

APOA Foot & Ankle Council Presents..

# Case of the Fortnight

1st March 2022



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Presented by:



**Sora Tonsuthanluck**

Department of Orthopaedics,  
Paolo Phrapradaeng Hospital, Bangkok, Thailand

## Learning Points:

- ▲ Malunited calcaneus fracture can occur after an inappropriate treatment.
- ▲ According to a deformity of calcaneus (loss of height, increase width, subtalar joint incongruity, hindfoot varus), the sequelae of malunited calcaneus fracture are post-traumatic subtalar arthritis, Hindfoot varus, anterior and subfibular impingement.
- ▲ Regarding Zwipp and Rammelt classification of post-traumatic deformities of the calcaneus: subtalar fusion (with or without bone-block), calcaneal osteotomy, ankle reconstructive surgery are treatment of choice depending on calcaneal deformity.

## Title:

# Malunited Calcaneus Fracture

*Upcoming Case of the Fortnight  
on 15th March 2022*

Presented by:

**Dr Wong Chong Hing**

Consultant, Department of  
Orthopaedics and Traumatology  
Princess Margaret Hospital, HKSAR



## Title:

**A case of combined  
fracture talar neck and body**

Want to present a case? Write to...



**Prof. Chayanin Anthonng**  
[chatthara@yahoo.com](mailto:chatthara@yahoo.com)



**Dr Kwai Ming Siu**  
[siukmhk@hotmail.com](mailto:siukmhk@hotmail.com)

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## Malunited Calcaneus Fracture

**Sora Tonsuthanluck**

Department of Orthopaedics, Paolo Phrapradaeng Hospital

Bangkok, Thailand

Email: [drsora.ton@gmail.com](mailto:drsora.ton@gmail.com)

### Case

#### Clinical presentation

A 43-year-old female suffered from right foot pain for 8 months. She had a motorcycle accident 1 year ago. She came to the provincial hospital and was diagnosed with a right calcaneal fracture. She was treated with a short leg cast for 8 weeks. After cast removal, her foot was still swollen at the heel with pain when bearing on an uneven surface.

#### Clinical evaluation

On physical examination, she walked with a limping gait with short stance phase on right foot. Hindfoot varus and decreased arch height were found. Subtalar motion was fixed with tenderness around the joint. An ankle dorsiflexion was limited with pain. Subfibular region was also tendered.

#### Problem list

- ▲ Malunion calcaneus
- ▲ Subtalar arthritis
- ▲ Loss of calcaneal height
- ▲ Increase calcaneal width
- ▲ Hindfoot varus
- ▲ Anterior and subfibular impingement

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## Diagnosis

Malunited Right calcaneal fracture

Zwipp & Rammelt classification of post-traumatic deformities of the calcaneus type III

Type	Characteristics	Treatment
0	Extra-articular or intra-articular malunion without arthrosis	Joint-preserving osteotomy
I	Subtalar joint incongruity with arthrosis	Subtalar in situ fusion
II	Additional hindfoot varus/valgus	Subtalar bone-block fusion (+osteotomy)
III	Additional loss of height	Subtalar bone-block fusion (+osteotomy)
IV	Additional lateral translation of the tuberosity	Oblique calcaneal osteotomy with subtalar fusion
V	Additional talar tilt at the ankle joint	Ankle revision, subtalar bone block fusion and osteotomy

*Modified from Zwipp H, Rammelt S (2003) Posttraumatic deformity correction at the foot [German]. Zentralbl Chir 128:218–226*

## Treatment

Subtalar bone-block fusion with Iliac bone graft was performed. Post-operative care, a patient started partial weight-bearing at 6 weeks after callus formation was seen at the fusion site. Eventually, full weight bearing was allowed in 3 months.

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*Fig 1: Hindfoot alignment:  
Rt Hindfoot varus*



*Fig 2: Rt foot showed a slightly decreased arch with forefoot supination*



*Fig 3: Rt forefoot supination*

## Investigations



*Fig 4: Foot lateral standing: Loss of calcaneal height*



*Fig 5: Foot AP Standing*



*Fig 6: Foot Lateral Standing*

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*Fig 7: Ankle AP Standing*



*Fig 8: Ankle Mortise*



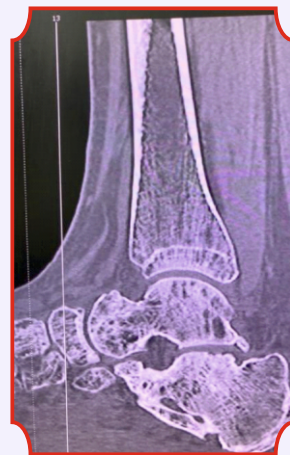
*Fig 9: Hindfoot alignment was shown as varus position*



*a*



*b*



*c*



*d*

*Fig 10: MRI and CT scan ankle revealed no evidence of osteochondral lesion of talus or tibiotalar joint arthritis*

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## Operative Information



*Fig 11: Patient was in lateral decubitus position*



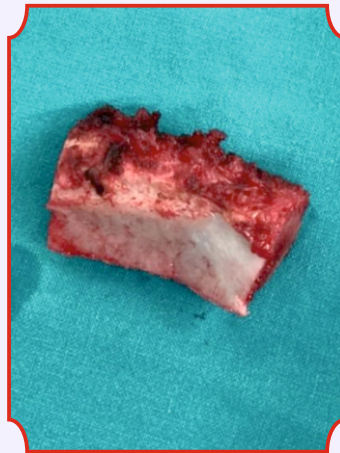
*Fig 12: Lateral extensile approach: lateral wall fragment was marked and removed*



*Fig 13: Lateral wall fragment was removed. Subtalar joint was identified*



*Fig 14: Subtalar joint surface was prepared for the fusion*



*Fig 15: Iliac bone graft was harvested. Size was measured from a plain radiograph*



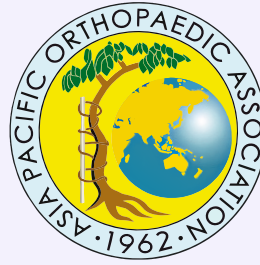
*Fig 16: A graft was placed into the prepared subtalar joint*

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*Fig 17: Subtalar bone-block fusion was fixed with cannulated screws (7.0 mm X 2). Hindfoot alignment was checked intraoperatively under fluoroscopic control*



*Fig 18: skin was closed with Reudi-Allgower technique*

## Post-operative radiographs



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