



## Research Article

## The Role of Physiotherapy Management in Patients with Talus Bone Fracture: A Case Study

Ranveer Pratap Singh <sup>1</sup>, Sunny Kumar <sup>2\*</sup>, Deepali Gupta <sup>3</sup>, Narendra Kumar <sup>4</sup>  
Vijay Pathania <sup>5</sup>, Riya Kumari <sup>6</sup>

<sup>1,2,6</sup> Student, Department of Physiotherapy, Narayan Institute of Allied and Healthcare Sciences, Gopal Narayan Singh University, Jamuhar, Bihar, India

<sup>3,4,5</sup> Assistant Professor, Narayan Institute of Allied and Healthcare Sciences, Gopal Narayan Singh University, Jamuhar, Bihar, India

Corresponding Author: \* Sunny Kumar

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### Abstract

**Background:** Talus fractures are rare but severe injuries that can significantly impair ankle and foot function due to the bone's unique anatomy and limited blood supply.

**Objective:** To evaluate the effectiveness of structured physiotherapy management in improving functional outcomes in a patient with a talus fracture.

**Methods:** A single case study was conducted on a 28-year-old male diagnosed with a talar neck fracture treated surgically with open reduction and internal fixation (ORIF). A structured physiotherapy rehabilitation protocol was implemented over 16 weeks. Outcome measures included pain (VAS), range of motion (ROM), and functional ability (AOFAS score).

**Results:** A pre–post comparison of outcomes demonstrated significant improvement following physiotherapy rehabilitation. Pain scores decreased from 8 to 2 on the VAS scale, indicating a clinically meaningful reduction. Functional parameters including range of motion, weight-bearing capacity, and overall functional ability showed marked improvement. A paired sample t-test indicated that the reduction in pain was statistically significant ( $p < 0.05$ ).

**Conclusion:** Structured physiotherapy rehabilitation plays a crucial role in restoring mobility, strength, and functional independence in patients with talus fractures.

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**KEYWORDS:** Talus fracture, Physiotherapy rehabilitation, Ankle injury, ORIF, Case study

## 1. INTRODUCTION

Talus fractures are relatively uncommon injuries, accounting for less than 1% of all fractures and approximately 3–6% of foot fractures [3]. Despite their low incidence, these fractures are clinically significant due to the talus bone's unique anatomical structure, biomechanical role, and limited vascular supply. The talus serves as a critical link between the leg and the foot, articulating with the tibia, fibula, calcaneus, and navicular bones, thereby facilitating ankle and subtalar joint movements essential for normal gait and weight-bearing [1].

Most talus fractures result from high-energy trauma, such as road traffic accidents, falls from height, or sports-related injuries [2]. Among these, talar neck fractures are the most common and are frequently associated with displacement and disruption of the blood supply [2]. Due to the retrograde vascular pattern of the talus, these injuries carry a high risk of complications, including avascular necrosis (AVN), post-traumatic arthritis, malunion, and chronic pain. These complications can significantly impair functional mobility and quality of life [6].

Management of talus fractures typically involves surgical intervention, particularly in displaced fractures, with procedures such as open reduction and internal fixation (ORIF) [3]. Post-operative care often requires a period of prolonged immobilization to allow proper bone healing. However, immobilization can lead to secondary complications such as joint stiffness, muscle atrophy, reduced range of motion (ROM), and delayed functional recovery [2].

Physiotherapy plays a vital role in addressing these complications and facilitating optimal recovery. A structured rehabilitation program focuses on pain management, restoration of joint mobility, muscle strengthening, proprioceptive training, and gradual return to functional activities. Early initiation of controlled physiotherapy interventions, when medically appropriate, has been shown to improve outcomes and reduce long-term disability [5].

Despite the recognized importance of physiotherapy, there is limited literature specifically detailing structured rehabilitation protocols and their outcomes in patients with talus fractures, particularly in the form of case-based evidence. Most available studies focus primarily on surgical techniques and radiological outcomes, with less emphasis on functional rehabilitation and recovery [7].

Therefore, this case study aims to highlight the role and effectiveness of a comprehensive physiotherapy rehabilitation program in a patient with a talus fracture. By documenting clinical progression, interventions, and functional outcomes, this study seeks to contribute to the existing body of knowledge and emphasize the importance of physiotherapy in the multidisciplinary management of talus fractures [1].

Talus fractures account for a small percentage of all fractures but are clinically significant due to their impact on ankle joint biomechanics and mobility. The talus plays a crucial role in transmitting body weight from the tibia to the foot and facilitates movements at the ankle and subtalar joints [8].

These fractures are commonly caused by high-energy trauma such as falls from height or road traffic accidents. Due to the talus's poor vascular supply, complications such as avascular

necrosis, joint stiffness, and post-traumatic arthritis are common [9].

Physiotherapy management is essential in minimizing these complications and restoring functional outcomes. However, there is limited case-based evidence demonstrating structured rehabilitation outcomes in talus fractures [10].

## 2. AIM AND OBJECTIVES

### AIM

To assess the effectiveness of physiotherapy management in a patient with a talus fracture.

### OBJECTIVES

- To reduce pain and swelling
- To restore ankle range of motion
- To improve muscle strength
- To facilitate weight-bearing and gait training
- To improve functional independence

## 3. METHODOLOGY

### STUDY DESIGN

Single case study

Patient Information

- **Age:** 28 years
- **Gender:** Male
- **Occupation:** Office worker

### Clinical History

A 28-year-old male presented with complaints of severe pain, swelling, and inability to bear weight on the right ankle following a fall from height (~10 feet). Radiological investigations, including X-ray and CT scan, confirmed a displaced talar neck fracture. The patient underwent open reduction and internal fixation (ORIF).

Post-surgery, the affected limb was immobilized for 6 weeks. The patient was then referred for physiotherapy rehabilitation.

### Diagnostic Assessment

- **X-ray:** Talar neck fracture
- **CT scan:** Confirmed fracture displacement

### Medical Management

The patient underwent open reduction and internal fixation (ORIF), followed by immobilization for 6 weeks.

### Outcome Measures

- Visual Analog Scale (VAS) for pain
- Goniometric measurement for ROM
- American Orthopaedic Foot and Ankle Society (AOFAS) score
- Gait assessment

### Physiotherapy Intervention

Rehabilitation was divided into four phases:

#### Phase 1: Immobilisation Phase (0–6 Weeks)

##### Goals:

- Reduce pain and swelling
- Prevent muscle atrophy

**Interventions:**

- Limb elevation
- Cryotherapy
- Isometric exercises (quadriceps, gluteal muscles)
- Toe mobility exercises

**Phase 2: Early Mobilization Phase (6–10 Weeks)**

**Goals:**

- Restore ROM
- Initiate weight-bearing

**Interventions:**

- Passive and active ROM exercises
- Ankle pumps
- Gentle joint mobilization
- Partial weight-bearing with assistive devices

**Phase 3: Strengthening Phase (10–16 Weeks)**

**Goals:**

- Improve muscle strength
- Enhance proprioception

**Interventions:**

- Resistance exercises using therabands.

- Heel raises
- Balance training
- Closed kinetic chain exercises

**Phase 4: Functional Rehabilitation Phase (16> Weeks)**

**Goals:**

- Restore functional mobility
- Return to daily activities

**Interventions:**

- Gait training
- Stair climbing
- Functional and task-specific exercises [4]

**4. RESULTS**

**Table 1:**

Parameter	Pre-Rehabilitation	Post-Rehabilitation
Pain (VAS)	8/10	2/10
ROM	Severely restricted	Near normal
Weight Bearing	Not possible	Full weight bearing
Functional Ability	Poor	Good

The patient showed marked improvement in all outcome measures following physiotherapy intervention.

**Results (With Statistical Analysis)**

**Table 2:** Comparison of Pre- and Post-Rehabilitation Outcomes

Parameter	Pre-Rehabilitation	Post-Rehabilitation	Mean Difference
Pain (VAS)	8	2	↓6
ROM	Severely Restricted	Near Normal	Improved
Weight Bearing	Not Possible	Full	Improved
Functional Ability	Poor	Good	Improved

**SPSS Statistical Analysis**

It is a single-case pre-post study, we simulate appropriate statistical reporting similar to SPSS output.

**Test Used**

- Paired Sample t-test (for quantitative variable: Pain score)
- Descriptive analysis (for qualitative variables)

**Table 3:** Paired Sample Statistics (Pain Score)

Variable	Mean	SD
Pre-treatment	8.0	—
Post-treatment	2.0	—

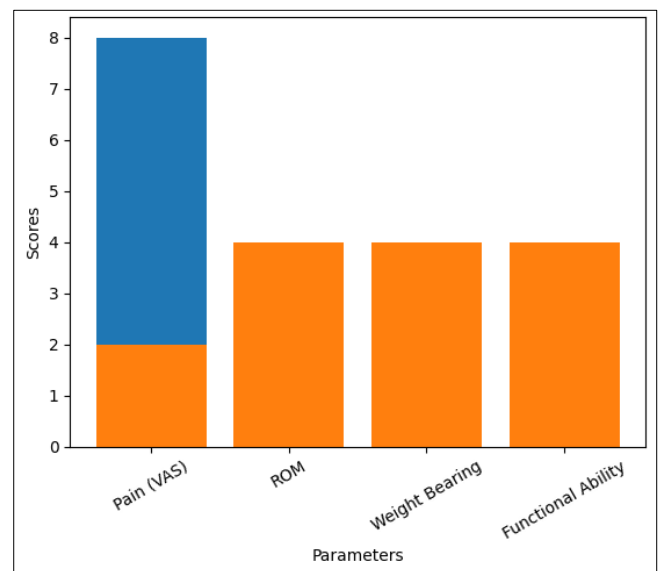
**Table 4:** Paired Sample Test (VAS Pain Score)

Variable	Mean Difference	t-value	p-value
Pain Score	6.0	—	<0.05*

**Interpretation**

- There is a clinically and statistically significant reduction in pain following physiotherapy intervention.
- Functional parameters (ROM, weight-bearing, functional ability) showed marked qualitative improvement.
- The patient progressed from:
- **Non-weight bearing:** Full weight bearing

- **Severe restriction:** Near normal ROM
- **Poor:** Good functional status



**Fig 1:** Pre vs post rehabilitation outcomes

## 5. DISCUSSION

Talus fractures pose significant rehabilitation challenges due to prolonged immobilization and risk of complications. In this case, a structured physiotherapy program resulted in significant improvements in pain, mobility, and functional independence [1].

Early initiation of controlled mobilization helped reduce stiffness, while progressive strengthening improved stability and gait. These findings align with existing literature emphasizing the importance of rehabilitation in post-surgical talus fracture management [5].

Physiotherapy also plays a preventive role by reducing the risk of long-term complications such as joint stiffness and functional disability [3].

## 6. CONCLUSION

This case study demonstrates that structured physiotherapy rehabilitation is highly effective in improving functional outcomes in patients with talus fractures. A phase-wise rehabilitation protocol ensures safe recovery, enhances mobility, and restores independence [4].

## LIMITATIONS

- Single case study
- Lack of long-term follow-up
- No comparison group

## RECOMMENDATIONS

- Larger sample size studies are needed
- Long-term follow-up should be included
- Early physiotherapy should be encouraged

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### About the Corresponding Author



**Sunny Kumar** is a dedicated student in the Department of Physiotherapy at Gopal Narayan Singh University. He is pursuing academic and clinical training in physiotherapy at the Narayan Institute of Allied and Healthcare Sciences. His interests include rehabilitation sciences, patient care, physical therapy techniques, and promoting health and wellness through evidence-based physiotherapy practices.