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## Case Report

## Management of 3 month old neglected talus neck fracture: A case report and review of literature

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## ARTICLE INFO

## Keywords:

Talar neck fracture  
Internal fixation  
Bone graft  
Non-union talus fracture

## ABSTRACT

**Background:** Talus fractures are extremely uncommon, accounting for approximately 1 % of foot and ankle fractures. The talar neck fracture has a high probability of damaging the anastomotic ring, which would interrupt blood circulation to talar body and cause serious issues with fracture healing and integrity. Due to insufficient radiological and clinical examination, approximately 39 % of midfoot and ankle fractures could be undiagnosed after initial evaluation. Talus fractures account for about half of these missed fractures. Anatomic reduction and advanced fixation methods can be performed in the management of neglected talus neck fracture for the purpose of improving functional outcome.

**Case report:** A 30-year-old male patient presented with swelling and pain on the right foot while walking for three months. He had previously fallen about two meters from stairs three months back. Instead of going to the hospital, he received conventional massage therapy. Three months later, he came to us complaining of chronic, dull aching, swelling, and continuous pain when walking and standing. After radiology evaluation, the patient was diagnosed with neglected nonunion type III Hawkins fracture of the neck talus and managed by double incision approach, Iliac crest cancellous bone graft, open reduction and internal fixation (ORIF) with cannulated screw. He was able to return to full weight bearing and his previous activity without experiencing any pain after 14 months.

**Conclusion:** Open reduction and internal fixation (ORIF) with Iliac crest cancellous bone graft is a reliable methods for neglected non-union type III Hawkins fracture of neck talus with great functional outcomes after 14 months of follow up.

## Introduction

Talus fractures are extremely uncommon, accounting for approximately 1 % of foot and ankle fractures. The majority of talus fractures are found in the talus neck which accounts for 50 % of overall talus fractures. Even though it is rare, talus fractures have gained importance because of its typical vascularity [1].

Talar neck fracture has a high chance of damaging anastomotic ring, which would interrupt the the blood circulation to the talar body and cause serious issues with fracture healing and integrity. The main prevalent and serious complication of talar neck fractures

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were osteonecrosis and subtalar arthritis [2]. Elgafy et al. reported an association of 53.3 % subtalar arthritis and 25 % tibiotalar arthritis with talus fractures [3]. Failure to prevent these complications will lead to chronic pain, disability, and multiple surgeries [4].

Hence early diagnosis by using necessary modalities including ultrasonography (USG), computer tomography (CT), and magnetic resonance imaging (MRI) ensures a decrease in long term complications and morbidity of those patients. Anatomical reduction with open reduction and internal fixation was almost exclusively treatment for talar neck fracture [3–5]. We present a case in which talus fracture was not diagnosed in the beginning and was managed to go to traditional massage, which later presented as a non-union neck of the talus.

### Case report

A 30-year-old male patient presented with swelling and pain on the right foot while walking and standing for three months. He had previously fallen about two meters from the stairs three months back. Instead of going to the hospital, he went for conventional massage therapy. After several treatments, he did not feel any better and then went to hospital. Three months later, he came to us complaining of chronic, dull aching, swelling, and continuous pain when walking and standing.

### Clinical findings

The inspection of the right foot showed the presence of deformity with swelling. The active range of motion (ROM) was impaired. Dorsiflexion and plantar flexion were not full and supination and pronation were terminally painful.

### Diagnostic assessment

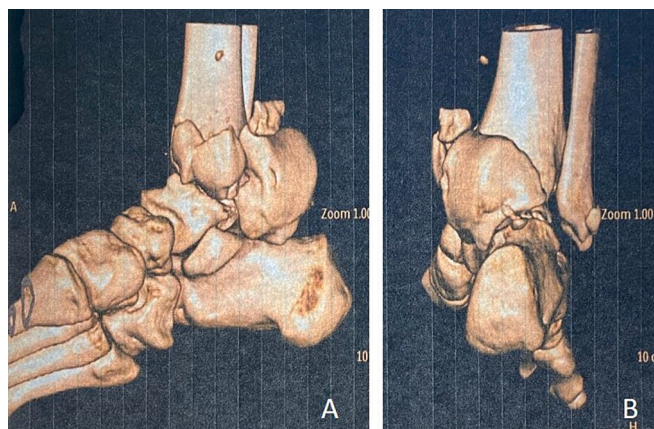
We performed a CT scan of the right ankle which showed a fracture line gap in the neck of the talus (Hawkins fracture type III) and a fracture of the medial malleolus with no sign of soft callus (Fig. 1A, B).

### Therapeutic intervention

We performed an open reduction and internal fixation (ORIF) with bone graft to treat nonunion talar neck fracture. Under anesthesia, the patient was positioned supination and tourniquet applied over mid-thigh. Tibialis anterior tendon, distal tibia, talus, and navicular palpated. Incision is made anterior and medial of fracture site. Soft tissues and tendons carefully dissected. Fracture fragments held using reduction clamps and reduced. After reducing the talus, we decided to fix medial malleolus first to help achieve a good stability of the reducing talus. Medial malleolus fixed using 2 cancellous cannulated screws and one k wire. The distal malleoli fragment is retracted together with its deltoid ligament attachment to achieve adequate visualization of the talus. After fixing the medial malleolus, we fix the talus fracture. Fracture ends identified and margins curetted till fresh bleed came. Ipsilateral non-vascular iliac crest cancellous graft is employed in fracture gap. Fracture fixed using 2 cannulated cancellous screws. Wound closure was done layer by layer. The ankle of the patient was immobilized with a back slab for 2 months in plantigrade position postoperatively, active and passive ROM exercise up to 6 months, and full weight bearing mobilization as tolerated up to 1 year.

### Follow-up and outcomes

Serial x rays were taken every 3 months the postoperatively (Fig. 2A, B). At the end of 14 months, the patient had complete union



**Fig. 1.** Preoperative CT-Scan of the right ankle: a fracture line gap in the neck of talus (Hawkins fracture type III) and a fracture of the medial malleolus with no sign of soft callus (A) Lateral view (B) posterior view.

without any pain (Fig. 3A, B), no restriction of movements (Fig. 4A, B), and improved functional outcome.

## Discussion

Talar neck fractures are treated urgently to decrease the risk of osteonecrosis since an immediate reduction can help to maintain any prevailing blood supply to the posterior talus [6]. Heather et al. suggest that if the reduction of the talar neck has been achieved, postponed fixation does not affect the incidence of osteonecrosis. But even with timely management, talar neck fracture is associated with a high incidence of long-term complications that lead to chronic pain and stiffness. The extent of fracture displacement and soft tissue injury was shown to be direct causative factors of osteonecrosis in the literature [7]. Our patient had missed initial treatment due to because he chose a conventional massage therapy and also had a fully displaced fracture and indicating only minimal soft tissue disruption. Even with the improvement in surgical techniques and advanced fixation methods, early diagnosis and intervention are critical in preventing future complications.

Management of talar neck fracture varies from conservative to operative treatment and depends on the soft tissue coverage, the extent of fracture and other associated injury [8]. The diagnosis of our patient was Hawkins type III fractures which involve the subtalar and tibiotalar joints being subluxated or dislocated. Most Type III talar neck fractures cannot be reduced in a closed manner [8]. Therefore, an open reduction was performed with internal fixation. The dual incision approach combined with screw fixation has emerged as preferred method of achieving adequate visualization. The current recommended standard of treatment recommends using anteromedial (AM) and anterolateral (AL) techniques. The reduction is performed using both incisions, with careful attention paid to the talar neck's optimal length, alignment, and rotation throughout the process [9]. The use of cancellous bone graft has been shown to improve the healing process of fractures and arthrodesis, as well as to fill bone defects. After that, the use of screw fixation alone is performed and limited to the treatment of uncomplicated fracture patterns where the anatomic reduction may be achieved and no comminution present [10]. In this case, we used non-vascular iliac crest cancellous graft and is employed in fracture gap, then the fixation of talus was using minimal hardware with 2 malleolar screw. The talus fracture was fixed with 2 screws. First screw is malleolar screw 4.5 mm partially threaded inserted from the medial side to achieve a good compression of the fracture, and then next step fixation from the lateral side using cancellous screw 4.0 mm fully threaded to help optimize the fracture and anti-rotation purpose. We decided to use a smaller screw on the lateral side because there was a very limited space of fixation available in a patient with a small talus bone.

Following surgery, the ankle of patient was immobilized with a splint or cast in plantigrade position. Early range of motion of the ankle and subtalar joint is recommended and trained up to 6 months. Weight bearing can be permored as tolerated up to 1 year. MRI was performed for follow up period to assess the AVN. MRI performed after removal of the screw at 12 months. We decided to remove all the screws and wire because all the materials used are stainless steel screw. Our patient had a complete union confirmed, then was able to returned to full weight bearing and his prior activity without experiencing any pain after 14 months.

## Conclusion

Open reduction and internal fixation (ORIF) with Iliac crest cancellous bone graft is a reliable methods for neglected non-union type III Hawkins fracture of neck talus and results in great functional outcomes after 14 months of follow up.

## CRedit authorship contribution statement

ACL and DK performed manuscript draft writing, conceptualization, and resources. RAS and MAU performed a critical review and

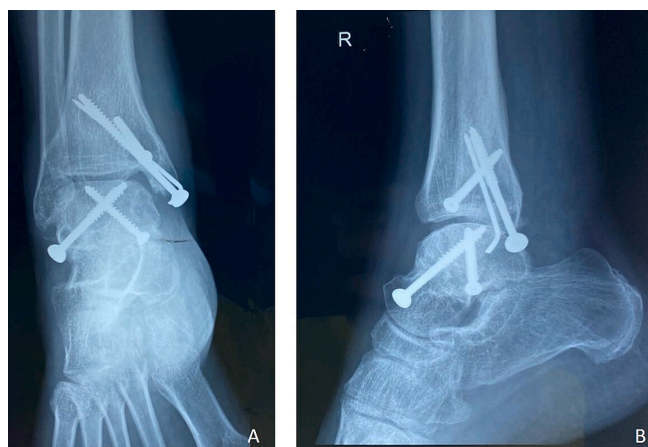


Fig. 2. 3-months postoperative X-ray of right ankle: fixation using cannulated cancellous screws (A) AP view (B) lateral view.



**Fig. 3.** Magnetic resonance imaging of right ankle after removal of all screws in 14 months of the follow-up: complete union of talar neck fracture (A) sagittal view (B) coronal view.



**Fig. 4.** Active range of the motion (ROM) of right ankle after 14 months follow-up (A) complete dorsoflexion (B) complete plantar flexion.

editing of the manuscript. All authors have checked the final version of the manuscript.

#### **Declaration of competing interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### **Acknowledgment**

None.

### Financial support and sponsorship

This case report received no external funding.

### Informed consent

Patient has consented the publication of this case to the journal.

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