

Physiotherapy Management After ORIF for Distal Tibia and Fibula Fracture: A Case Report

Nurul Fitrah Ramadhani H.¹, Irianto², Hermansyah³

^{1,2}Physiotherapy Profession Study Program, Faculty of Nursing, Hasanuddin University, Makassar, Indonesia

³Department of Medical Rehabilitation, Dr. Tadjuddin Chalid Central General Hospital, Makassar, Indonesia

Corresponding author:

Name: Nurul Fitrah Ramadhani H

E-mail: nurulfitrah772@gmail.com

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Abstract

Background: Distal tibia and fibula fractures treated with open reduction and internal fixation (ORIF) may cause pain, ankle stiffness, edema, muscle weakness, and impaired mobility. Detailed reports of multimodal physiotherapy with serial clinical outcomes remain limited.

Objective: To describe physiotherapy management and short term clinical outcomes following ORIF for a distal tibia and fibula fracture.

Methods: This case report involved a 38 year old woman assessed approximately two months after ORIF for a left distal one third tibia and fibula fracture. Three physiotherapy sessions on 14, 16, and 22 October 2025 were observed. Treatment included Interferential Current (IFC), ankle pumping, active and passive range of motion (ROM) exercises, isometric exercise, progressive weight bearing, and gait training. Outcomes included Visual Analog Scale (VAS), goniometry, Manual Muscle Testing (MMT), and circumferential measurements. Data were analyzed descriptively.

Results: Palpation pain decreased from 5/10 at T1 to 2/10 at T3, while pain at rest and during movement remained 0/10. Dorsiflexion to plantarflexion changed from 5°–0°–9° to 6°–0°–11°, and inversion to eversion from 22°–0°–20° to 30°–0°–21°. Ankle muscle strength improved from 4–/5 to 4/5. Left ankle circumference decreased from 22 to 21 cm, whereas calf circumference increased from 26 to 26.5 cm. No treatment related adverse events were documented.

Conclusion: Favorable short term changes were observed during three sessions. These descriptive findings do not establish treatment effectiveness or causal effects of individual interventions.

Keywords

Distal tibia and fibula fracture; Open reduction and internal fixation; Physiotherapy; Ankle rehabilitation; Range of motion; Gait training

Introduction

Fractures of the distal tibia and fibula are clinically important injuries because they can compromise lower limb stability, ankle mobility, and walking function. Depending on fracture characteristics, displacement, soft tissue involvement, and mechanical stability, surgical management with open reduction and internal fixation (ORIF) may be required to restore anatomical alignment and provide adequate fixation during fracture healing. Although surgical stabilization addresses mechanical integrity, patients may continue to experience postoperative pain, edema, restricted ankle range of motion (ROM), muscle weakness, and difficulty with weight bearing and ambulation. These impairments can affect mobility and participation in daily activities and may require structured rehabilitation during postoperative recovery.^{1,2}

Postoperative immobilization and reduced use of the affected limb may contribute to muscle deconditioning, joint stiffness, and reduced functional mobility. Rehabilitation must therefore balance protection of the healing fracture with restoration of ankle mobility, muscle performance, loading capacity, and gait function. The progression of weight bearing is particularly important and should be individualized according to fracture characteristics, fixation stability, radiographic findings, clinical status, and recommendations from the treating orthopedic team. Evidence concerning early weight bearing should also be interpreted within the specific fracture population studied, because findings from tibial plateau or tibial shaft fractures cannot be directly generalized to distal tibia and fibula fractures.

Physiotherapy may address several postoperative impairments concurrently through exercise and physical modalities. Ankle pumping exercises can promote active ankle movement and may assist venous return, while active and passive ROM exercises are commonly used to address postoperative movement restrictions. Isometric exercise and progressive loading may support muscle activation and the gradual restoration of lower limb function. As clinical recovery permits, gait training and progression of weight bearing can be incorporated to facilitate functional ambulation. Previous reports have described physiotherapy rehabilitation following tibia and fibula fractures using combinations of exercise, progressive loading, and gait training.^{2,3} However, differences in fracture location, postoperative stage, treatment duration, and outcome assessment limit direct comparison among individual reports. Pain management may also support participation in postoperative rehabilitation. Interferential Current (IFC) is an electrotherapy modality used clinically for symptom management, although evidence concerning its effects varies according to clinical population, treatment parameters, and outcome assessment.⁴ In the present case, IFC was delivered as one component of a multimodal physiotherapy program rather than as an isolated treatment. Therefore, changes in pain and other clinical outcomes cannot be attributed specifically to IFC when other rehabilitation components were administered concurrently.

An important gap in case based rehabilitation literature is the limited description of the temporal sequence, treatment dosage, progression, and serial clinical outcomes within individual postoperative cases. Detailed reporting is particularly relevant when rehabilitation combines electrotherapy, ankle mobility exercises, muscle activation, progressive weight bearing, and gait training.⁵ Without adequate documentation of these components, it becomes difficult to distinguish the observed clinical course of an individual patient from claims regarding treatment effectiveness. A structured description of serial outcomes can instead provide clinically useful

information about the patient's condition during a defined rehabilitation period while maintaining appropriate limitations on causal interpretation.

The present case report addresses this gap by describing the assessment findings, multimodal physiotherapy management, treatment progression, and serial clinical outcomes of a patient following ORIF for a distal tibia and fibula fracture. The report focuses on changes in palpation pain, ankle ROM, ankle muscle strength, and circumferential measurements across three documented physiotherapy sessions. The clinical context and progression of weight bearing and gait training are also described based on the available treatment records. Functional outcomes such as walking distance, walking tolerance, level of assistance, toileting, praying, and independence were not quantitatively assessed across all three sessions and therefore are not presented as serial outcomes. This case report aims to provide a transparent descriptive account of short term clinical changes during multimodal physiotherapy without assuming that the observed changes were caused by any individual intervention or by the rehabilitation program as a whole.

Methods

This case report described the physiotherapy management and short term clinical outcomes of a patient following open reduction and internal fixation (ORIF) for a left distal one third tibia and fibula fracture. The report was prepared with reference to the CARE guidelines to improve the completeness and transparency of case reporting.⁵ The observation period comprised three documented physiotherapy sessions conducted on 14 October 2025, 16 October 2025, and 22 October 2025. These sessions were selected because consistent clinical outcome data were available at all three time points. The patient had received physiotherapy before the observation period; however, equivalent serial outcome data from the earlier treatment period were unavailable and were therefore not included in the analysis.

The patient was a 38 year old woman who sustained a left distal one third tibia and fibula fracture after falling from stairs on 23 August 2025. ORIF with plate and screw fixation was performed on 25 August 2025. At the initial documented physiotherapy assessment, approximately two months after surgery, the surgical wounds had healed without reported signs of infection. The patient presented with mild pain, ankle stiffness, mild swelling, difficulty placing weight through the affected limb, and limitations in walking. She used a cane for ambulation and a wheelchair for longer distances, including travel to the hospital. Difficulties with walking, praying, toileting, and independent mobility were documented during the initial assessment. No standardized functional scale, walking distance, walking tolerance, assistance level, or serial functional assessment was available for the three observation sessions. These variables were therefore not quantitatively analyzed.

The initial clinical assessment identified edema around the left ankle and healed surgical scars measuring approximately 7 cm over the tibial region and 3 cm over the fibular region. The surrounding skin appeared shiny, and local warmth was detected during palpation. Active and passive ankle movements were assessed using a goniometer, with the patient positioned lying on the treatment bed before the intervention. Ankle dorsiflexion, plantarflexion, inversion, and eversion were assessed. Baseline measurements recorded dorsiflexion to neutral to plantarflexion as 5°–0°–9° and inversion to neutral to eversion as 22°–0°–20°, following the notation used in the original clinical record. Muscle strength of the ankle dorsiflexors, plantarflexors, invertors, and evertors was assessed using Manual Muscle Testing (MMT). Baseline strength was graded 4–/5 across the assessed muscle groups.

Pain was assessed using the Visual Analog Scale (VAS), distinguishing pain at rest, during movement, and on palpation. At baseline, the patient reported no pain at rest or during ankle movement, whereas palpation elicited pain rated 5/10. Circumferential measurements were obtained using a measuring tape. The thigh was measured 15 cm above the patella, the calf 10 cm below the patella, and the ankle at the level of the medial and lateral malleoli. Measurements were performed by the same assessor. Bilateral values were recorded to provide comparison between the affected and unaffected limbs.

Radiographic examination dated 28 August 2025 showed satisfactory alignment of the left lower limb and ankle joint without dislocation. Fracture lines remained visible in the distal tibia and distal one third of the fibula, while the plate and screw fixation were reported to be appropriately positioned. Bone density and joint spaces were preserved according to the available radiographic report. These findings provided the documented postoperative clinical context for rehabilitation. However, no written orthopedic instruction or documented radiographic criterion specifying progression from partial to full weight bearing was available in the source records. The progression of weight bearing described in this report was based on direction and information provided by the physiotherapist at the treatment setting. No undocumented orthopedic clearance or specific medical loading criterion was inferred.

The clinical sequence from injury to surgery and the documented rehabilitation observation is presented in Table 1. This timeline distinguishes the patient's previous physiotherapy attendance from the three sessions included in the present serial analysis.

Table 1. Clinical Timeline

Date/Period	Clinical Event
23 August 2025	The patient fell from stairs, resulting in a left distal one third tibia and fibula fracture.
25 August 2025	ORIF with plate and screw fixation was performed for the left distal one third tibia and fibula fracture.
Early October 2025, approximately 6 weeks postoperatively	The patient had commenced physiotherapy and attended treatment approximately twice weekly. Serial outcome data from this earlier period were not available for analysis.
14 October 2025, T1	Initial documented assessment and first observed physiotherapy session. Pain, ankle ROM, muscle strength, and circumferential measurements were recorded.
16 October 2025, T2	Second observed physiotherapy session with serial reassessment of the documented clinical outcomes.
22 October 2025, T3	Third observed physiotherapy session and final assessment within the observation period. Progression from partial toward full weight bearing was documented under physiotherapist supervision.

Table 1 shows that the three analyzed sessions represented a defined short observation period following an earlier phase of postoperative physiotherapy. Although the patient had attended physiotherapy approximately twice weekly before T1, the absence of equivalent serial data from that period prevented its inclusion in the outcome analysis. The documented progression toward full weight bearing occurred during the observation period, but the available records did not specify a written orthopedic recommendation, formal loading criterion, or documented medical authorization for the timing of progression.

The physiotherapy program was multimodal and included Interferential Current (IFC), ankle pumping exercises, active and passive ROM exercises, isometric exercises, progressive weight bearing, and gait training. Each documented session lasted approximately 60 minutes. IFC was administered once per session for 10 minutes using a 2 pole configuration with a carrier frequency of 4,000 Hz, an amplitude modulated frequency of 100 Hz, continuous mode, and an intensity of 13.0 mA. The electrodes were positioned in a bipolar configuration, with one pad placed over the gastrocnemius region and the other over the Achilles tendon region. Ankle pumping exercises were performed for approximately 10 minutes using eight count movements and three repetitions. Active and passive ROM exercises were performed for approximately 10 minutes using eight count movements and two to three

repetitions. Isometric exercises were performed for approximately 10 minutes using eight count contractions and three to four repetitions.

Progressive weight bearing was performed for approximately 10 minutes under supervision, with progression from partial toward full weight bearing documented during the observation period. Because no written orthopedic criteria or authorization were available, the clinical record does not permit determination of the specific medical basis for this progression. Gait training using an assistive device was performed for approximately 10 minutes according to the documented treatment protocol. The complete intervention sequence and documented dosage are summarized in Table 2.

Table 2. Physiotherapy Intervention Protocol During the Documented Observation Period

Clinical Problem	Intervention	Documented Dose and Procedure
Pain	Interferential Current (IFC)	Once per session for 10 minutes; 2 pole configuration; carrier frequency 4,000 Hz; amplitude modulated frequency 100 Hz; continuous mode; intensity 13.0 mA; bipolar electrode placement with one pad over the gastrocnemius region and one pad over the Achilles tendon region.
Ankle edema	Ankle pumping exercise	Approximately 10 minutes; eight count movements; three repetitions.
Limited ankle ROM	Active and passive ROM exercises	Approximately 10 minutes; eight count movements; two to three repetitions.
Muscle weakness	Isometric exercise	Approximately 10 minutes; eight count contractions; three to four repetitions.
Impaired weight bearing	Progressive weight bearing exercise	Approximately 10 minutes under supervision; progression from partial toward full weight bearing during the observation period. No specific written orthopedic criterion for progression was available.
Impaired ambulation	Gait training with an assistive device	Approximately 10 minutes according to the documented treatment protocol.

Table 2 demonstrates that the intervention addressed pain, edema, restricted ankle mobility, muscle weakness, impaired weight bearing, and impaired ambulation through several concurrent treatment components. The confirmed IFC parameters are reported to improve treatment transparency and replace the incomplete TENS description in the previous version. The overall treatment duration was approximately 60 minutes per session. The patient had previously attended physiotherapy approximately twice weekly, but details of the earlier treatment content were unavailable.

No structured home exercise program or additional intervention outside the documented sessions was recorded. Treatment modification and intervention fidelity were not formally assessed. The progression of exercises was based on the documented treatment protocol and patient response during the sessions, but no standardized progression criteria were available in the source documentation.

Clinical outcomes were assessed at T1 on 14 October 2025, T2 on 16 October 2025, and T3 on 22 October 2025. The same outcome domains were recorded at each time point, including VAS, ankle ROM, MMT, and circumferential measurements. Pain was recorded at rest, during movement, and on palpation. Ankle ROM was assessed using goniometry, MMT was used to assess ankle muscle strength, and circumferential measurements were obtained using a measuring tape. The same assessor performed the documented measurements. Data were analyzed descriptively because the report involved a single patient, three observations, and no control or comparison group. No inferential statistical analysis, hypothesis testing, or causal effect estimation was performed.

Adverse events were monitored clinically during each documented session through observation of the patient's response and reports of symptoms during and after treatment. No increase in pain, swelling, or other treatment related complaints was documented. Because no prespecified adverse event definition or standardized monitoring instrument was used, adverse events were reported descriptively.

The patient perspective was obtained from the documented clinical interaction. At the final session, the patient reported that her walking distance at home had increased slightly while using a four-legged cane and that the affected leg felt somewhat more mobile than previously, although the perceived improvement was limited. This information was treated as a qualitative patient reported observation rather than a standardized functional outcome because no validated functional instrument or quantitative walking assessment was used.

Regarding research ethics and publication, the information provided by the author indicated that verbal consent for publication of the case report and anonymized clinical information had been obtained directly from the patient. Written consent documentation was not available. According to the information provided, the single patient case report did not require formal ethical approval under the applicable institutional policy, and no ethics approval number or exemption documentation was available. Accordingly, no approval number or institutional exemption status has been added beyond the information that could be confirmed.

Results

Clinical outcomes were assessed at three documented time points: T1 on 14 October 2025, T2 on 16 October 2025, and T3 on 22 October 2025. The analysis included only outcome domains that were consistently documented across the three sessions, namely pain intensity, ankle range of motion (ROM), ankle muscle strength, and circumferential measurements. Because this was a single patient observed over a short period without a comparison group, the findings are presented descriptively. No inferential statistical analysis, hypothesis testing, or estimation of treatment effects was performed.

Pain was assessed separately at rest, during movement, and during palpation. At T1, the patient reported no pain at rest or during ankle movement, whereas palpation elicited a VAS score of 5/10. The palpation score decreased to 4/10 at T2 and 2/10 at T3, while pain at rest and during movement remained 0/10 throughout the observation period. The complete serial pain findings are presented in Table 3.

Table 3. Serial Changes in Pain Intensity

Pain category	T1	T2	T3
Pain at rest, VAS	0/10	0/10	0/10
Pain during movement, VAS	0/10	0/10	0/10
Pain on palpation, VAS	5/10	4/10	2/10

The main change in pain occurred during palpation, with a reduction of 3 points between T1 and T3. The absence of pain at rest and during movement remained consistent across all three assessments. Thus, the observed change represents improvement in palpation elicited pain rather than a generalized reduction across all pain domains.

Ankle ROM was assessed using goniometry in the same movement directions at each observation point. The recorded values are summarized in Table 4 using the notation documented in the clinical record, with movement reported relative to the neutral position.

Table 4. Serial Changes in Left Ankle Range of Motion

Movement	T1	T2	T3
Dorsiflexion to neutral to plantarflexion	5°–0°–9°	5°–0°–10°	6°–0°–11°
Inversion to neutral to eversion	22°–0°–20°	24°–0°–20°	30°–0°–21°

The serial measurements showed increases in all recorded movement components by T3 compared with T1. Dorsiflexion increased from 5° to 6°, plantarflexion from 9° to 11°, inversion from 22° to 30°, and eversion from 20° to 21°. The largest numerical change was observed in inversion, while changes in dorsiflexion and eversion were smaller.

Ankle muscle strength was assessed for the dorsiflexors, plantarflexors, invertors, and evertors using the MMT grading scale. The results are presented in Table 5 to show the pattern of change across the three observation points.

Table 5. Serial Changes in Left Ankle Muscle Strength

Muscle group	T1	T2	T3
Ankle dorsiflexors	4–/5	4–/5	4/5
Ankle plantarflexors	4–/5	4–/5	4/5
Ankle invertors	4–/5	4–/5	4/5
Ankle evertors	4–/5	4–/5	4/5

All assessed ankle muscle groups were graded 4–/5 at T1 and remained at the same grade at T2. By T3, the recorded grade increased to 4/5 across all four muscle groups. Therefore, the documented change in clinically assessed muscle strength occurred between T2 and T3.

Circumferential measurements were recorded bilaterally to describe changes in the affected and unaffected limbs. The calf and ankle measurements across the three assessment points are presented in Table 6.

Table 6. Serial Circumferential Measurements of the Lower Limbs

Measurement site	T1	T2	T3
Calf, right	28 cm	28 cm	28 cm
Calf, left	26 cm	26 cm	26.5 cm
Ankle, right	19 cm	19 cm	19 cm
Ankle, left	22 cm	21.2 cm	21 cm

The left ankle circumference decreased progressively from 22 cm at T1 to 21.2 cm at T2 and 21 cm at T3, while the right ankle remained unchanged at 19 cm. The left calf circumference increased from 26 cm at T1 to 26.5 cm at T3, whereas the right calf remained stable at 28 cm. These measurements describe the observed serial changes but should be interpreted with consideration of measurement reproducibility because the original clinical documentation did not specify all measurement landmarks and positioning details available at the time of the assessment.

The rehabilitation program also included supervised progression from partial toward full weight bearing and gait training with an assistive device. However, the available records did not contain standardized serial measures of walking distance, walking tolerance, assistance level, assistive device progression, toileting, praying, or independent mobility. Consequently, these functional domains could not be quantitatively compared between T1, T2, and T3. The initial assessment documented difficulty with walking, praying, toileting, and independent mobility, but the absence of comparable serial measurements prevents determination of whether these activities improved during the observation period.

The patient's reported perspective provided limited qualitative information regarding functional change. At the final session, the patient reported that her walking distance at home had increased slightly while using a four legged cane and that the affected leg felt somewhat more mobile than previously. Because this information was not obtained using a standardized functional instrument or quantitative walking assessment, it was treated as a patient reported observation rather than a measured functional outcome.

No adverse events were documented during the three observed sessions. The patient was able to participate in the prescribed physiotherapy program, and no increase in pain, swelling, or other treatment related complaints was recorded during or after the sessions. Because adverse events were monitored through clinical observation and patient reports without a prespecified standardized definition or assessment instrument, these findings are reported descriptively.

Overall, the three session observation showed a reduction in palpation pain, increases in recorded ankle ROM and MMT grades, a decrease in left ankle circumference, and a small increase in left calf circumference. The documented progression of weight bearing and gait training provides additional clinical context but cannot be linked quantitatively to functional recovery because serial functional measures were unavailable. These findings represent the clinical course of a single patient during a limited observation period and do not establish the effectiveness or causal contribution of any individual component of the multimodal physiotherapy program.

Discussion

This case report described short term changes in pain, ankle range of motion (ROM), muscle strength, and circumferential measurements during three documented physiotherapy sessions in a patient approximately two months after open reduction and internal fixation (ORIF) for a left distal one third tibia and fibula fracture. The principal findings were a reduction in palpation pain from 5/10 to 2/10, increases in recorded ankle ROM, improvement in clinically assessed ankle muscle strength from 4–/5 to 4/5, a reduction in left ankle circumference from 22 to 21 cm, and an increase in left calf circumference from 26 to 26.5 cm. These changes occurred while the patient received a multimodal program consisting of Interferential Current (IFC), ankle pumping, active and passive ROM exercises, isometric exercise, progressive weight bearing, and gait training. Because several interventions were delivered concurrently over only three sessions without a control condition, the observed changes should be interpreted as the clinical course of one patient rather than evidence of the effectiveness of any individual intervention.

The reduction in palpation pain was the clearest change in the pain outcomes. Pain at rest and during movement was absent at all three assessment points, whereas palpation pain decreased progressively from 5/10 at T1 to 4/10 at T2 and 2/10 at T3. This distinction is clinically important because the change was confined to pain elicited by palpation and should not be interpreted as a generalized improvement in postoperative pain. IFC was included as one component of the treatment program, but the present case cannot determine whether the reduction in palpation pain was related to IFC, therapeutic exercise, changes in tissue recovery, or

other factors occurring during the postoperative period. Evidence concerning electrotherapy for postoperative pain suggests that treatment effects can vary according to the intervention parameters, surgical population, and outcome assessment.⁶ Therefore, the current finding is best regarded as a temporal clinical observation rather than evidence of a specific analgesic effect of IFC.

Ankle ROM showed improvement across the observation period. Dorsiflexion increased from 5° to 6°, plantarflexion from 9° to 11°, inversion from 22° to 30°, and eversion from 20° to 21° between T1 and T3. The relatively larger numerical increase in inversion should not be interpreted as a differential response to treatment because short term variation, measurement technique, tissue recovery, and examiner related factors may influence goniometric findings. Nevertheless, the overall direction of change is compatible with the rehabilitation objective of restoring ankle mobility following postoperative restriction and reduced limb use. Active and passive ROM exercises were incorporated throughout the documented treatment period, although their individual contribution cannot be separated from the effects of the other concurrent interventions. Previous rehabilitation reports following tibia and fibula fractures have similarly described progressive ROM exercise as part of postoperative management.²

Ankle muscle strength also improved from 4-/5 to 4/5 across the assessed dorsiflexors, plantarflexors, invertors, and evertors. The change was recorded between T2 and T3, with no difference between T1 and T2. Isometric exercise and progressive weight bearing were included in the rehabilitation program and were clinically intended to support muscle activation and progressive use of the affected limb. However, the change in MMT grade over three sessions cannot be attributed specifically to these interventions. MMT provides an ordinal clinical assessment and may be influenced by voluntary effort, patient condition, and examiner judgment. The observed change should therefore be interpreted as an improvement in clinically assessed muscle performance during the observation period rather than a confirmed physiological increase in muscle strength. This interpretation is consistent with previous rehabilitation reports describing improvements in muscle function alongside progressive exercise after tibial fracture fixation, although differences in fracture type and rehabilitation phase limit direct comparison.^{2,6,8}

The left ankle circumference decreased from 22 cm to 21 cm, while the left calf circumference increased from 26 cm to 26.5 cm. The reduction in ankle circumference occurred during a program that included ankle pumping and active and passive ankle movement. Ankle pumping may facilitate repeated ankle movement and contribute to the calf muscle pump and venous return. A recent meta analysis of randomized controlled trials involving patients undergoing lower limb orthopedic surgery reported improvements in venous hemodynamic parameters and a reduced incidence of postoperative deep vein thrombosis following postoperative ankle pump exercise.⁷ However, this evidence does not establish that the 1 cm reduction in ankle circumference in the present case was caused by ankle pumping. Postoperative edema can change naturally during recovery, and circumferential measurements may vary according to measurement technique and anatomical positioning. The lack of complete documentation of measurement conditions in the original clinical record further limits interpretation.

The documented progression from partial toward full weight bearing and the inclusion of gait training represent important components of the patient's rehabilitation context. However, the source documentation did not contain a written orthopedic recommendation specifying the timing, criteria, or radiographic basis for progression. The progression was documented as occurring under physiotherapist direction at the treatment setting, but no undocumented orthopedic clearance should be inferred. This limitation is particularly relevant because weight bearing after fracture fixation depends on factors including fracture characteristics, fixation stability, healing status, and medical assessment. Evidence from tibial plateau and tibial shaft fractures may provide general rehabilitation context, but those populations cannot be directly extrapolated to distal tibia and fibula fractures because fracture anatomy and fixation characteristics differ.^{8,9}

Although walking, praying, toileting, and independent mobility were identified as difficulties at the initial assessment, serial quantitative functional data were unavailable. The patient reported at the final session that she could walk slightly farther at home using a four legged cane and that the affected leg felt somewhat more mobile. This provides a limited patient reported perspective, but it was not obtained using a standardized functional instrument or quantitative walking assessment. Consequently, the case cannot establish changes in walking distance, walking tolerance, level of assistance, independence, or participation. Future case reports should prospectively document standardized functional outcomes alongside impairment measures to provide a more complete representation of rehabilitation progress.⁵

The main contribution of this report is therefore its structured description of serial impairment related outcomes and the documented sequence of a multimodal physiotherapy program during a clearly defined short observation period. The case also illustrates the importance of transparent reporting when some clinically relevant information is unavailable. Important limitations include the single patient design, three session observation period, absence of a comparison condition, concurrent interventions, limited serial functional assessment, and incomplete documentation of some aspects of intervention and measurement reproducibility. Although the IFC parameters and measurement landmarks were subsequently confirmed, other information, including the basis for weight bearing progression and details of physiotherapy provided before the observation period, could not be fully reconstructed.

Future research should use prospective designs with longer follow up and standardized impairment and functional outcomes. Walking distance or tolerance, assistive device use, level of assistance, patient reported function, and participation in daily activities should be assessed serially. Intervention reporting should also document treatment parameters, exercise dosage, progression criteria, weight bearing authorization, measurement procedures, and treatment fidelity in sufficient detail to permit replication. Larger studies are required to determine whether specific rehabilitation components provide benefits beyond the expected course of postoperative recovery.

Overall, the patient demonstrated favorable short term changes in palpation pain, ankle ROM, clinically assessed muscle strength, and circumferential measurements during three observed physiotherapy sessions. These findings are compatible with the goals of multimodal postoperative rehabilitation but cannot establish the effectiveness of IFC, exercise, weight bearing progression, gait training, or their combination. The appropriate interpretation is that the patient experienced measurable clinical changes during the documented observation period, while the extent of functional recovery and the contribution of individual interventions remain uncertain.

Conclusion

This case report described the short term clinical course of a patient following ORIF for a left distal one third tibia and fibula fracture during three documented physiotherapy sessions. The patient demonstrated a reduction in palpation pain, improvements in ankle ROM and clinically assessed ankle muscle strength, a reduction in left ankle circumference, and a small increase in left calf circumference. These changes occurred during a multimodal physiotherapy program comprising IFC, ankle pumping, active and passive ROM exercises, isometric exercise, progressive weight bearing, and gait training.

The findings should be interpreted descriptively because the report involved a single patient, a short observation period, multiple concurrent interventions, and no comparison group. The observed changes therefore cannot establish the effectiveness or

causal contribution of any individual intervention or of the multimodal program as a whole. Serial quantitative functional outcomes were also unavailable, limiting conclusions regarding changes in walking distance, walking tolerance, assistance level, independence, and participation in daily activities.

This case highlights the value of individualized postoperative rehabilitation and serial monitoring of clinically relevant impairments following distal tibia and fibula fracture fixation. Future studies should use prospective designs with longer follow up, standardized functional and impairment related outcomes, and more detailed reporting of intervention parameters, progression criteria, weight bearing authorization, and measurement procedures to improve reproducibility and clinical interpretation.

Author Contribution

Nurul Fitrah Ramadhani. H: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing Original Draft, Visualization, Project Administration.

Irianto: Methodology, Validation, Supervision, Writing Review and Editing.

Hermansyah: Investigation, Resources, Validation, Data Curation, Supervision, Writing Review and Editing.

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Conflict of Interest Statement

The authors declare that they have no conflicts of interest related to the preparation, conduct, or publication of this case report.

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Ethics Statement

According to the information provided by the authors, this single patient case report did not require formal ethical approval under the applicable institutional policy. No ethical approval number or exemption documentation was available. Verbal consent for publication of the case report and anonymized clinical information was obtained directly from the patient. The authors acknowledge that written informed consent for publication was not available.

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