

Optimizing Orthopedic Outcomes in Complex Bilateral Talus Fracture-dislocations with Medial Malleolus Injuries: A Comparative Analysis of Surgical Approaches and Long-term Results

Kushal Gohil¹, Sangeet Gawhale¹, Niranjn Sunil Ghag¹, Karthik Subhas Chavan¹,
Abhay Sudam Surjuse¹

Learning Point of the Article:

In this rare scenario of bilateral talus fracture, two distinct operational procedures were employed: Open reduction and internal fixation with a cannulated cancellous (CC) screw, and percutaneous fixation with a CC screw after closed reduction. Remarkably, both approaches had comparable outcomes.

Abstract

Introduction: Bilateral talar fracture- dislocations with concomitant medial malleolus fractures are rare and present complex challenges.

Case Report: We present a case study of a 30-year-old male painter who sustained these injuries following a significant fall. The surgical intervention included open reduction and internal fixation with a cannulated cancellous (CC) screw on one side and percutaneous fixation after closed reduction on the other.

Conclusion: The patient's three-year follow-up revealed excellent ankle function and minimal avascular necrosis changes, demonstrating the importance of well-planned delayed therapy over hasty acute procedures. Remarkably, both approaches yielded comparable and favorable outcomes, emphasizing the importance of surgical planning, soft soft-tissue management, and the choice of surgical approach in optimizing outcomes.

Keywords: Bilateral talus fracture-dislocation, comparative analysis, open reduction, and internal fixation (orif) versus percutaneous fixation.

Introduction

Fractures of the talus result from high-energy trauma, trauma often associated with incidents such as automobile accidents and falls from significant heights [1]. The etiology of the injury involves the application of compressive stresses on the talus, which are transferred from the tibia due to the weight force exerted on it, as well as from the ground. Although talus fractures are the second-most prevalent fractures affecting the tarsal bones, the incidence of bilateral talus fracture-dislocation is rare [2]. It accounts for a mere 0.06% of dislocations and 2% of talus injuries [1]. Hawkins described fractures occurring in the

neck of the talus with their associated joint dislocations [3]. These complex injuries pose unique challenges due to the risk of complications, including avascular necrosis and post-traumatic arthritis [2,4]. Despite the use of suitable interventions and anatomical fixation, these injuries have a poor prognosis [2].

Management demands timely intervention, meticulous surgical planning, and a choice between surgical approaches. This case study explores the comparative outcomes of two surgical techniques in optimizing orthopedic results.

Author's Photo Gallery



Dr. Kushal Gohil



Dr. Sangeet Gawhale



Dr. Niranjn Sunil Ghag



Dr. Karthik Subhas Chavan



Dr. Abhay Sudam Surjuse

Access this article online

Website:
www.jocr.co.in

DOI:
<https://doi.org/10.13107/jocr.2024.v14.i01.4184>

¹Department of Orthopedics, Grant Government Medical College and Sir JJ Group of Hospitals, Mumbai, Maharashtra, India.

Address of Correspondence:

Dr. Niranjn Sunil Ghag,
Department of Orthopedics, Grant Government Medical College and Sir JJ Group of Hospitals, Mumbai, Maharashtra, India.
E-mail: niranjnaghag95@gmail.com

Submitted: 05/10/2023; Review: 02/11/2023; Accepted: December 2023; Published: January 2024

DOI: <https://doi.org/10.13107/jocr.2024.v14.i01.4184>

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License <https://creativecommons.org/licenses/by-nc-sa/4.0/>, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms



Figure 1: Pre-operative ankle X-ray (a: Anteroposteriorap, b: LAT, c: Mortise view) suggestive of right medial malleolar fracture with type II Hawkins talus fracture with left Hawkins type I fracture.

Case Report

In this case study, a 30-year-old gentleman had an injury to both ankles as a result of a fall from a 5 five-storey height while engaged in his occupational duties as a painter. The individual fell on the floor with both feet in a dorsiflexed position — the potential mechanism of injury resulting from dorsiflexion, and supination. Upon admission, the patient remained awake and had stable hemodynamics, four 4 hours after the occurrence of the traumatic event, the Glasgow cComa sScale scoring was 15. The patient had pronounced bilateral ankle edema, without any blisters. The extremities were warm, and there was no indication of any neurovascular impairment. Ankle Radiographs revealed a closed talar neck fracture of the left ankle consistent with Hawkin type I classification. On the right side, there is a closed talus talus fracture of the Hawkin type II, accompanied by a fracture of the medial malleolus (Fig. 1).

The patient received pre-operative management consisting of strict limb elevation using a below-knee splint, application of cold fomentation, and initiation of trypsin therapy from admission until the presence of skin wrinkling. The patient had trauma to the operation operation timing of of eight8 days. For

the right side, he underwent a surgical procedure including open reduction and internal fixation, using a cannulated cancellous (CC) screw for the talus and tension band wire (TBW) for the medial. Percutaneous CC screw was used after closed reduction on the left side. The surgical procedure was conducted with combined spinal-epidural anesthesia while employing a tourniquet coverage. The surgical procedure included performing bilateral fixation in a single setting, with an operating duration of 150 minutes.

In the case of a right talus fracture, a combined medial and anterolateral approach was employed. A 7–8 cm incision was made over the medial malleolus to access the fracture site. Following the reduction of the fracture, a 40 mm x 4 mm CC screw was inserted using a guide wire. In Additionally, an incision was made on the anterolateral aspect of the ankle joint, through which another guide wire was inserted and a 40 mm x 4 mm CC screw was inserted. During the surgery, a bone defect was identified and subsequently corrected using allograft material. The medial malleolus was successfully reduced under direct visualization, followed by the insertion of a Kirschner wire (K-wire) and tension band wiring (TBW) to complete the procedure.



Figure 2: Immediate post-operative X-rays (a & b: Right side; c & d: Left side) both showing well-reduced and aligned fracture with the implant in situ.



Figure 3: 3 years post-operative follow-up radiographs (a: Anteroposterior ap view; b: Lat view) showing united fracture without any signs of joint arthritis or avascular necrosis.

On the other side, percutaneous CC screw fixation followed closed reduction. A stab incision was made at the posterolateral aspect of the ankle and two guide wires were inserted diagonally in an anteromedial direction to intersect the fracture site, with the use of fluoroscopy guidance. Two screws measuring 45 mm \times 4 mm were utilized for fixation. The confirmation of reduction was done by the use of fluoroscopy. Associated metatarsal fractures were managed conservatively. The estimated blood loss during the procedure was 200 mL. Wound closure was achieved with Albert Lembert sutures.

Antibiotics were continued up to a 48-hour post-operative period. Fig. 2 shows the immediate post-operative radiographs of both sides showing adequate fracture reduction with satisfactory position of implants. The patient was discharged after the check dress of the wound was done on the third 3rd post-operative day with below knee slab for one 1 week. He was started with standard ankle rehabilitation protocol, with a range of motion exercises. The patient was fully non-weight bearing for three 3 months, and protected weight bearing was started from three 3 months onwards with the help of a walker and toe touch. Postoperatively, the patient started full weight bearing without support from the 5th month. The patient was followed up regularly with no complications of the wound (wound

dehiscence, infection, etc.). A three3- year post-operative X-ray showed union at both talus and medial malleolus with very minimal avascular necrosis changes and no subtalar or tibiotalar joint arthritis (Fig. 3). Three-year follow-up showed both ankle range of motion with 30° deg plantar flexion, and 15° degrees dorsiflexion with mild intermittent pain and stiffness (Fig. 4). The patient's quality of life was good with no significant disability with foot and ankle disability index (FADI) Activities Score: 99 / 104 (95%).

Discussion

Bilateral talar fracture-dislocations with medial malleolus fractures are uncommon in the medical literature. The low number of published cases exemplifies the complex nature of this injury pattern, also emphasizing its rarity. As demonstrated in the provided example, the mechanism of damage frequently involves a fall from a substantial height, resulting in high-energy trauma [1, 5].

A precise surgical technique is required to treat such a complicated injury. To provide stability and restore anatomical alignment, open reduction and internal fixation with CC screws for the right Talus talus fracture and K wires with TBW tension band wiring for the medial malleolus were used in our case [6].



Figure 4: 3 years post-operative follow-up clinical photographs showing ankle joint function.

| Authors | Patient | Clinical condition | Treatment | Post-operative treatment | Patient condition at the last follow-up |
|--|-------------------------------------|---|---|---|---|
| G Noia, et al 1 | Age: 29 year. | Right: Open Gustilo-Anderson type two, and Hawkin type III fracture Left: Open Gustilo-Anderson type IIIB, and Hawkin type IV | both side open reduction and fixation utilizing tibial medial malleolus osteotomy for exposure followed by a 4.5mm CC screw for talus fracture and two screws for osteotomy. An external fixator was added to augment this internal fixation. | Following one year of trauma, the patient achieved ambulation without the need for assistive devices. | Radiograph shows arthritis of talonavicular and subtalar joint with sclerosis of talus. |
| | Mode of injury: Accidental trauma | | | | |
| Taraz-Jamshidi MH, et al (2013) ² | Age: 29 year. | Left ankle: Open Gustilo-Anderson type two Hawkin type 4 | Right ankle: ORIF with medial malleolar osteotomy and fixation with CC screws; Left ankle: ORIF with both anteromedial and anterolateral approach and fixation with CC screws | 2-year follow-up painful walking | Right-sided AVN and collapse of talus and left side no AVN at two-year follow-up |
| | Mode of injury: Road traffic trauma | Right: Gustilo-Anderson type two; Hawkin type 4 | | | |
| Balaji GG, et al (2014) ³ | Age:45 year. | Right: Gustilo-Anderson type IIIA with Hawkin type IV. Left: closed, Hawkin's type III fracture | Right ankle: External fixator. Left ankle: ORIF with 2 cannulated cancellous screws after medial malleolar osteotomy. | weight-bearing without support after 7 months. | Right: AVN with complete collapse Left: union of fracture with signs of AVN |
| | Mode of injury: Accidental trauma | | | | |
| Sayegh FE, et al (2009) ⁷ | Age: 29 years. | Right: closed, Hawkin type III; Left: open Gustilo-Anderson Type II, Hawkin type III | Compound wound management was performed on the left side, followed by open reduction and fixation with K-wires for bilateral fracture management. | Return to work at 9 months postoperatively | both ankle showed signs of arthritis, but no sign of AVN at post-op two and half year follow-up. |
| | Mode of injury: Road traffic trauma | | | | |
| Our study | Age:30 year. | Left: Closed, Hawkin type I fracture | Right: ORIF with CC screw | Weight-bearing without support after 5 th month. | Right and Left: union of fracture with no signs of arthritis with early changes of AVN at post-op 3-year follow-up. |
| | Mode of injury: Fall from height | Right: Closed, Hawkin type II | Left: Percutaneous Fixation with CC screw | | |

Table 1: Review of literature and comparison with the present case.

The Left Talus fracture was managed by percutaneous CC screw fixation as the ankle mortise was not disturbed. This case study specifically compares the results of open reduction with internal fixation and percutaneous fixation after closed reduction. The need for meticulous soft soft-tissue management cannot be emphasized, since maintaining the integrity of surrounding soft tissues is critical in limiting problems, as well-documented [2].

Talar fracture consequences include avascular necrosis and post-traumatic arthritis. Despite the complexities of this injury, the careful surgical intervention undertaken in this patient is intended to reduce the likelihood of complications [7]. We discover a positive result when we compare the patient's post-operative results to the current literature. The patient had a good range of motion and reported no pain, which is consistent with other cases in the literature [1, 2, 4, 7] (Table 1).

Talus fractures have a significant long-term effect on ankle function as well as physical activity. The success of surgical therapy is determined by the presence of post-operative osteoarthritis/AVN, the kind of fracture, and the degree of fracture reduction. Because only the latter is adjustable, efforts should be taken to enhance the result by restoring articular congruence [8]. Even in undisplaced fractures (Hawkins type I), talar fracture osteosynthesis is needed [9]. A well-planned delayed therapy with open reduction and stable osteosynthesis offers better long-term results than a hasty acute procedure performed by an inexperienced or insufficiently trained operating team [10].

In summary, this unique case underscores the need to use meticulous and carefully planned surgical techniques, as well as provide comprehensive post-operative care and ongoing follow-up, to achieve optimal outcomes for individuals with bilateral talar fracture-dislocations with accompanying medial malleolus fractures. While both approaches yielded comparable and promising outcomes in this case, the choice between them should consider factors such as surgical expertise, patient-specific factors, and the specific fracture type. Precise anatomical reduction and stable osteosynthesis are essential in mitigating complications, particularly avascular necrosis and post-traumatic arthritis.

Conclusion

This case highlights the need for meticulous surgical planning, careful soft-tissue management, and the choice of surgical approach in achieving optimal outcomes in the management of bilateral talus fracture-dislocations. The comparable outcomes of two surgical techniques (open reduction internal fixation vs. closed reduction percutaneous fixation) reaffirm the significance of surgical expertise and thoughtful planning in addressing these rare and challenging orthopedic cases.

Clinical Message

In rare bilateral talar fracture dislocations, carefully planned delayed therapy with open reduction and stable osteosynthesis may offer superior outcomes compared to hasty acute procedures. Surgical teams should prioritize surgical expertise and comprehensive planning in managing such complex cases.



Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

- Noia G, Silluzio N, Sircana G, Maccauro G, Ziranu A. Aviator's fracture - bilateral fracture-dislocation of talus in a 29-year-old patient: A case report. *Malays Orthop J* 2019;13:80-4.
- Taraz-Jamshidi MH, Shapari O, Shiravani R, Moalemi S, Birjandinejad A. Simultaneous bilateral fracture dislocation of the talus: A case report. *Trauma Mon* 2013;18:90-4.
- Alton T, Patton DJ, Gee AO. Classifications in brief: The Hawkins classification for talus fractures. *Clin Orthop Relat Res* 2015;473:3046-9.
- Balaji GG, Arockiaraj J. Bilateral talus fracture-dislocation: Is avascular necrosis inevitable? *BMJ Case Rep* 2014;2014:bcr2014205367.
- Vosoughi AR, Fereidooni R, Shirzadi S, Zomorodian SA, Hoveidaei AH. Different patterns and characteristics of Talar injuries at two main orthopedic trauma centers in Shiraz, south of Iran. *BMC Musculoskelet Disord* 2021;22:609.
- Aygün Ü, Çalçık Y, Alkan B, Işçık C. Simultaneous bilateral fracture unilateral dislocation of the talus. *J Am Podiatr Med Assoc* 2016;106:370-4.
- Sayegh FE, Nikolaidis AP, Anagnostidis KS, Kapetanos GA. Simultaneous bilateral fracture-dislocation of the talus: A case report. *Foot (Edinb)* 2009;19:125-9.
- Vints W, Matricali G, Geusens E, Nijs S, Hoekstra H. Long-term outcome after operative management of talus fractures. *Foot Ankle Int* 2018;39:1432-43.
- Kopp L, Obruba P, Riegl J, Meluzinová P, Edelmann K. Chirurgická léčba zlomenin talu--střednědobé funkční a rentgenové výsledky [Surgical management of talus fractures: Mid-term functional and radiographic outcomes]. *Acta Chir Orthop Traumatol Cech* 2013;80:165-70.
- Zeman J, Matějka J, Pavelka T. Chirurgické léčení zlomenin krčku a těla talu [Surgical treatment for fractures of the neck and body of the talus]. *Acta Chir Orthop Traumatol Cech* 2012;79:119-23.

Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Gohil K, Gawhale S, Ghag NS, Chavan KS, Surjuse AS. Optimizing Orthopedic Outcomes in Complex Bilateral Talus Fracture-dislocations with Medial Malleolus Injuries: A Comparative Analysis of Surgical Approaches and Long-term Results. *Journal of Orthopaedic Case Reports* 2024 January;14(1): 155-159.