pain decreased from VAS 4 to 2 (pressure) and 8 to 5 (movement)
Mon, 18 Nov 2025	TENS, muscle release, stretching, traction–translation, strengthening (stick flexion, rotator cuff with load, isometric, pendulum), PNF	Pain reduction maintained (VAS 4→2; 8→5)
Tue, 19 Nov 2025	TENS, muscle release, stretching, traction–translation, strengthening (stick flexion, rotator cuff with load, isometric, pendulum, front raise with elastic band), PNF	Pain reduction maintained (VAS 4→2; 8→5); MMT improved from 3→4; ROM increased though still limited; SPADI improved from 68→59

Based on the clinical assessment findings, a structured physiotherapy intervention program was developed to address the patient's identified problems. Table 2 presents the physiotherapy intervention program delivered during the first treatment session. The table outlines the main physiotherapy problems identified in the patient, the modalities applied, and the dosage parameters including frequency, intensity, technique, and duration. The program addressed six primary issues: anxiety, pain, muscle tightness, muscle weakness, limited range of motion (ROM), and limitations in activities of daily living (ADL). Interventions combined therapeutic communication, electrotherapy using TENS, manual therapy, exercise therapy (stretching and strengthening), and proprioceptive neuromuscular facilitation (PNF). Dosage parameters were determined according to the patient's condition and applied systematically as part of the physiotherapy plan.

Table 2. Physiotherapy Intervention Program During the First Session

No.	Physiotherapy Problem	Physiotherapy Modality	Physiotherapy Dosage
1	Anxiety	Therapeutic communication	F: every session; I: patient-focused; T: interpersonal approach; T: throughout physiotherapy process
2	Pain	Electrotherapy (TENS)	F: 40 Hz; I: 36 mA; T: local contrapad; T: 15 min
3	Muscle tightness	Exercise therapy	F: every session; I: 15 counts × 8 reps; T: stretching exercise; T: 5 min
4	Muscle weakness	Exercise therapy	F: 10 counts × 8 reps; I: 3 sets; T: strengthening (shoulder flexion with stick, rotator cuff strengthening with load, isometric exercise); T: 5 min
5	Limited ROM	Manual therapy	F: every session; T: traction-translation; T: 5 min
6	Limited ADL	Exercise therapy	F: every session; I: 10 reps; T: PNF; T: 5 min

F: frequency, I: intensity, T: technique, T: time
Source: Primary Data, 2024

Table 3 illustrates the physiotherapy program during the second and third sessions. The intervention plan was largely consistent with that of the first session, with incremental progression in strengthening exercises. Additional modalities included pendulum exercise and front raise with elastic band to further improve shoulder muscle strength.

Table 3. Physiotherapy Intervention Program During the Second and Third Sessions

No.	Physiotherapy Problem	Physiotherapy Modality	Physiotherapy Dosage
1	Anxiety	Therapeutic communication	F: every session; I: patient-focused; T: interpersonal approach; T: throughout physiotherapy process
2	Pain	Electrotherapy (TENS)	F: 40 Hz; I: 36 mA; T: local contrapad; T: 15 min
3	Muscle tightness	Exercise therapy	F: every session; I: 15 counts × 8 reps; T: stretching exercise; T: 5 min
4	Muscle weakness	Exercise therapy	F: 10 counts × 8 reps; I: 3 sets; T: strengthening (shoulder flexion with stick, rotator cuff strengthening with load, isometric exercise, pendulum exercise, front raise with elastic band); T: 5 min
5	Limited ROM	Manual therapy	F: every session; T: traction-translation; T: 5 min
6	Limited ADL	Exercise therapy	F: every session; I: 10 reps; T: PNF; T: 5 min

Source: Primary Data, 2024

Table 4 presents the evaluation of physiotherapy outcomes from the first to the last session. Improvements were observed in multiple domains, including pain reduction, muscle strength enhancement, increased ROM, and reduced disability.

Table 4. Evaluation of Physiotherapy Intervention Program (First vs. Last Session)

No.	Physiotherapy Problem	Parameter	Before	After	Remarks
1	Pain	VAS	Rest: 0; Pressure: 4; Motion: 8	Rest: 0; Pressure: 2; Motion: 5	Decreased pain
2	Muscle weakness	MMT	3	4	Increased muscle strength
3	Limited ROM	Goniometer	Shoulder (S): 60°-0°-90°; (F): 80°-0°-0°; (R): 70°-0°-60° Elbow (S): 0°-0°-110°; (R): 90°-0°-90°	Shoulder (S): 60°-0°-100°; (F): 90°-0°-0°; (R): 75°-0°-65° Elbow (S): 0°-0°-120°; (R): 90°-0°-90°	Improved ROM, though still limited
4	Shoulder disability	SPADI	68/100 (severe disability)	59/100 (moderate disability)	Reduced disability

Source: Primary Data, 2024

The patient completed all three treatment sessions and adhered to the prescribed home exercise program once daily. No significant adverse effects were reported during or after therapy. The patient only experienced mild muscle soreness after the first session, which resolved within 24 hours.

Discussion

A patient identified as I presented to the clinic with complaints of shoulder pain and stiffness. The pain had been present for the past five years, with restricted movement due to stiffness and pain beginning approximately one year prior. The patient had previously received corticosteroid injections and oral analgesics. A history of repeated falls while sitting, with the hands supporting the body, was reported, and the patient experienced pain when moving the affected arm. Static inspection revealed shoulder asymmetry, with the left shoulder elevated compared to the right, accompanied by shoulder protraction. Dynamic inspection showed a tendency for the patient to predominantly use the left arm during daily activities.

Palpation findings indicated no edema, normal skin temperature, and normal contour, but tenderness was noted over the rotator cuff. Range of motion (ROM) assessment revealed limitations, and the patient also exhibited restricted activities of daily living (ADL), such as self-care and eating. The diagnosis was established based on anamnesis and physical examination findings, adjusted to the patient's condition during evaluation. Identification of the patient's primary complaints served as the foundation for determining physiotherapy problems. A specific exercise program was designed to target clinical outcomes at each rehabilitation phase. Interventions were tailored to the patient's condition, with gradual progression of exercise intensity across therapy sessions. The main objectives of physiotherapy were to reduce pain, improve muscle strength, decrease muscle stiffness, increase joint ROM, and restore functional activities. In this case, the intervention program included TENS, strengthening exercises, stretching exercises, traction-translation, and PNF. After three sessions, the patient demonstrated significant clinical improvement, including pain reduction (VAS), increased muscle strength (MMT), improved ROM, and reduced disability (SPADI). Thus, the intervention program proved effective in addressing the patient's main complaints.

Shoulder osteoarthritis (OA) is a common cause of shoulder pain. Osteoarthritis is an inflammatory joint disorder resulting from cartilage degeneration, also known as degenerative arthritis. Multiple factors contribute to its onset, including aging, obesity, previous joint injury, excessive or insufficient physical activity, and genetic predisposition. In the shoulder, OA typically causes pain and reduced ROM due to inflammation of the glenohumeral joint, which restricts mobility. This decline in ROM may also be caused by decreased soft tissue flexibility and glenoid deformities associated with OA.[8]

The intervention outcomes demonstrated reductions in pain, with VAS during movement decreasing from 8 to 5 and VAS during pressure decreasing from 4 to 2. This aligns with the theory that TENS reduces pain by increasing pain thresholds through stimulation of afferent nerve fibers, thereby reducing pain signal transmission. These findings are consistent with previous reports indicating that TENS is effective in reducing musculoskeletal pain, including in cases of low back pain.[9] TENS has also been applied to skeletal muscle trauma (acute and chronic), headaches, postoperative pain, postpartum pain, myofascial pain, visceral pain, and other pain conditions.[9] Its primary mechanism involves elevating pain thresholds, thereby reducing patients' perception of pain.[10]

Additionally, an increase in muscle strength was observed (MMT from 3 to 4), supporting evidence that strengthening exercises enhance shoulder muscle function and help prevent atrophy.[11] Reduced pain also enabled the patient to perform exercises more effectively, creating a synergistic effect between pain reduction and muscle strengthening. In patients with shoulder OA, muscle weakness commonly occurs because the affected limb is used less frequently, leading to disuse atrophy. Strengthening exercises are particularly important for reducing pain, improving muscle strength, and maintaining joint stability, thereby alleviating stress on the arthritic joint surfaces.[11] Exercise also helps prevent muscle atrophy and poor posture. Regular strengthening programs contribute to maintaining muscle mass and optimizing shoulder posture.[8]

Improvement in ROM observed in this study is consistent with the theory that traction-translation techniques restore joint play and stretch shortened capsules. These results are aligned with previous findings reporting enhanced ROM after combined TENS and traction-translation interventions.[11] Limitations in ROM due to shoulder OA can be effectively managed using traction-translation through rolling and gliding techniques. This approach restores joint play, applies stretching effects to shortened capsules, and elongates collagen fibers, thereby improving elasticity of contracted capsules and ligaments.[11]

The SPADI disability score decreased from 68 to 59, indicating improvement in functional daily activities. This outcome was associated with the use of PNF, which is consistent with evidence that PNF improves flexibility and ADL performance.[12] Pain reduction, increased muscle strength, and improved ROM together contributed to decreased disability. Proprioceptive neuromuscular facilitation, specifically the contract–relax technique, involves stretching muscles with external assistance during contraction and relaxation phases. This method has been consistently applied in OA patients to address limitations in daily activities.[12,13]

This case highlights that individualized multimodality interventions for shoulder OA can produce favorable short-term outcomes. However, this study has limitations, as it involves only a single case (case report), which restricts generalizability. Moreover, the short intervention duration and limited therapy sessions prevented a comprehensive evaluation of long-term effects. Nevertheless, the findings provide important implications, suggesting that physiotherapy interventions may effectively address shoulder OA symptoms. Future research should include larger sample sizes, longer intervention durations, and long-term follow-up to evaluate sustained treatment effects.

Conclusion

Patients with shoulder osteoarthritis experience pain, stiffness, and limited range of motion that interfere with daily activities. A physiotherapy program incorporating pain management modalities such as transcutaneous electrical nerve stimulation (TENS), strengthening exercises, joint mobilization, and proprioceptive neuromuscular facilitation (PNF) techniques was shown to alleviate symptoms, improve mobility, and gradually enhance patient function. Rehabilitation goals—including pain reduction, improvement of range of motion, muscle strength, and the ability to perform daily activities—were partially achieved. However, the short treatment duration and limited number of sessions restrict conclusions regarding long-term outcomes. These findings highlight that a well-structured, multimodal approach tailored to the patient's needs can provide meaningful clinical benefits. Further studies with longer treatment periods and sustained follow-up are strongly recommended to strengthen the evidence base and support clinical application in physiotherapy practice.

Author Contribution

Dewi Masitoh contributed to case conceptualization, patient assessment, intervention planning and implementation, data collection, and manuscript drafting.
Dea Angreni Mustamin, Putri Rezkina Aris, Rindy Diani Woretma, Nurliya Dwi Ichsanti Prawito, Siti Ummu Jamilah, Winiy Mahdiyah Siradja, and Salma Nur Madina contributed to data collection, clinical observation, and manuscript review.
Aulia Masita contributed to clinical supervision, methodological guidance, and critical revision of the manuscript.
All authors read and approved the final manuscript.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest related to this study.

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Ethics Statement

Written informed consent was obtained from the patient and her legal guardian prior to participation in the physiotherapy intervention and for the publication of this case report. Patient confidentiality and anonymity were strictly maintained in accordance with ethical standards and institutional guidelines.

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