

## Multimodal Physiotherapy for Bilateral Chronic Plantar Fasciitis: A Case Report

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### Abstract

**Background:** Plantar fasciitis is a leading cause of chronic heel pain resulting from repetitive mechanical stress on the plantar fascia, often leading to functional limitations. Bilateral involvement in older adults is relatively uncommon and presents additional clinical challenges.

**Objective:** This study aimed to describe the clinical outcomes of a multimodal physiotherapy intervention in a patient with bilateral chronic plantar fasciitis.

**Methods:** A case report was conducted on a 69-year-old male diagnosed with bilateral chronic plantar fasciitis. Outcome measures included the Numeric Rating Scale (NRS), Range of Motion (ROM), Manual Muscle Testing (MMT), and Foot and Ankle Disability Index (FADI). The intervention consisted of low-level laser therapy (LLLTL), muscle release, stretching, and strengthening exercises administered over six sessions (twice weekly for three weeks).

**Results:** Pain during standing and walking decreased from NRS 7 to 3, exceeding the minimal clinically important difference. Ankle dorsiflexion improved by approximately 5–8°, and muscle strength increased by one grade. The FADI score improved from 54% to 78%, indicating meaningful functional recovery. No adverse events were reported during the intervention period.

**Conclusion:** Multimodal physiotherapy combining LLLTL, muscle release, stretching, and strengthening demonstrated positive clinical outcomes in reducing pain and improving function in this case of bilateral chronic plantar fasciitis. Further studies with larger samples are required to confirm these findings.

### Keywords

Plantar Fasciitis; Low-Level Light Therapy; Physiotherapy; Heel Pain; Rehabilitation

### Introduction

Plantar fasciitis is the most common cause of chronic heel pain in adults and affects both physically active individuals and less active older populations. It is primarily associated with repetitive mechanical loading of the plantar fascia, leading to microtrauma and progressive tissue degeneration.<sup>1</sup> The condition contributes substantially to functional limitations, particularly in weight-bearing activities such as standing and walking, thereby reducing quality of life.<sup>2</sup>

The underlying pathophysiology involves repetitive tensile stress on the plantar fascia at its calcaneal insertion, which may initially present as an inflammatory condition but often progresses into a degenerative process known as plantar fasciosis.<sup>1</sup> Several risk factors have been identified, including obesity, prolonged standing, excessive running activities, abnormal foot biomechanics such as overpronation, and limited flexibility of the posterior chain muscles, particularly the gastrocnemius–soleus complex.<sup>3</sup> Gastrocnemius tightness, in particular, has been shown to correlate significantly with heel pain severity, suggesting its important role in increasing mechanical strain on the plantar fascia.<sup>3</sup>

Conservative physiotherapy remains the first-line management for chronic plantar fasciitis, especially in non-surgical cases. Exercise-based interventions, including gastrocnemius–soleus stretching and intrinsic foot muscle strengthening, have demonstrated effectiveness in reducing pain and improving functional outcomes.<sup>4</sup> In addition, adjunctive modalities such as low-level laser therapy (LLLTL) have gained increasing attention due to their potential to modulate inflammation and promote tissue healing through photobiomodulation mechanisms.<sup>5</sup> Recent evidence suggests that LLLTL may provide short- to medium-term pain relief compared with conventional therapy alone; however, variations in dosage parameters, application techniques, and patient characteristics limit the generalizability of these findings.<sup>6</sup> Recent studies have further confirmed the effectiveness of low-level laser therapy in reducing pain and improving function in plantar fasciitis, particularly when combined with exercise-based interventions.<sup>7,8</sup>

Despite the growing body of evidence, several gaps remain in the current literature. First, most studies focus on unilateral plantar fasciitis, whereas bilateral cases, particularly in older adults, are less frequently reported despite their potentially greater functional burden. Second, the effectiveness of multimodal physiotherapy approaches that combine LLLTL with manual therapy and therapeutic exercise in bilateral chronic cases has not been extensively documented. Third, age-related factors, such as reduced tissue regeneration capacity and altered biomechanical adaptation, may influence treatment response but are often underexplored in clinical reports.

Given that chronic plantar fasciitis is multifactorial in nature, relying on a single intervention may not adequately address the complex interplay between mechanical stress, muscle dysfunction, and tissue degeneration. A multimodal physiotherapy approach integrating LLLTL, muscle release techniques, stretching, strengthening, and home exercise programs may offer a more comprehensive strategy to reduce pain and restore function.<sup>9</sup>

Therefore, this case report aims to describe the clinical outcomes of a structured multimodal physiotherapy intervention in a 69-year-old patient with bilateral chronic plantar fasciitis. This report is expected to provide clinically relevant insights into the management of complex plantar fasciitis cases and contribute to evidence-informed physiotherapy practice, particularly in older populations with bilateral involvement.

**Methods**

This study employed a case report design to describe the clinical management and outcomes of a multimodal physiotherapy intervention in a patient with bilateral chronic plantar fasciitis. This case report was prepared in accordance with the CARE (CAse REport) guidelines, and all relevant checklist items have been addressed to ensure completeness and transparency.

The patient was a 69-year-old male who presented with bilateral heel pain localized to the plantar aspect of both feet, with symptoms persisting for approximately two months prior to presentation. The pain was exacerbated during prolonged standing and walking and occasionally radiated to the calf region. The condition interfered with daily activities, particularly those involving weight-bearing tasks, although the patient remained independent in basic activities of daily living.

A detailed clinical history was obtained, including past medical history and lifestyle factors. The patient reported no history of systemic inflammatory disease, diabetes mellitus, peripheral vascular disease, or previous trauma such as calcaneal fracture that could confound the diagnosis. No prior surgical interventions to the lower extremities were reported. The patient’s daily activities included moderate physical activity with prolonged standing, which may have contributed to cumulative mechanical loading on the plantar fascia.

A comprehensive physical examination was conducted. The patient was fully conscious (compos mentis), cooperative, and hemodynamically stable, with blood pressure of 132/82 mmHg, heart rate of 76 beats per minute, respiratory rate of 18 breaths per minute, and body temperature of 36.2 °C. Clinical findings included tenderness on palpation of the plantar fascia, muscle spasm in the right gastrocnemius and bilateral tibialis anterior, and limited ankle range of motion. The Windlass test was positive bilaterally, supporting the diagnosis of plantar fasciitis. The detailed results of the initial clinical assessment are summarized in Table 1.

**Table 1.** Baseline Clinical Examination Findings

Examination	Findings	Interpretation
Inspection (static)	Dry skin; slight knee semiflexion; no edema	No contraindication for intervention
Inspection (dynamic)	Right-dominant weight bearing; absence of normal heel strike and toe-off phases	Altered gait mechanics
Palpation	Tenderness in plantar fascia; spasm in right gastrocnemius and bilateral tibialis anterior	Suggestive of mechanical overload and muscle dysfunction
ROM (ankle)	Right: 20°–0°–25°; Left: 17°–0°–25°	Limited dorsiflexion
MMT	Right: dorsiflexor 3/5, plantarflexor 4/5; Left: dorsiflexor 3/5, plantarflexor 3/5	Reduced muscle strength
NRS	Pain increased to 7/10 during standing/walking	Clinically significant pain
Windlass Test	Positive bilaterally	Indicates plantar fascia involvement
FADI	54%	Moderate functional limitation

Outcome measures included the Numeric Rating Scale (NRS) for pain intensity, ankle range of motion (ROM), Manual Muscle Testing (MMT) for muscle strength, and the Foot and Ankle Disability Index (FADI) for functional assessment. These instruments have demonstrated strong validity and reliability in musculoskeletal assessment.<sup>10–12</sup> The intervention consisted of a structured multimodal physiotherapy program combining low-level laser therapy (LLLT), muscle release techniques, stretching, and strengthening exercises. The treatment was administered over six sessions, twice weekly for three weeks. In addition, the patient was instructed to perform a home exercise program to support treatment outcomes, and adherence was monitored through patient self-report at each session. A detailed description of the intervention protocol is presented in Table 2.

**Table 2.** Multimodal Physiotherapy Intervention Protocol

Intervention	Dose (FITT Principle)	Description and Purpose
Low-Level Laser Therapy (LLLT)	Frequency: 2×/week; Intensity: 120 J (4.0 J/cm <sup>2</sup> ); Time: 6 min 40 sec; Mode: pulsed (50%), 50–60 Hz. <sup>5</sup>	Applied to the plantar fascia insertion at the medial calcaneal region and along the plantar arch to reduce pain, modulate inflammation, and promote tissue healing via photobiomodulation
Muscle release	Frequency: 2×/week; Intensity: mild; Duration: 5 min. <sup>13</sup>	Targeted release of gastrocnemius and tibialis anterior muscles to reduce spasm and improve tissue mobility
Stretching	Frequency: 2×/day; Duration: 30 sec per repetition; Intensity: within pain tolerance. <sup>4</sup>	Focused on gastrocnemius–soleus complex and plantar fascia to improve flexibility and reduce mechanical tension
Strengthening	Frequency: 3×/day; Repetitions: 15 reps, 2–3 sets. <sup>9</sup>	Included toe curls and heel raises to enhance intrinsic and extrinsic foot muscle strength and improve load distribution

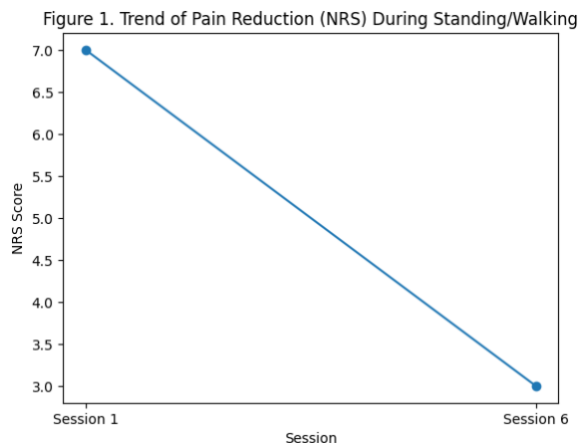
To ensure clarity in the sequence of clinical events, a timeline summarizing the patient’s condition, assessment, and intervention phases is provided in Table 3.

**Table 3.** Clinical Timeline

Time Point	Clinical Event
Week -8 to 0	Onset of bilateral heel pain with progressive worsening
Week 0	Initial assessment and baseline measurements
Week 1–3	Multimodal physiotherapy intervention (6 sessions)
Week 3	Final evaluation and outcome assessment

Throughout the intervention period, no adverse events such as skin irritation, increased pain, or treatment intolerance were reported. The patient demonstrated good adherence to both in-clinic sessions and the prescribed home exercise program. Ethical considerations were carefully observed throughout this case report. The patient received a comprehensive explanation regarding the objectives, procedures, potential benefits, and possible risks of the intervention prior to participation. The progression of pain reduction across treatment sessions is illustrated in Figure 2.

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**Figure 2.** Trend of Pain Reduction (NRS) During Standing/Walking Across Six Sessions

Written informed consent was obtained for both the treatment and the publication of anonymized clinical data and findings. Patient confidentiality and privacy were strictly maintained by removing all identifiable personal information. This case report was conducted in accordance with the ethical principles of the Declaration of Helsinki.

## Results

Following six sessions of multimodal physiotherapy administered over three weeks, changes were observed across all assessed clinical parameters, including pain intensity, range of motion, muscle strength, and functional ability. The detailed comparison between baseline (session 1) and post-intervention (session 6) outcomes for both the right and left lower extremities is presented in Table 3.

**Table 3.** Comparison of Clinical Outcomes Before and After Intervention

Parameter	Pre Right (Session 1)	Post Right (Session 6)	Pre Left (Session 1)	Post Left (Session 6)
Pain (NRS)				
Rest	0/10	0/10	0/10	0/10
Palpation	4/10	2/10	6/10	3/10
Movement	4/10	2/10	6/10	3/10
Standing/walking	7/10	3/10	7/10	3/10
Ankle ROM				
Dorsiflexion	25°	30°	17°	25°
Plantarflexion	20°	25°	20°	25°
Muscle Strength (MMT)				
Dorsiflexors	3/5	4/5	3/5	4/5
Plantarflexors	4/5	4/5	3/5	4/5
Functional Outcome (FADI)	54%	78%	—	—

Pain intensity decreased across all assessed conditions, with the most notable change observed during standing and walking activities in both feet. No changes were observed in pain at rest. Ankle range of motion increased bilaterally, particularly in dorsiflexion, while plantarflexion also demonstrated measurable improvement. Muscle strength, as measured by Manual Muscle Testing, showed improvement in both dorsiflexor and plantar flexor muscle groups, with an increase of one grade in most assessed muscles. Functional ability, as measured by the Foot and Ankle Disability Index (FADI), improved from 54% at baseline to 78% following the intervention period. Throughout the intervention, no adverse events such as increased pain, skin irritation, or treatment intolerance were reported. The patient completed all six treatment sessions and reported adherence to the prescribed home exercise program.

## Discussion

This case report demonstrated that a structured multimodal physiotherapy intervention was associated with improvements in pain intensity, joint mobility, muscle strength, and functional ability in a patient with bilateral chronic plantar fasciitis. These findings are consistent with previous evidence suggesting that conservative physiotherapy plays a central role in managing plantar heel pain through both mechanical and biological mechanisms.<sup>1</sup>

The reduction in pain observed in this case may be explained by the combined effects of low-level laser therapy (LLLT) and therapeutic exercise. LLLT is known to exert its therapeutic effect through photobiomodulation, which enhances cellular metabolism, promotes tissue repair, and reduces inflammatory mediators.<sup>5</sup> Previous systematic reviews have reported that LLLT provides significant short- to medium-term pain reduction in patients with plantar fasciitis compared with control interventions.<sup>6</sup> The application of LLLT in this case was directed at the plantar fascia insertion and surrounding tissue, which is considered a key site of pathological stress and degeneration.

In addition to LLLT, stretching and strengthening exercises contributed to the observed clinical improvements. Gastrocnemius–soleus stretching has been shown to reduce tension within the posterior chain, thereby decreasing mechanical load on the plantar fascia during gait.<sup>4</sup> Limited ankle dorsiflexion is a recognized risk factor for plantar fasciitis, as it increases compensatory strain on the plantar fascia.<sup>3</sup> The improvement in dorsiflexion range of motion observed in this case is therefore clinically relevant, as it may contribute to long-term load redistribution across the foot.

Strengthening exercises targeting both intrinsic and extrinsic foot muscles may also have played a role in improving functional outcomes. Enhanced muscle strength can improve foot stability, optimize load distribution, and reduce excessive strain on passive structures such as the plantar fascia.<sup>9</sup> Previous randomized controlled trials have demonstrated that combined stretching and strengthening programs produce superior functional improvements compared with isolated interventions.<sup>14</sup>

The inclusion of muscle release techniques further supported the intervention by reducing muscle spasm and improving soft tissue mobility. Myofascial release has been shown to enhance circulation and reduce nociceptive input, thereby contributing to pain

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reduction and improved tissue extensibility.<sup>13</sup> The integration of multiple therapeutic modalities in this case aligns with current clinical recommendations emphasizing a multimodal approach for chronic plantar fasciitis management.<sup>7</sup>

An important aspect of this case is the patient's age. At 69 years, age-related physiological changes such as reduced collagen elasticity, decreased vascularization, and slower tissue regeneration may influence the healing process. These factors may prolong recovery and reduce responsiveness to single-modality interventions.<sup>15</sup> However, the observed improvements suggest that a multimodal approach may help overcome these limitations by targeting multiple pathways simultaneously, including mechanical, neuromuscular, and cellular mechanisms.<sup>16</sup>

Another notable feature is the bilateral presentation of plantar fasciitis, which is less frequently reported compared with unilateral cases. Bilateral involvement may reflect a more systemic or cumulative mechanical loading pattern, potentially increasing functional impairment.<sup>17,18</sup> Despite this, the patient demonstrated meaningful improvements across all outcome measures, indicating that multimodal physiotherapy may be applicable even in more complex bilateral cases.<sup>19</sup>

From a clinical perspective, this case highlights the practicality and efficiency of combining LLLT with exercise-based interventions in routine physiotherapy settings. The relatively short treatment duration (six sessions over three weeks) and the absence of adverse events suggest that this approach is both feasible and well tolerated.<sup>20</sup> This is particularly relevant for outpatient or community-based practice, where time-efficient and cost-effective interventions are essential. The relatively short application time of LLLT and its integration with exercise-based interventions suggest that this approach is time-efficient and feasible for implementation in routine physiotherapy practice, including outpatient and independent clinical settings.<sup>21,22</sup>

In addition to the observed clinical improvements, the patient reported reduced pain during daily activities, particularly during prolonged standing and walking. The patient also expressed satisfaction with the intervention and perceived the treatment as manageable and beneficial in supporting functional recovery.<sup>23</sup>

Nevertheless, several limitations should be acknowledged. First, this report describes a single case, and therefore the findings cannot be generalized to broader populations. Second, the absence of a control condition limits the ability to attribute improvements to specific components of the intervention. Third, the follow-up period was limited to the end of the intervention, and long-term outcomes such as recurrence rates were not assessed. Future studies, particularly randomized controlled trials with larger sample sizes and longer follow-up periods, are required to validate the effectiveness of multimodal physiotherapy in bilateral chronic plantar fasciitis.

In addition, although patient adherence to the home exercise program was reported as good, objective monitoring methods were not employed. Future research may benefit from incorporating adherence tracking tools to better understand the relationship between exercise compliance and clinical outcomes. Furthermore, inclusion of patient-reported experience measures could provide additional insight into treatment satisfaction and perceived benefits, which are important components of patient-centered care.

Overall, this case supports the growing body of evidence that a comprehensive, multimodal physiotherapy approach can address the multifactorial nature of chronic plantar fasciitis and contribute to meaningful clinical improvement, even in older patients with bilateral involvement.

## Conclusion

This case report demonstrates that a multimodal physiotherapy approach consisting of low-level laser therapy, muscle release, stretching, and strengthening was associated with clinically meaningful improvements in pain, joint mobility, muscle strength, and functional ability in a patient with bilateral chronic plantar fasciitis. The reduction in pain during weight-bearing activities and the improvement in functional scores suggest a positive therapeutic response within the intervention period. However, as this report is based on a single case, the findings should be interpreted with caution and cannot be generalized to wider populations. Further research, particularly randomized controlled trials with larger sample sizes and extended follow-up periods, is required to establish the effectiveness and long-term benefits of this multimodal approach in managing bilateral chronic plantar fasciitis.

## Author Contribution

Alfu Ni'am Faza: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing Original Draft, Writing Review and Editing.

Totok Budi Santoso: Supervision, Validation, Methodology, Writing Review and Editing.

Kingkinarti: Data Interpretation, Project Administration, Validation, Writing Review and Editing.

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## Conflict of Interest Statement

The author declares no conflict of interest.

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## Ethics Statement

Written informed consent was obtained from the patient prior to the intervention and for the publication of anonymized clinical data. All procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki. Patient confidentiality and privacy were strictly maintained.

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