

Non-union of the Navicular with Associated Talonavicular and Calcaneocuboid Joint Degenerative Arthritis and Its Management: A Case Report

Neetin P Mahajan¹, Prasanna Kumar GS², Kartik P Pande³, Tushar C Patil⁴

ABSTRACT

Introduction: Tarsal navicular bone fractures are most commonly occurs as a result of either trauma or undue stress. The stress causes higher incidence in younger individuals and athletes. These fractures are at higher risk of going to non-union and osteonecrosis because of the bone's tenuous blood supply as well as the joint complexity.

Case description: A 40-year-old male patient presented with complaints of right foot pain for 2 years with an old history of trauma. Radiological examination revealed non-union of the right navicular with adjacent joint degeneration. We managed with open reduction and internal fixation using a cannulated cancellous screw. At 1-year follow-up, the patient has got a good radiological and functional outcome.

Conclusion: Navicular non-unions are well managed with open reduction and internal fixation using cannulated cancellous screws, which helps in getting compression at the non-union site and provides stability. Early surgical intervention helps to prevent adjacent joint degenerative arthritis. CT scan evaluation is very essential to diagnose the non-union navicular as the X-rays appear normal in most cases.

Keywords: Degenerative arthritis, Navicular, Non-union.

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INTRODUCTION

Tarsal navicular bone fractures are most commonly occurs as a result of either trauma or undue stress. The stress causes higher incidence in younger individuals and athletes. Fractures of the midfoot are uncommon, navicular stress fractures represent one-third of all stress fractures.^{1,2} These fractures are at higher risk of going to non-union and osteonecrosis because of the bone's tenuous blood supply as well as the joint complexity.¹ These fractures most often require surgical fixation and some fractures can also be managed conservatively. The axis of the navicular lies in the dorsoplantar and lateromedial direction. The base and the apex are situated dorsolaterally and plantar medial, respectively.³ Large part of the navicular bone is covered with articular cartilage as it has multiple articulations with the adjacent bones. The medial and lateral tarsal arteries supply the dorsal aspect of the navicular, tibialis posterior artery branch supplies the medial plantar aspect.⁴ We present a case of an adult male patient with right foot navicular non-union and its management.

CASE DESCRIPTION

A 40-year-old male patient, a truck driver by occupation presented with a complaint of pain and swelling of the right foot while walking for 2 years, which was aggravated for 2 months. The patient had a history of fall from height 15 years back which was managed by a quack with plaster for 8 days. The patient was not a known case of diabetes or hypertension. On examination, the patient had tenderness over the medial aspect of the midfoot with no external wound and no neurovascular deficit. The X-ray of the right foot was suggestive of decreased joint space in the talonavicular joint with a mild gap in the navicular which was inconclusive (Fig. 1). CT scan of the right foot revealed old non-union of the navicular with degenerative arthritis of the talonavicular and calcaneocuboid

¹⁻⁴Department of Orthopaedics, Grant Government Medical College, Mumbai, Maharashtra, India

Corresponding Author: Prasanna Kumar GS, Department of Orthopaedics, Grant Government Medical College, Mumbai, Maharashtra, India, e-mail: prasannakumarg5@gmail.com

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joints (Figs 2 and 3). As the patient had chronic foot pain with non-union and failed conservative measures, surgical intervention was planned.

The patient was operated on in a supine position under spinal anesthesia using a tourniquet. The dorsomedial approach was used. The incision was made between the extensor hallucis longus tendon (EHL) and tibialis anterior tendon. The dissection was made deep from the skin to the periosteum without raising flaps. The EHL was retracted laterally and tibialis anterior medially, which exposed the non-union site (Fig. 4). The non-union site was freshened using a curette and fibrous tissue was removed. The graft was placed in the non-union site, which was taken from the calcaneum and fixed with a 4-mm cannulated cancellous screw. The position of the screw was confirmed intraoperatively using fluoroscopy (Fig. 5) and the wound was closed in layers. The immediate postoperative X-ray right foot showed the good position of the screw with no joint penetration (Fig. 6). Postoperatively, the patient was advised nil weight-bearing for 3 weeks and weight-bearing as tolerable using sports shoes after 3 weeks along with foot physiotherapy. The patient was able to weight bear without any pain after 8 weeks postoperatively. At the present 1-year follow-up, the patient is comfortable with no

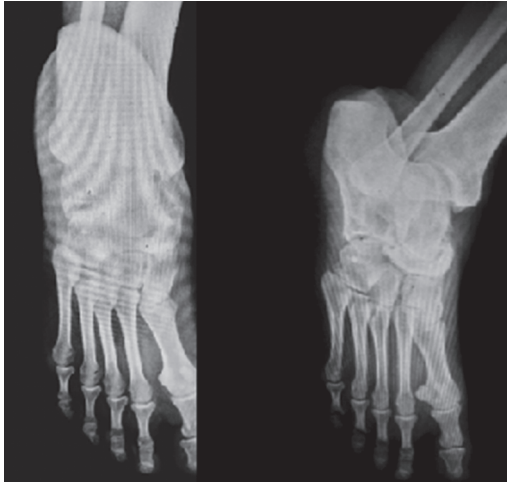


Fig. 1: Preoperative X-ray right foot showing talonavicular and

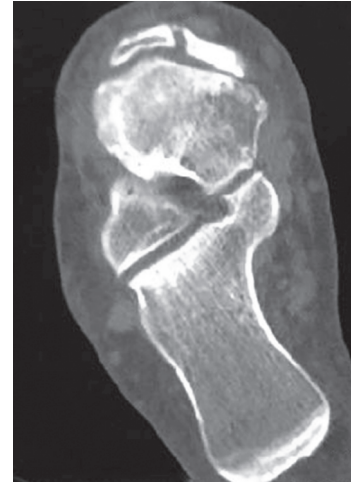


Fig. 3: 2D CT foot showing navicular non-union

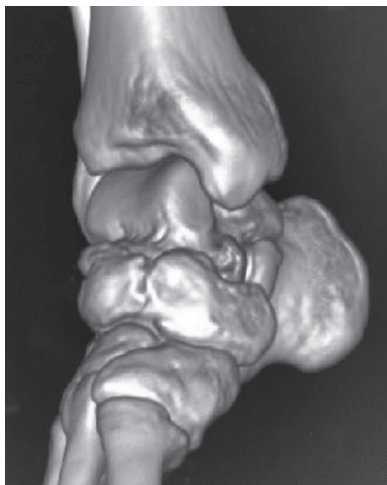


Fig. 2: 3D CT right foot showing navicular non-union

pain and swelling while walking and no other complaints with a good radiological outcome (Fig. 7).

DISCUSSION

The surgical or conservative management of the navicular fractures depends on the individual fracture morphologies, i.e., size, displacement, location, the comminution of the fracture, and condition of the surrounding soft tissue. The general condition of the patient, associated fractures, and patient comorbidities also help in deciding the management options in these fractures.⁵ The conservative management can be considered in cases of avulsion fractures, tuberosity fractures, and undisplaced body fractures. These fractures are conservatively managed using a weight-bearing short leg cast and walking boot.⁶ The displaced navicular fractures are best managed with open reduction and internal fixation using screws or small plates. The main intention of the surgical management of navicular displaced fractures is an anatomical reduction by restoring the length of the medial column which in turn helps in early mobilization with fewer complications.⁶



Figs 4A and B: Picture showing dorsomedial incision marking (A) and non-union site after retraction of EHL and tibialis anterior tendon (B)



Fig. 5: Intraoperative fluoroscopic image showing the position of the



Fig. 7: Follow-up X-ray foot AP view at 1 year



Fig. 6: Immediate postoperative X-ray foot AP and oblique views showing the position of the screw and compression at the non-union site

The complications associated with a navicular fracture are osteonecrosis, malunion, non-union, persistent stiffness, and chronic pain. The non-union of the navicular can also lead to deformity. The primary surgical intervention in displaced fractures helps in preventing the above-mentioned complications. Non-union of the navicular can lead to adjacent joint degeneration as observed in our patient. Careful clinical examination along with proper investigations are very important in preventing missed navicular injuries which later presents as non-unions and adjacent

joint arthritis. The symptomatic non-unions of the navicular should be surgically managed with internal fixation which helps in getting a better outcome.

CONCLUSION

Navicular non-unions are well managed with open reduction and internal fixation using cannulated cancellous screws, which helps in getting compression at the non-union site and provides stability. Early surgical intervention helps to prevent adjacent joint degenerative arthritis. CT scan evaluation is very essential to diagnose the non-union navicular as the X-rays appear normal in most cases.

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