

# Medical digest

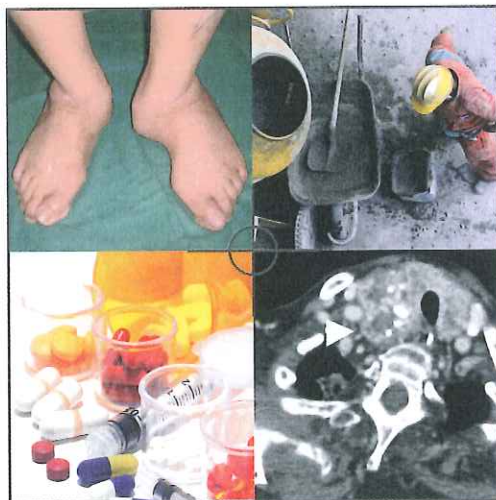
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Tan Tock Seng  
HOSPITAL

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# Surgery for Foot & Ankle Deformities

Deformity correction is a complex yet rewarding surgical challenge. Deformities of the foot and ankle pose an even greater challenge to the orthopaedic surgeon given the wide-ranging causes and the progressive nature of some of them.

An in-depth understanding of the bony, muscular and ligamentous relationships of the foot and ankle is required to tackle these deformities. With better knowledge of the conditions causing the deformities and with the advent of newer implants, we are now able to achieve very satisfactory surgical results.

Patients with foot and ankle deformities may present with pain, difficulty with footwear and walking, ulceration or simply a 'funny-looking foot'. Given the plethora of conditions that can cause deformities of the foot and ankle, we approach the problem by determining the cause of the deformity through a sound history. This is followed by a detailed examination to assess the mobility of the joints, the soft tissue status and the neurovascular status of the foot.

I present a few cases that illustrate the commoner conditions that present with deformity of the foot and ankle.

## CASE 1

This is a 52-year-old bus driver who presented with bilateral feet deformity which has been progressively worsening over the past 3 years (figure 1).



Figure 1. Deformity of the feet of a 52-year-old driver.



Figure 2. Posterior view of the feet, showing hindfoot valgus deformity.



This patient has adult acquired flatfoot deformity (AFFD).<sup>1</sup> Notice that the talus is completely dislocated in the talonavicular joint on the left side (figures 1 and 3). He also has severe hindfoot valgus and subfibular impingement on the lateral aspect of his foot. (figure 2). This is collectively described as pes plano abducto valgus deformity. If left untreated, this patient will develop ankle arthritis and ulcers over the bony prominences of his foot.



Figure 3. Radiographic view of the feet of a 52-year-old driver.



Figure 4. Anterior and medial views of the left foot just after surgery, illustrating the incisions on the medial and lateral aspects.

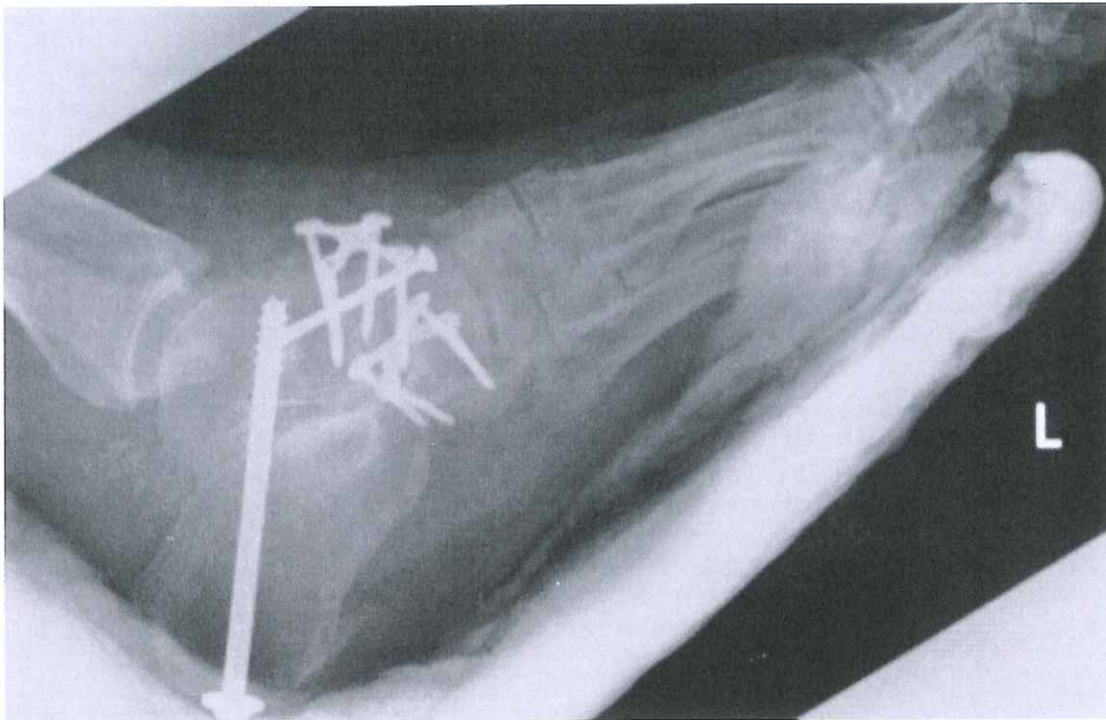


Figure 5. X-ray showing the medial view of the left foot after surgery.

He underwent corrective triple arthrodesis of the left foot (figure 4) producing a plantigrade and stable shoeable foot. Plate and screws were utilized in the surgical reconstruction (figure 5). At the time of writing, one year after surgery, he is able to wear his shoes when he drives his bus. Surgical correction of his right foot will be carried out.

## CASE 2

This is a 26-year-old banker who presented with bilateral forefoot deformity. Her main complaints were metatarsalgia (pain over the ball of the feet) and inability to wear her favorite shoes.

This patient has bilateral bunions. There is prominence of the first metatarsal head over the medial aspect of the foot (figure 6). Notice that the sesamoids are subluxed laterally out of the metatarsal heads (figure 7).



Figure 6. A 26-year-old banker with bilateral forefoot deformity.



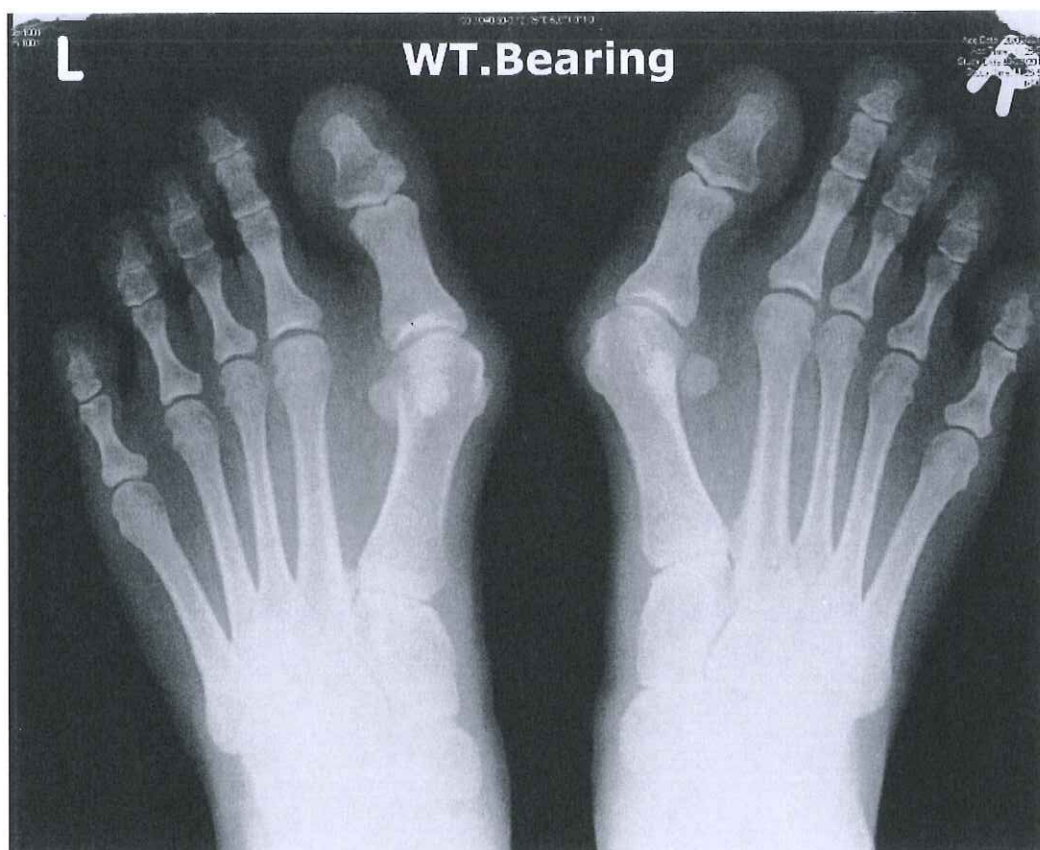


Figure 7. X-ray of the feet of the 26-year-old banker.

On the right foot, the first metatarsal is a lot shorter and pronated, disrupting the normal parabola of the forefoot, which contributed to her transfer metatarsalgia.<sup>2</sup> Clinically, she had callosity over the metatarsal heads of the first and second toes. She was also noted to have calf tightness. Tight gastrocnemius tendon is a very common associated finding in bunions and it contributes to excessive forefoot overload and exacerbates the metatarsalgia.<sup>3</sup>



Figure 8. Surgical correction of forefoot deformities.

She underwent bilateral correction of her deformity with an osteotomy of the first metatarsal and of the proximal phalanx of the right foot, a Weil's decompression osteotomy of the third metatarsal of the right second toe, medial capsulorrhaphy and bilateral endoscopic gastrocnemius release (figure 8) Postoperatively, the big toe is well aligned and the lesser toes are symmetrically placed. The endoscopic gastrocnemius release improves dorsiflexion of the foot and relieves forefoot overload. She is pain-free and is able to wear her favorite shoes.

### CASE 3

This is a 66-year-old lady with rheumatoid arthritis. She is wheelchair bound due to her deformity especially that of the left ankle. On examination there was excessive mobility of the left ankle as well as an ulcer over the lateral malleolus. She had good pedal pulses (figure 9).



Figure 9. Ankle deformity with lateral malleolar ulceration.



Figure 10. X-ray of the left foot showing destruction of the ankle joint, talus and calcaneum.



The radiograph shows complete destruction of the talus and the calcaneum from severe destructive inflammatory arthritis. There is absence of the ankle joint and the foot is subluxed medially away from the tibia (figure 10). In such cases of severe arthropathy, it is important to exclude an infective etiology. A multi-disciplinary approach was adopted and this patient was optimized for surgery in collaboration with the anaesthetist, rheumatologist and the rehabilitation physician.



Figure 11. X-ray showing left hindfoot arthrodesis.

She eventually underwent a hindfoot arthrodesis procedure using an intramedullary device.



Figure 12. Results of left foot surgery.

Figure 12 shows the left ankle of the patient 3 months post-reconstruction of deformity. She has a stable, plantigrade foot and the ulcer over the lateral malleolus has healed. She is able to weight bear and now walks with a walking stick.

**CASE 4**

This is a 70-year-old lady with Charcot's arthropathy of the hindfoot from diabetes mellitus. She has severe rocker-bottom deformity of both her feet and the heel is not in contact with the ground (figure 13). She presented with pain on both soles and ankle and was unable to stand for prolonged periods of time.



Figure 13. Photographs of the posterior and dorsal views of the feet of a 70-year-old lady with diabetes mellitus.

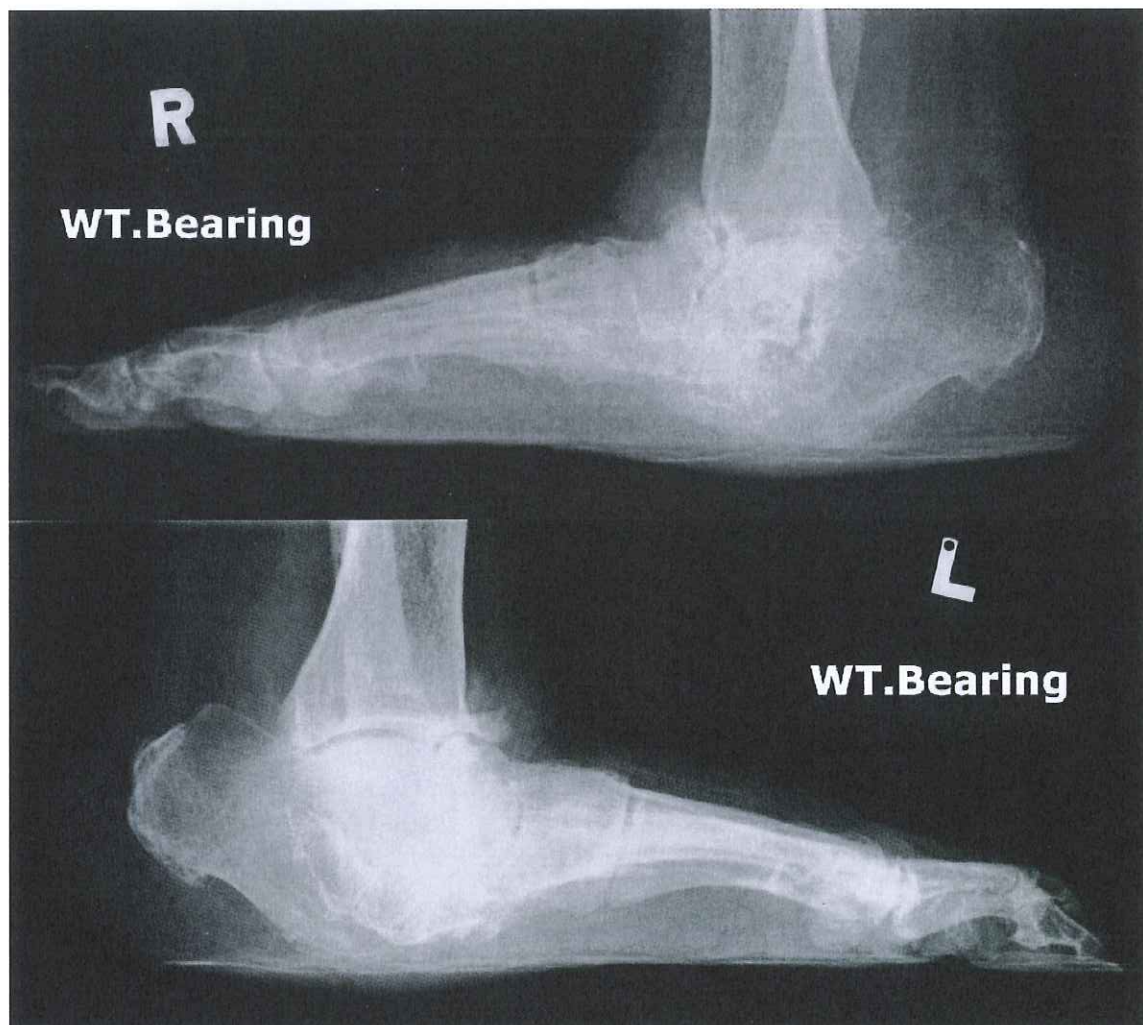


Figure 14. Radiographs of the lateral view of the feet of the 70-year-old lady with diabetes mellitus.

The radiographs show the abnormal position of the calcaneum with a flexion deformity. The anterior process of the calcaneum is in direct contact with the ground and the patient is essentially walking on a bony prominence with limited dorsiflexion ability. The subtalar joint is not visible and patient has loose bodies in the anterior ankle joint (figure 14). The hindfoot and midfoot show architectural collapse and consolidation consistent with Eichenholtz Stage 3 Charcot arthropathy.<sup>4</sup>





Figure 15. X-ray of the right ankle after surgery.

The patient underwent soft-tissue deformity correction with bilateral endoscopic gastrocnemius release, exostectomy (removal of bony prominence) and anterior chilectomy (removal of loose bodies) (figure 15).

Note that the calcaneum is in a more anatomical position and the anterior bony loose bodies have been removed. She did not require any rigid internal fixation as she was a stable Charcot arthropathy in the remodeling stage. She is able to enjoy pain-free ambulation with a pair of special orthotic shoes.

#### CASE 5

This 20-year-old national serviceman presented with symptomatic flatfeet (figure 16). He had bilateral medial foot pain which severely limited his participation in military activities. He was also unable to wear his military boots and experienced pain even when walking in normal sports shoes. Note his excessive heel valgus, worse on the right (figure 16).



Figure 16. Photograph of the dorsal and posterior views of feet of a 20-year-old national serviceman.

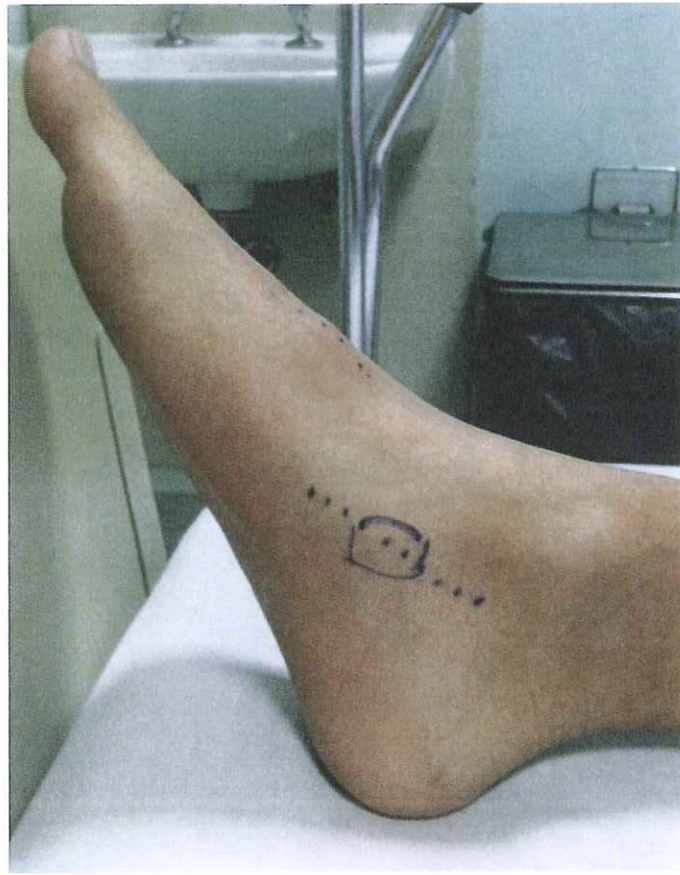


Figure 17. Medial view of the right foot showing the most painful spot which was the insertion of the tibialis posterior tendon into the navicular.

The area marked out on the foot represents his most painful spot and corresponds to the tibialis posterior tendon insertion into the navicular bone (figure 17). There is complete absence of an arch over the medial foot. Most cases of painful adolescent flatfoot deformity are due to an unstable accessory navicular and it has to be actively looked for during examination of the foot.

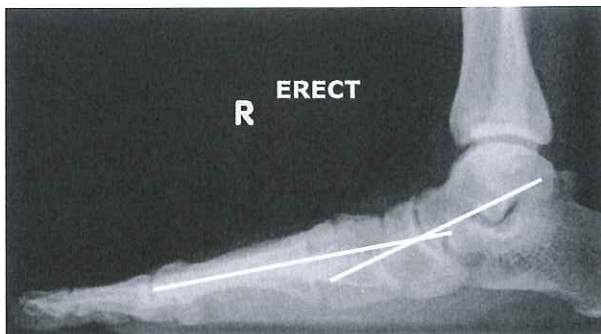


Figure 18. Medial view of the right foot showing the loss of the normal arch. The two non-parallel lines show that the axes of the talus and first metatarsus are no longer collinearly aligned.



Figure 19. Radiograph of the right foot after surgery.

The lateral radiograph of the foot displays the midfoot arch collapse and the declination of the talus. The talus and the first metatarsal bone are not collinearly aligned. One can also make out the accessory navicular bone (figure 18).



He underwent flatfoot reconstruction surgery. He had an endoscopic gastrocnemius recession, modified Kidner's procedure (excision of the accessory navicular and reattachment of the posterior tibial tendon), subtalar arthroeresis screw insertion into the sinus tarsi to correct talar declination and a first metatarsal osteotomy (figure 19). The aim of the reconstruction is to remove the painful source and reestablish the architecture of the foot (figure 20). Figure 21 shows the excised accessory navicular bone.



Figure 20. Immediate post operative photograph showing the re-establishment of the medial arch.



Figure 21. The excised accessory navicular bone.

### CONCLUSION

The cases illustrate common conditions of the foot and ankle presenting with deformities that are seen in general practice. A systematic approach to elicit the underlying pathology and appropriate counseling of the patient can bring about improved patient satisfaction and outcome. Some of the conditions may require surgical intervention.

The Foot and Ankle Division in Tan Tock Seng Hospital is a newly established subspecialty service and is well poised to handle foot and ankle specialist referrals. More information can be found in the TTSH website <http://www.ttsh.com.sg/patient-guide/find-care/clinics/page.aspx?clid=105>.

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