COMPLICATIONS IN REARFOOT AND ANKLE SURGERY

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INTRODUCTION

A wide variety of postoperative complications can be encountered with surgery of the rearfoot and ankle. Several texts of foot and ankle surgery include chapters relating to specific complications from surgery in this region. This paper will review several case studies which demonstrate difficulties that have been encountered in a variety of different clinical scenarios.

The complications encountered are included in Table 1. The majority of complications involving the rearfoot and ankle have been either wound healing or malposition and/or malunion of selected fracture and arthrodesis sites.

The following case presentations include a brief history, clinical illustration and a retrospective analysis of the complications encountered.

Table 1

POSTOPERATIVE COMPLICATIONS OF REARFOOT AND ANKLE SURGERY

IMMEDIATE POSTOPERATIVE COMPLICATIONS
- Atelectasis
- Pulmonary Embolism
- Excessive bleeding

WOUND COMPLICATIONS
- Dehiscence
- Infection
- Hypertrophic scars

MALUNION/NONUNION

MALPOSITION

CONTINUED PAIN/DISABILITY

INTERNAL FIXATION FAILURE

REFERRED SYMPTOMATOLOGY

CASE 1

A 12-year-old white male presented with severe flexible pes valgo planus deformity. A gastrocnemius recession, Evans calcaneal osteotomy with allogeneic graft and medial arch reconstruction was performed. The allograft was dislodged following the initial surgery and a revisional procedure was performed to correct the malposition.

Discussion

The surrounding tension following the calcaneal osteotomy is usually sufficient for compression and stability of the graft. Primary bone healing normally occurs. A limited amount of dissection is usually performed to avoid disruption of the dorsal and plantar calcaneo-cuboid ligamentous attachments. Excessive dissection will result in an unstable calcaneo-cuboid joint with subluxation of the graft as demonstrated. The authors believe that excessive dissection and/or manipulation of the foot during other components of the flatfoot reconstruction contributed to graft displacement. (Figures 1A-D)

Figure 1A. Preoperative lateral radiograph demonstrating pes valgo planus deformity.

Figure 1B. Immediate postoperative lateral radiograph. Note the distal region of the calcaneus where an allograft was placed for correction of the transverse plane component of the flexible flatfoot.

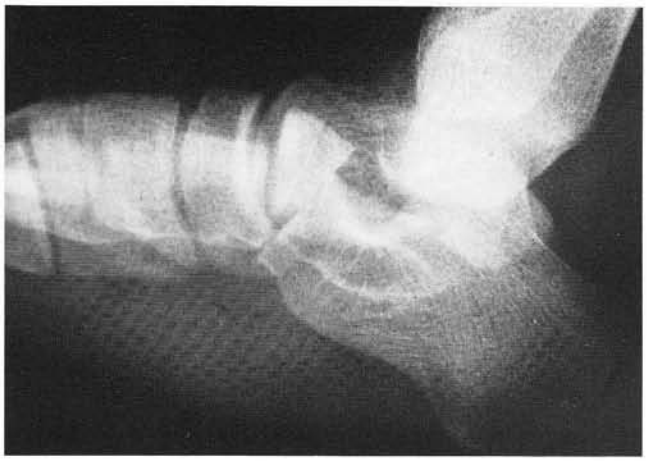

Figure 1C. A lateral radiograph demonstrating gross malposition of the calcaneal allograft and dorsal excursion of the graft with the anterior portion of calcaneus.

Figure 1D. Surgical revision of the displaced graft. Note the internal fixation used to secure placement of the graft.

CASE 2

A 33-year-old white male was admitted following a PER IV ankle fracture. Open reduction internal fixation (ORIF) was performed at the time of presentation. The syndesmotic screw which was placed to reduce the diastasis was inappropriate and the syndesmotic injury was not fixated adequately.

Discussion

Pronation - external rotation ankle fractures are unique because of the complete disruption of the distal tibiofibular syndesmosis. Adequate reduction requires direct visualization of the anterior tibia-fibula articulation. This area should be securely reduced prior to placement of the syndesmotic screw. This case demonstrates separation or diastasis of the syndesmosis following placement of the syndesmotic screw. This complication probably occurred because of inadequate reduction of the distal tibia-fibula articulation prior to fixation. It is also possible that the syndesmotic screw actually did not penetrate into the tibia, but actually slipped along its posterior surface. This error in technique could have given an intraoperative sensation and radiographic appearance of adequate transfixation. With subsequent manipulation and motion, the fibula will separate at the syndesmosis and diastasis will be maintained by the transfixion screw. (Figures 2A-C)

Figure 2B. AP ankle radiograph intraoperatively demonstrating reduction of fibular fracture with plate and screw fixation.

Figure 2A. Preoperative radiograph demonstrating a PER IV ankle fracture. Reduction of the diastasis is critical for stabilization of the torn syndesmotic ligaments.

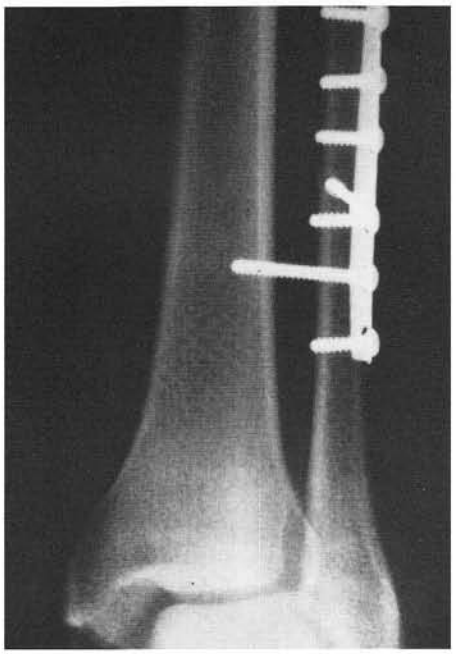

Figure 2C. Final postoperative AP ankle radiograph reveals gaping at medial malleolus and valgus ankle deformity. This clear space suggests displacement of the talus in ankle mortise. The syndesmotic screw "pushed the diastasis" apart. This reduction is not satisfactory.

CASE 3

A 65-year-old white female complained of severe rearfoot pain following a talar fracture and subsequent post-traumatic arthritis of her ankle. She underwent arthrodesis of the ankle joint with internal fixation passing through the subtalar joint as well. Traumatic arthritis developed in the subtalar joint and fusion was performed. The position of the rearfoot was varus and the patient continued to have pain with ambulation.

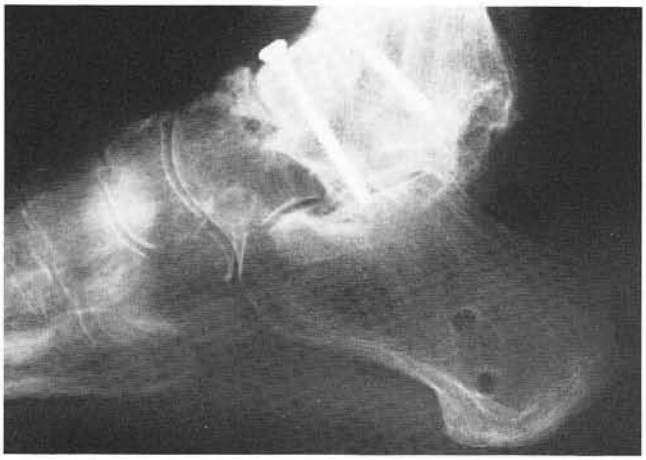

Figure 3A. Preoperative radiograph demonstrating arthrodesis of the ankle joint with internal fixation advancing to the posterior facet of subtalar joint.

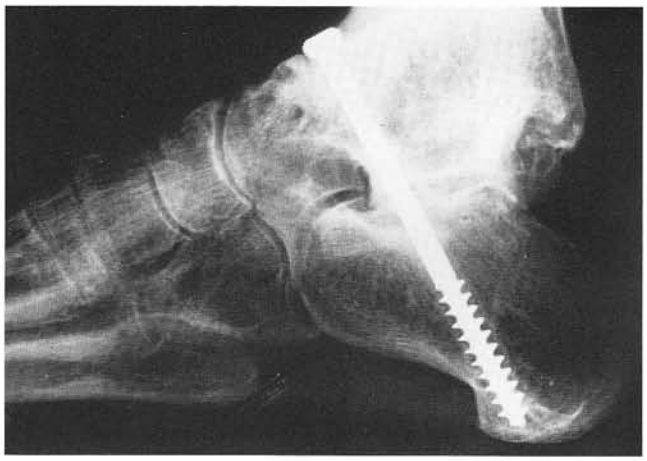

Figure 3B. Subtalar joint subsequently fused with cancellous bone screw.

Discussion

This case illustrates two types of complications in ankle surgery. The initial arthrodesis was complicated by inadvertent violation of the posterior facet of the subtalar joint. The patient developed rapid arthritic changes of the talocalcaneal joint when weight bearing was allowed. As a result, the subtalar joint required fusion. Unfortunately, the secondary fusion was complicated by malposition of the joint as demonstrated on the calcaneal axial view. The subtalar joint should be fused in a neutral or slight valgus position. Orthotic control was not successful and the patient will need a revisional subtalar arthrodesis. (Figures 3A-C)

Figure 3C. Calcaneal axial view demonstrating the varus position of the heel. The lateral plantar heel will absorb the majority of the forces in weight bearing with no ability to compensate. Continued pain has been clinically demonstrated by the patient.

CASE 4

This 55-year-old white male was seen for surgical repair of an acute achilles tendon rupture with avulsion from the calcaneus. Following the primary repair, the wound sloughed. The area was drained, and once stable, a flap was transferred, and a split thickness graft was applied to the defect.

Discussion

Surgical repair of the achilles tendon is the preferred method of treatment for ruptures involving the tendo achillis. This case was especially challenging because the tendon had actually been avulsed from the calcaneus. A gastrocnemius recession was performed concurrently to create additional length of the tendon. Two cancellous screws were also used with washers for attachment to the posterior heel. Wound dehiscence occurred, and reconstructive skin techniques were used to preserve the tendon repair. The bulky nature of the polyacetyl washers and screws probably stressed the incision and contributed to the breakdown of the wound. The advent of other less prominent soft tissue anchors will help prevent this complication. (Figures 4A-E)

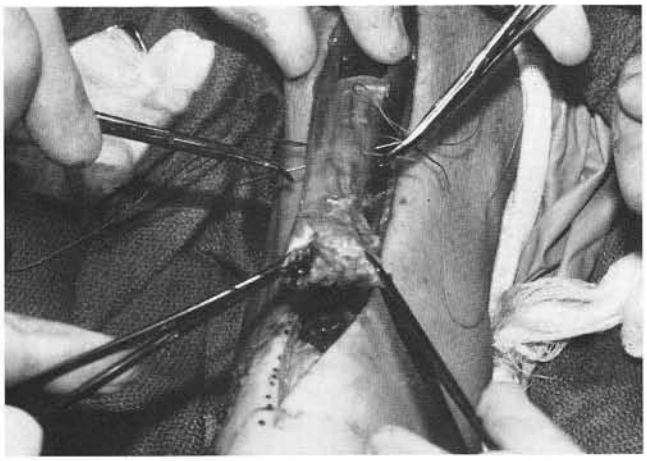

Figure 4A. Initial intra-operative view of surgical repair of ruptured achilles tendon.

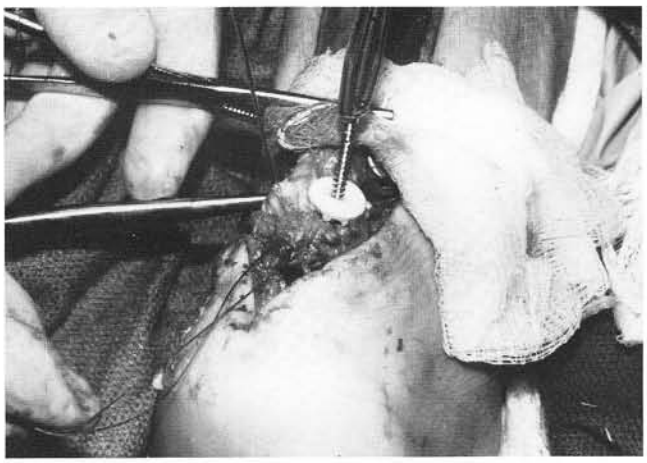

Figure 4B. A polyacetyl washer was used to attach the distal aspect of the tendon to the posterior calcaneus.

Figure 4C. Dehiscence is evident at the distal portion of the incision.

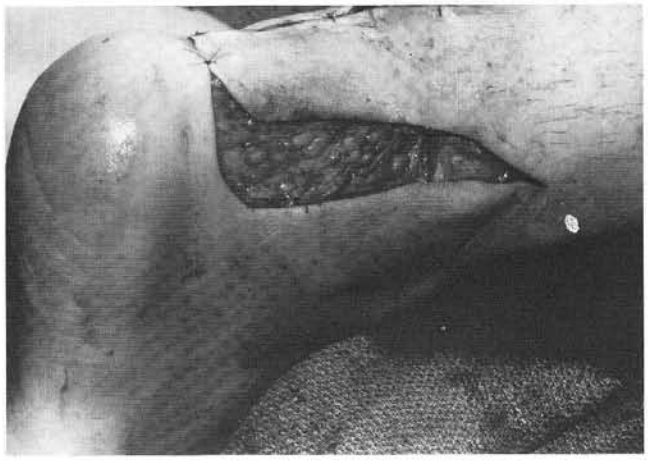

Figure 4D. Debridement, and creation of a flap to cover the achilles tendon and prevent loss of function.

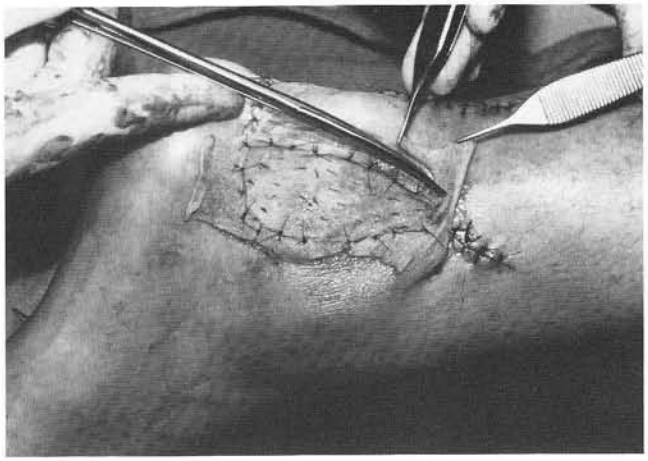

Figure 4E. Clinical photograph illustrating the transferred flap and skin graft placed over the remaining defect.

CASE 5

This 33-year-old white female presented with severe deformity and pain secondary to Charcot-Marie-Tooth disease. A triple arthrodesis was performed which resulted in an excessive amount of forefoot abduction. A revision of the midtarsal arthrodesis was performed which corrected the excessive external rotation of her foot.

Discussion

This case illustrates the importance of alignment of the lower extremity arthrodesing procedures. The surgeon must assess the position of the hip, knee, and lower leg, as well as the forefoot to rearfoot position. Excessive forefoot abduction will create a pronatory gait and difficulty with ambulation. Preoperative assessment of position, as well as available range of motion at all joints of the lower extremity, will aid in determining the ideal position to fuse the rearfoot. (Figures 5A-E)

Figure 5A. Preoperative view demonstrating neurologic cavus foot and digital contraction.

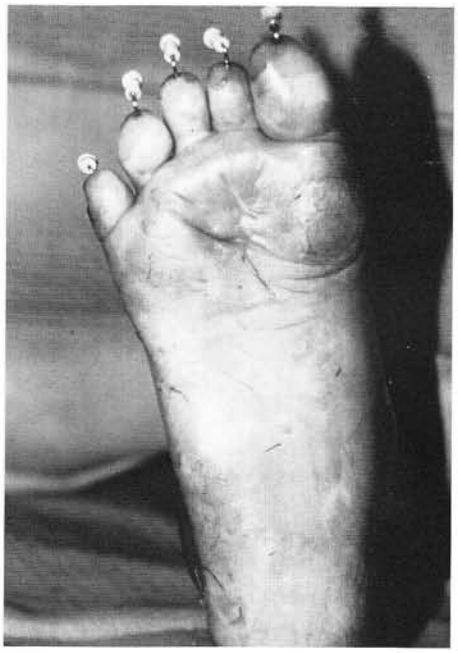

Figure 5B. Postoperative view demonstrating an unsatisfactory relationship of the forefoot to rearfoot. Excessive abduction of the midtarsal joint necessitated revision of the midtarsal joint.

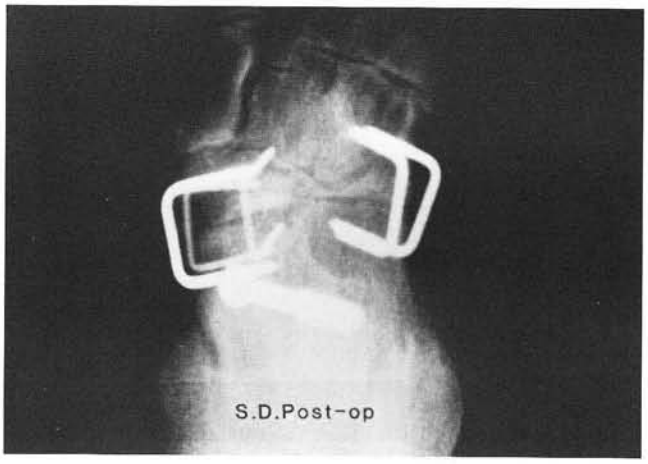

Figure 5C. Postoperative radiograph with excessive abduction of the forefoot.

Figure 6C. Postoperative radiographs demonstrating satisfactory alignment and reduction of fracture fragments.

Figure 6D. Lateral wound dehiscence approximately three months following initial debridement and ORIF. Note the protruding plate and screw head at the distal extent of wound.

Figure 6E. Following revisional debridement and removal of internal fixation devices, a tissue flap was transferred and a split thickness skin graft was used to cover the defect created.

Figure 6F. Appearance of the wound at 2 years follow-up. Ankle function is restored and soft tissue integrity is satisfactory.

CONCLUSION

Postoperative complications of rearfoot and ankle surgery can be challenging. The authors have presented an illustrated approach to some of the complications which may be encountered in this area. The authors advocate the discussion of complications so that others may better understand and treat disorders of this nature.