Majalah Ilmiah Fisioterapi Indonesia
Indonesian Scientific Journal of Physiotherapy

Reports / Case Studies
ISSN (Print): 2303-1921
ISSN (Online): 2722-0443
Volume 14, Number 03, Pages 756-763 (2026)
DOI: https://doi.org/10.24843/mifi.000001866

Physiotherapy Intervention for Myogenic Low Back Pain in an Older Adult: A Case Report

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Received 30 April 2026; Revised 07 May 2026; Accepted 08 May 2026; Published 20 September 2026.
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Abstract

Background: Myogenic low back pain is common among older adults and is associated with reduced muscle strength, impaired flexibility, degenerative changes, and functional limitations. Combined physiotherapy interventions may improve pain and functional performance in geriatric patients.

Objective: This study aimed to evaluate the potential benefits of combined physiotherapy interventions in an older adult with myogenic low back pain.

Methods: A case report was conducted involving a 65-year-old woman diagnosed with myogenic low back pain at RSUD Pandan Arang Boyolali, Indonesia. The patient received three physiotherapy sessions over two weeks consisting of Transcutaneous Electrical Nerve Stimulation (TENS; 100 Hz, 15 minutes), infrared therapy (10–15 minutes), and exercise therapy including bridging, cat-cow stretch, knee-to-chest stretch, and modified plank exercises. Outcome measures included the Visual Analog Scale (VAS), trunk range of motion, Manual Muscle Testing (MMT), Functional Reach Test (FRT), and Oswestry Disability Index (ODI).

Results: After intervention, movement-related pain decreased from 8/10 to 5/10 on the VAS, while tenderness decreased from 5/10 to 2/10. Trunk flexion and lateral bending improved from 30° to 35°. Trunk muscle strength improved from 4−/5 to 4+/5. Functional Reach Test distance increased from 9 cm to 12 cm. ODI scores decreased from 44% (severe disability) to 22% (moderate disability).

Conclusion: Combined physiotherapy interventions consisting of TENS, infrared therapy, and exercise therapy demonstrated potential benefits in reducing pain and improving functional ability in an older adult with myogenic low back pain. However, further controlled studies are required.

Keywords
Low Back Pain; Aged; Physical Therapy Modalities; Transcutaneous Electrical Nerve Stimulation; Exercise Therapy

Introduction

Low back pain (LBP) remains one of the leading causes of disability worldwide and substantially contributes to reduced quality of life, particularly among older adults. The prevalence of LBP increases with age due to progressive musculoskeletal degeneration, including decreased muscle strength, reduced flexibility, impaired balance, and declining postural stability.[1] In older adults, these physiological changes may significantly reduce functional capacity and independence in daily activities. Therefore, chronic LBP in geriatric populations is not only associated with pain but also with mobility limitations, fear of movement, decreased social participation, and increased risk of disability.[2]

Myogenic low back pain is a subtype of nonspecific LBP originating from soft tissue structures such as muscles, ligaments, tendons, and fascia without direct nerve root involvement.[3] Degenerative changes, obesity, prolonged poor posture, sedentary behavior, and reduced physical activity contribute to altered spinal biomechanics and increased mechanical stress on lumbar structures in elderly individuals.[4] Clinically, patients commonly present with localized lumbar pain, muscle stiffness, limited trunk mobility, impaired walking tolerance, balance deficits, and reduced ability to perform activities of daily living.[5] Persistent symptoms may additionally affect psychological well-being and contribute to reduced quality of life.[6]

Physiotherapy plays an important role in the conservative management of chronic myogenic LBP through interventions targeting pain reduction, muscle relaxation, spinal stabilization, and functional recovery.[7] One commonly used electrotherapy modality is Transcutaneous Electrical Nerve Stimulation (TENS), which works through pain modulation mechanisms involving stimulation of large-diameter afferent fibers and inhibition of nociceptive transmission according to the gate control theory.[8] TENS may also stimulate endogenous opioid release and improve local circulation, thereby reducing pain perception.[9] In addition, infrared therapy is frequently used to increase tissue temperature, improve muscle relaxation, reduce muscle spasm, and prepare soft tissues before exercise interventions.[10]

Exercise therapy remains one of the primary interventions for chronic LBP management because it may improve muscle strength, trunk stability, flexibility, mobility, and functional performance. Core stabilization exercises such as bridging and modified plank exercises aim to improve activation of deep trunk musculature responsible for spinal stability, while stretching exercises including cat-cow stretch and knee-to-chest stretch may improve spinal mobility and reduce muscle stiffness.[11] These exercises are particularly relevant in geriatric populations because aging-related reductions in muscle mass and neuromuscular control may impair postural stability and increase the risk of functional decline.[12] Recent systematic reviews have demonstrated that exercise therapy may improve pain intensity, trunk stability, mobility, and functional performance in older adults with chronic low back pain.[13]

Several studies have reported positive effects of electrotherapy and exercise therapy in patients with chronic LBP.[14] However, evidence specifically evaluating the combined application of TENS, infrared therapy, and core stabilization exercise in geriatric patients with myogenic LBP remains limited.[15] Most available studies have focused on younger adults, mixed chronic LBP

populations, or isolated intervention approaches rather than integrated physiotherapy management in older adults with functional impairment.[16] Furthermore, evidence specifically investigating combined TENS, infrared therapy, and core stabilization exercise in geriatric patients with myogenic low back pain remains limited.[15]

Therefore, this case report aimed to evaluate the potential benefits of combined physiotherapy interventions consisting of TENS, infrared therapy, and exercise therapy in reducing pain and improving functional ability in an older adult with myogenic low back pain. It was hypothesized that combined physiotherapy interventions would demonstrate potential benefits in improving pain intensity, trunk mobility, muscle strength, and functional performance in geriatric patients with myogenic LBP.

Methods

This study used a case report design to describe the clinical outcomes of combined physiotherapy interventions in an older adult with myogenic low back pain (LBP). A case report approach was selected because it allows detailed clinical documentation of assessment findings, intervention procedures, and short-term functional outcomes in a geriatric patient with musculoskeletal impairments.[17] The study was conducted at RSUD Pandan Arang Boyolali, Indonesia, between September and October 2025.

The participant was a 65-year-old female diagnosed with myogenic low back pain and referred for physiotherapy management. The patient reported chronic low back pain for approximately one year, particularly during trunk flexion and prolonged walking activities. Walking tolerance was limited to approximately 10 minutes. The patient also had comorbid conditions including hypertension, diabetes mellitus, obesity, and a history of cervical herniated nucleus pulposus diagnosed in 2024.

The inclusion criteria in this case report were: (1) age ≥60 years, (2) clinical diagnosis of myogenic low back pain without radicular symptoms, (3) ability to communicate and follow physiotherapy instructions, and (4) willingness to participate in the intervention program. Exclusion criteria included severe neurological deficits, acute fracture, severe cardiopulmonary instability, severe cognitive impairment, or other contraindications to exercise therapy or electrotherapy modalities.

Before intervention, subjective and objective physiotherapy assessments were performed. Subjective assessment included pain history, aggravating factors, walking tolerance, and functional complaints. Objective examination demonstrated thoracic kyphotic posture, forward-flexed gait pattern, reduced walking speed, shortened step length, muscle spasm in the erector spinae and gluteal muscles, and decreased trunk muscle strength. Special tests showed positive Patrick test results and negative straight leg raise and Bragard tests, indicating the absence of significant nerve root involvement.

Pain intensity was assessed using the Visual Analog Scale (VAS), which is a valid and reliable instrument commonly used for musculoskeletal pain evaluation. Trunk range of motion (ROM) was measured using a universal goniometer. Muscle strength was evaluated using Manual Muscle Testing (MMT) using a grading scale ranging from 0 to 5. Functional ability and balance were assessed using the Oswestry Disability Index (ODI), Functional Reach Test (FRT), Five Times Sit-to-Stand Test (FTSTS), tandem walking test, and Two-Minute Step Test. The ODI is a standardized questionnaire widely used to assess disability related to low back pain.

The intervention program consisted of Transcutaneous Electrical Nerve Stimulation (TENS), infrared therapy, and exercise therapy. Interventions were administered during three physiotherapy sessions over a two-week period at a frequency of two sessions per week. The patient additionally received education regarding proper posture, body mechanics, and safe movement strategies during daily activities.

TENS was administered in the prone position using asymmetrical stimulation with a frequency of 100 Hz for 15 minutes. Electrodes were placed over the lumbar region. Intensity was gradually increased according to patient tolerance until a comfortable tingling sensation was perceived without pain or discomfort. The purpose of TENS administration was to reduce pain perception through neuromodulation mechanisms.

Infrared therapy was applied in the prone position for 10–15 minutes with a distance of approximately 45–60 cm between the infrared source and the lumbar region. Intensity was adjusted according to patient comfort until a mild warming sensation was achieved. The intervention aimed to improve muscle relaxation, reduce muscle spasm, and increase tissue extensibility before exercise therapy.

Exercise therapy consisted of bridging exercise, cat-cow stretch, knee-to-chest stretch, and modified plank exercise. Each exercise was performed for 2–3 sets with approximately 8 repetitions according to patient tolerance. Rest intervals of 30–60 seconds were provided between sets to minimize fatigue. Exercise intensity and holding duration were progressively adjusted during subsequent sessions based on symptom tolerance and patient performance. Before presenting the intervention protocol, Table 1 summarizes the physiotherapy program implemented during the intervention period.

Table 1. Physiotherapy Intervention Protocol

Intervention	Parameters	Therapeutic Purpose
TENS	Frequency: 100 Hz; Duration: 15 minutes; Type: asymmetrical stimulation	Pain reduction through neuromodulation
Infrared therapy	Duration: 10–15 minutes; Distance: 45–60 cm	Muscle relaxation and reduction of muscle spasm
Bridging exercise	2–3 sets; 8 repetitions	Improve gluteal and trunk stabilization
Cat-cow stretch	2–3 sets; 8 repetitions	Improve spinal mobility and flexibility
Knee-to-chest stretch	2–3 sets; 8 repetitions	Reduce lumbar muscle tightness
Modified plank	2–3 sets; adjusted holding duration	Improve core muscle activation and spinal stability

The overall clinical management pathway of the patient is presented in Figure 1. Following patient screening and referral to physiotherapy, a comprehensive subjective and objective assessment was performed to identify the patient's primary impairments and functional limitations. The assessment included pain intensity, range of motion, muscle strength, balance, and functional ability. Based on the assessment findings, an individualized physiotherapy program consisting of TENS, infrared therapy, and exercise therapy was implemented, followed by systematic reassessment to monitor the patient's clinical response.

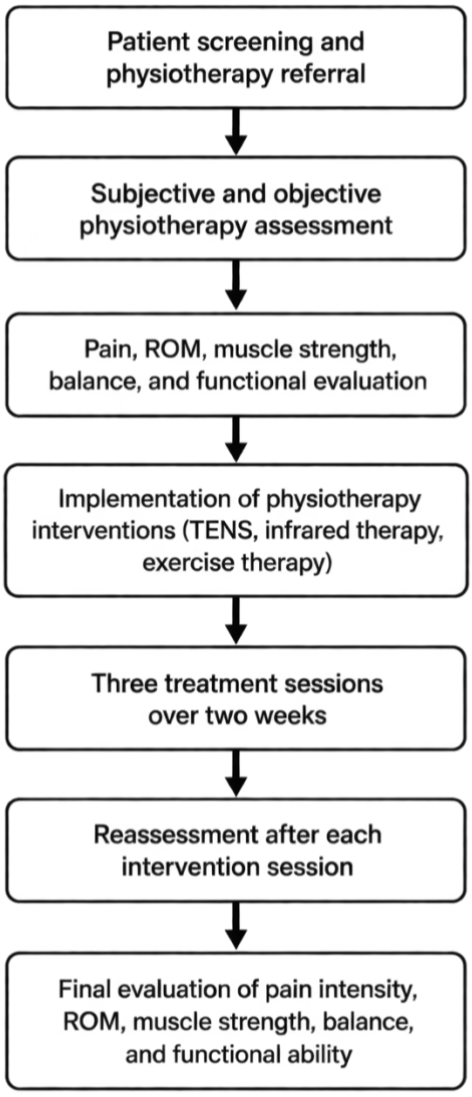


Figure 1. Physiotherapy Assessment and Intervention Flowchart

Data were analyzed descriptively by comparing baseline and post-intervention outcomes. Absolute changes in pain intensity, ROM, muscle strength, and functional disability were calculated to evaluate clinical improvement. Interpretation of clinical significance considered previously reported Minimal Clinically Important Difference (MCID) values for pain and disability outcomes in chronic low back pain populations.[18]

Potential sources of bias in this study included observer bias and the absence of a control comparison. To minimize measurement variability, all assessments and interventions were conducted by the same physiotherapist using standardized procedures.

Written informed consent was obtained from the patient before participation and publication of anonymized clinical information and related images. Formal ethical approval was waived because this study was conducted as a single-patient case report using routine clinical physiotherapy management without experimental intervention. Patient confidentiality and anonymity were maintained throughout the reporting process in accordance with the CARE reporting guideline.

Results

One participant (n=1) completed all three physiotherapy sessions without adverse events. Outcome evaluation was conducted at baseline before intervention (T1), after the second session (T2), and after the third session (T3). The assessments focused on pain intensity, trunk range of motion (ROM), muscle strength, balance, and functional disability to determine short-term clinical changes following the combined physiotherapy intervention program. The overall sequence of assessment and intervention is presented in Figure 2. Before the detailed outcome results are presented, Figure 2 provides a concise clinical timeline illustrating the initial assessment at T1, the administration of TENS, infrared therapy, and exercise therapy during each treatment session, the subsequent evaluations at T2 and T3, and the final post-intervention functional assessment. This timeline clarifies the temporal relationship between each intervention session and the corresponding outcome evaluation.

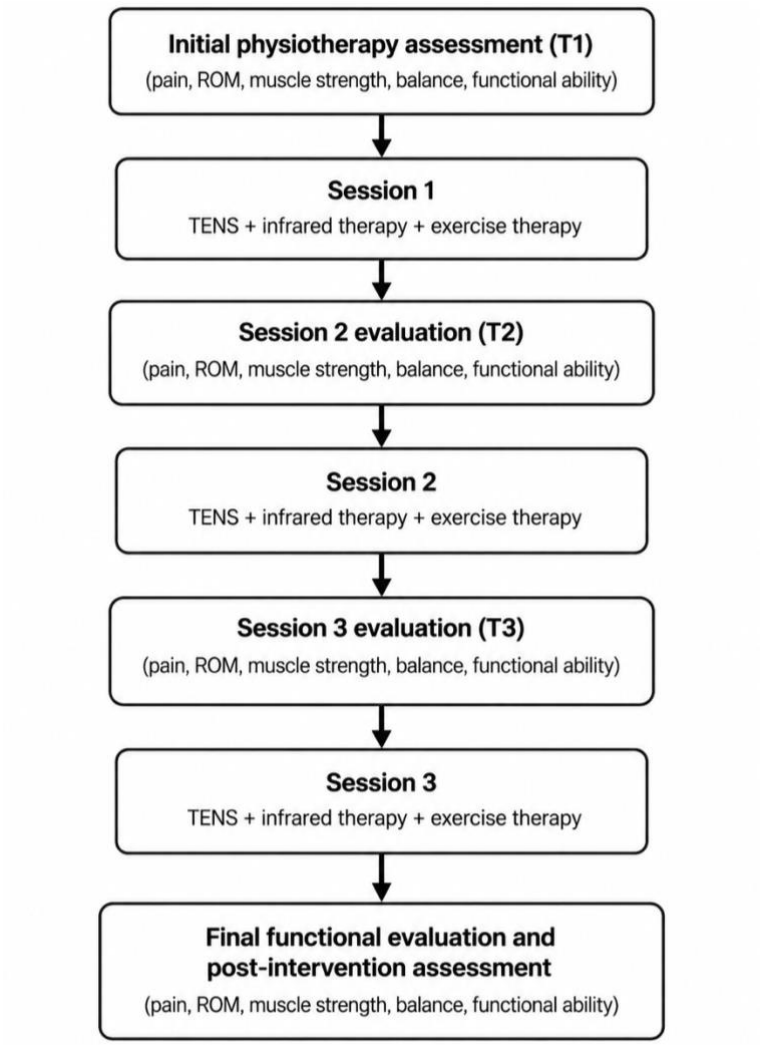


Figure 2. Physiotherapy Intervention and Assessment Timeline

Pain intensity demonstrated progressive improvement throughout the intervention period. Movement-related pain showed the greatest reduction, followed by tenderness and resting pain. Table 1 summarizes changes in pain intensity measured using the Visual Analog Scale (VAS).

Table 1. Pain Intensity Outcomes Based on Visual Analog Scale

Pain Variable	T1	T2	T3	Absolute Change
Resting pain	2	1	1	−1
Tenderness	5	4	2	−3
Movement-related pain	8	6	5	−3

The reduction in movement-related pain from 8/10 to 5/10 exceeded the commonly reported Minimal Clinically Important Difference (MCID) threshold for chronic musculoskeletal pain.[19] Changes in trunk ROM were evaluated using a universal goniometer. Progressive improvements were observed in trunk flexion-extension and lateral bending movements following intervention. Table 2 summarizes the ROM outcomes across treatment sessions.

Table 2. Trunk Range of Motion Outcomes

Trunk Motion	T1	T2	T3	Absolute Change
Flexion-extension	30°-0°-90°	30°-0°-90°	35°-0°-95°	+5°
Lateral bending	30°-0°-30°	35°-0°-35°	35°-0°-35°	+5°

Trunk muscle strength also improved during the intervention period. Assessment using Manual Muscle Testing demonstrated increased resistance tolerance during movements against gravity. The progression in muscle strength is presented in Table 3.

Table 3. Trunk Muscle Strength Outcomes

Time Point	MMT Grade	Clinical Interpretation
T1	4−/5	Able to resist minimal to moderate resistance
T2	4+/5	Able to resist moderate resistance
T3	4+/5	Stable improvement maintained

Functional balance and reach ability demonstrated mild improvement after intervention. Table 4 presents the Functional Reach Test (FRT) outcomes during the treatment period.

Table 4. Functional Reach Test Outcomes

Time Point	Reach Distance
T1	9 cm
T2	9 cm
T3	12 cm

The Functional Reach Test score increased from 9 cm at baseline to 12 cm after intervention. Functional disability was evaluated using the Oswestry Disability Index (ODI). A substantial reduction in disability level was observed following intervention. Table 5 summarizes the changes in ODI scores before and after the intervention program.

Table 5. Oswestry Disability Index Outcomes

Assessment	ODI Score	Disability Category
Pre-intervention	44%	Severe disability
Post-intervention	22%	Moderate disability

The ODI score demonstrated a 22-point absolute reduction, corresponding to a 50% relative improvement in functional disability. This finding indicated clinically meaningful improvement in daily functional performance following the physiotherapy intervention program. The intervention demonstrated a 50% relative reduction in ODI scores and a 37.5% reduction in movement-related pain intensity compared with baseline values.

To improve clarity regarding the clinical outcomes observed throughout the intervention period, visual representations of pain intensity and functional disability changes are presented below. Figure 3 illustrates the trend of movement-related pain reduction measured using the Visual Analog Scale (VAS) across intervention sessions, while Figure 4 presents the comparison of Oswestry Disability Index (ODI) scores before and after the physiotherapy intervention program. These visualizations were included to facilitate interpretation of the patient's clinical progression following combined physiotherapy interventions.

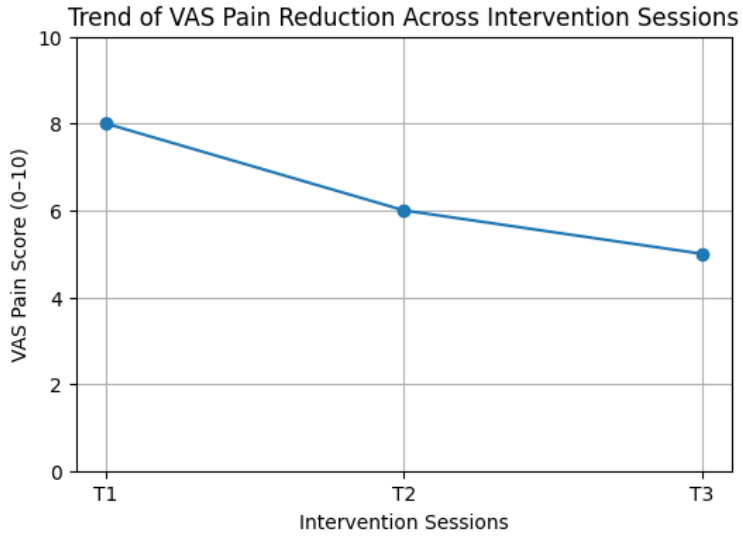


Figure 3. Trend of VAS pain reduction across intervention sessions.

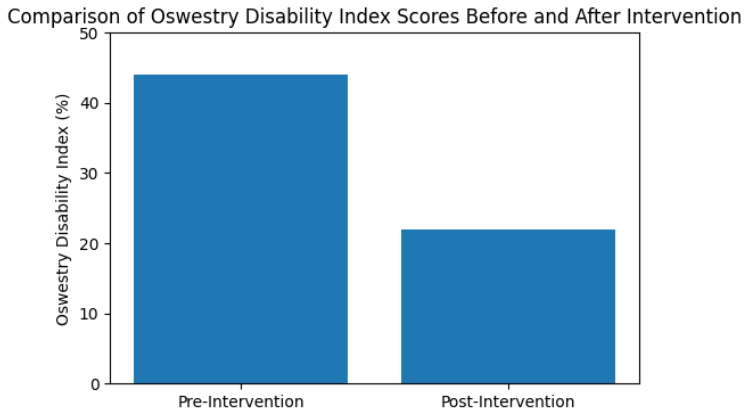


Figure 4. Comparison of Oswestry Disability Index scores before and after intervention.

Additional functional assessments also demonstrated improvement after intervention. The patient initially required 19 seconds to complete the Five Times Sit-to-Stand Test, indicating impaired lower extremity functional performance and increased fall risk. Tandem walking assessment at baseline revealed impaired dynamic balance and reduced gait stability. Following intervention, observational findings suggested improved movement confidence, trunk control, and walking stability during functional activities, although quantitative reassessment of these variables was limited due to the short intervention duration.

Overall, the results demonstrated short-term improvements in pain intensity, trunk mobility, muscle strength, balance, and functional disability following the combined physiotherapy intervention program in this geriatric patient with myogenic low back pain.

Discussion

This case report demonstrated short-term improvements in pain intensity, trunk mobility, muscle strength, balance, and functional disability following combined physiotherapy interventions consisting of Transcutaneous Electrical Nerve Stimulation (TENS), infrared therapy, and exercise therapy in an older adult with myogenic low back pain (LBP). The reduction in movement-related pain, improvement in trunk range of motion (ROM), and decrease in disability scores suggest that a multimodal physiotherapy approach may provide potential clinical benefits in geriatric patients with chronic myogenic LBP. These findings are clinically relevant because chronic LBP in older adults is commonly associated with progressive physical decline, impaired balance, reduced mobility, and increased dependency during daily activities.[1,4]

The reduction in pain intensity observed in this case may be associated with the analgesic effects of TENS combined with thermal intervention through infrared therapy. TENS is believed to reduce pain through activation of large-diameter afferent fibers, thereby inhibiting nociceptive transmission at the spinal cord level according to the gate control theory.[10] In addition, electrical stimulation may stimulate endogenous opioid release and improve local circulation, contributing to pain modulation.[20] Previous randomized controlled trials have reported that TENS may improve pain and disability outcomes in patients with chronic nonspecific LBP, particularly when combined with active rehabilitation approaches.[21] The reduction in movement-related pain from 8/10 to 5/10 in this study exceeded commonly reported Minimal Clinically Important Difference (MCID) thresholds for chronic musculoskeletal pain, indicating clinically meaningful improvement.[22] [Perlu sitasi tambahan: MCID threshold for VAS in chronic low back pain]

Infrared therapy may also have contributed to symptom reduction through superficial thermal effects that improve tissue extensibility, reduce muscle spasm, and promote muscle relaxation before exercise therapy.[22] In older adults, age-related muscular stiffness and degenerative changes may reduce soft tissue elasticity and increase pain sensitivity during movement.[23] Therefore, combining thermal modalities with exercise may facilitate improved tolerance to active rehabilitation.[24] However, it should also be recognized that evidence regarding passive electrotherapy modalities remains inconsistent across the literature. Several systematic reviews have suggested that modalities such as TENS may provide short-term analgesic effects but limited long-term functional improvement when used as isolated interventions.[25] Consequently, the improvements observed in this case are likely attributable to the combined intervention approach rather than a single modality alone.

Exercise therapy likely played a major role in improving trunk mobility, muscle performance, and functional ability. Core stabilization exercises such as bridging and modified plank exercises aim to enhance activation of deep trunk stabilizing muscles responsible for maintaining spinal alignment and postural control.[13] Improvement in trunk muscle strength from 4−/5 to 4+/5 may indicate improved neuromuscular activation and increased tolerance against gravitational resistance during functional movement. Furthermore, stretching exercises including cat-cow stretch and knee-to-chest stretch may have contributed to improved trunk flexibility and reduced muscular stiffness, which was reflected in the increased ROM outcomes observed after intervention.

The improvement in functional disability measured using the Oswestry Disability Index (ODI) was clinically important, with disability scores decreasing from 44% to 22%. This finding suggests meaningful improvement in daily functional activities, including bending, standing, and walking tolerance. Chronic LBP in older adults often results in avoidance behavior, reduced confidence during movement, and decreased participation in physical activity.[26] Therefore, reductions in pain combined with improvements in trunk stability may positively influence overall movement efficiency and functional independence in older adults with chronic low back pain.[27]

The improvement observed in the Functional Reach Test (FRT) may also indicate enhanced dynamic balance and postural control following intervention. Balance impairment is highly relevant in geriatric populations because aging-related declines in proprioception, muscle strength, and neuromuscular coordination increase fall risk.[5] Although the increase from 9 cm to 12 cm remained below normal functional thresholds, the observed improvement suggests that combined physiotherapy interventions may positively influence postural stability in older adults with chronic LBP. Nevertheless, the short duration of intervention limited the extent of measurable balance adaptation.

The relatively rapid clinical improvement observed after only three treatment sessions should be interpreted cautiously. Several factors beyond the physiotherapy interventions themselves may have influenced the outcomes, including placebo responses, increased patient motivation, therapist-patient interaction, and natural symptom fluctuation over time.[26] Reviewer concerns regarding natural recovery and placebo effects are therefore important considerations in interpreting the findings. Additionally, educational components regarding posture correction and safe movement strategies may have contributed to improved movement confidence and symptom management during daily activities.

Another important aspect in this case is the influence of aging physiology on both symptom presentation and rehabilitation response.[28] Older adults experience progressive reductions in muscle mass, flexibility, tissue elasticity, and postural adaptability, all of which may impair spinal stabilization and functional mobility.[1,5] These physiological changes may also alter rehabilitation responses compared with younger populations.[29] Consequently, exercise intensity and progression in geriatric patients should be carefully individualized to avoid excessive fatigue, pain exacerbation, or increased fall risk.[30] The use of modified plank exercises in this case was considered appropriate because modified positions may reduce mechanical stress while still activating core musculature safely in elderly individuals.

The findings of this case report are generally consistent with previous studies demonstrating that multimodal physiotherapy interventions may improve pain and functional outcomes in patients with chronic LBP.[31] However, conflicting evidence remains regarding the magnitude and sustainability of benefits associated with electrotherapy modalities such as TENS. Some studies have emphasized that active rehabilitation strategies, particularly exercise therapy, contribute more consistently to long-term functional improvement than passive modalities alone.[32]

From a clinical perspective, the findings of this case report suggest that early implementation of multimodal physiotherapy interventions combining pain modulation and active exercise may help improve mobility and functional performance in older adults with chronic myogenic low back pain. The combination of TENS, infrared therapy, and low-intensity core stabilization exercise may be particularly applicable in geriatric rehabilitation settings because the interventions can be adjusted according to patient tolerance and functional capacity.[33]

Several limitations should be acknowledged in this study. First, the findings were derived from a single patient and therefore cannot be generalized to broader populations. Second, the intervention duration and follow-up period were relatively short, limiting evaluation of long-term outcomes and recurrence prevention. Third, the absence of a control condition prevented differentiation between intervention effects and spontaneous recovery. Fourth, potential observer bias may have influenced assessment outcomes because evaluations were conducted by the same therapist providing intervention. Finally, several functional variables such as balance and endurance were not reassessed quantitatively at the end of intervention due to limited treatment duration.

Despite these limitations, this case report provides clinically relevant information regarding the feasibility and potential benefits of combining TENS, infrared therapy, and exercise therapy in older adults with myogenic LBP. The findings highlight the importance of individualized multimodal physiotherapy approaches targeting pain modulation, trunk stabilization, flexibility, and functional mobility in geriatric rehabilitation settings. Future studies involving randomized controlled trials with larger sample sizes, standardized intervention protocols, and longer follow-up periods are required to establish the effectiveness and long-term clinical value of combined physiotherapy interventions for older adults with chronic myogenic low back pain.

Conclusion

Combined physiotherapy interventions consisting of Transcutaneous Electrical Nerve Stimulation (TENS), infrared therapy, and exercise therapy demonstrated potential benefits in reducing pain intensity and improving trunk mobility, muscle strength, balance, and functional ability in an older adult with myogenic low back pain. Clinically meaningful improvements were observed in movement-related pain and functional disability following three treatment sessions.

These findings suggest that a multimodal physiotherapy approach may be considered as a supportive rehabilitation strategy for older adults with myogenic low back pain, particularly in improving functional performance and daily activity tolerance. However, the findings should be interpreted cautiously due to the single-case design, short intervention duration, and absence of long-term follow-up.

Further studies involving larger sample sizes, controlled study designs, and longer follow-up periods are recommended to determine the effectiveness and long-term clinical impact of combined physiotherapy interventions in geriatric populations with chronic low back pain.

Author Contribution

Muhammad Fadhillah: Conceptualization, Data curation, Investigation, Writing original draft.
Isnaini Herawati: Supervision, Methodology, Writing review and editing.
Ririt Ika Lestari: Clinical supervision, Investigation, Writing review and editing.

Acknowledgments

The authors would like to express their sincere gratitude to the patient for her willingness, cooperation, and active participation throughout the implementation of this case report. The authors also thank the clinical supervisors and clinical instructors for their professional guidance, supervision, and support during the assessment, intervention, and physiotherapy management process.

Conflict of Interest Statement

The authors declare no conflict of interest.

Funding Sources

The authors received no specific funding for this study or the preparation and publication of this case report.

Ethics Statement

Ethical approval was not required for this case report involving a single patient. Written informed consent was obtained from the patient for publication of this case report and any accompanying clinical information or images.

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