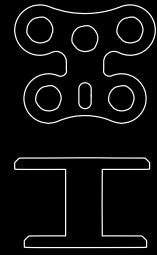


CASE REPORT



Flatfoot reconstruction with medialising calcaneal osteotomy and FDL transfer to the navicular

The Surgeon

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Surgeon at Sheffield University Teaching Hospitals, UK, specialising in the treatment of elective and traumatic conditions of the adult foot and ankle. He now runs his clinical practice solely from Spire Claremont Hospital, Sheffield. He qualified from the University of Southampton in 1993 and undertook basic surgical training in London, Oxford and Swindon prior to commencing Orthopaedic training in Sheffield. He is both Fellowship trained in Limb Reconstruction techniques (Sheffield) and in elective Adult Foot & Ankle surgery (Brisbane). In education, he has been voted Orthopaedic Trainer of the Year by the South Yorkshire trainees and contributes to teaching and training nationally and internationally. He consults for many implant manufacturers providing design ideas and education. He has a specific interest in additive manufacturing processes for custom solutions. He has been an investigator in many local, national and international clinical trials and has published extensively on many aspects of foot and ankle surgery. He is the current President of the British Orthopaedic Foot & Ankle Society (BOFAS) having been the former Honorary Secretary and ordinary member of the Scientific Committee. He is the former Chairman of Sheffield Orthopaedics Ltd.

Introduction

Progressive collapsing foot deformity occurs for many reasons. Failure of medial soft tissue structures such as the tibialis posterior tendon or spring ligament can lead to collapse of the medial longitudinal arch of the foot and concurrent planovalgus deformation of the hindfoot. Initial treatments should include analgesia, physiotherapy and use of orthotics but, if these fail, then surgery may be warranted. In flexible deformities, surgery in the form of tightening/reefing of soft tissue structures along the medial column together with medialising the posterior calcaneus have gained long term popularity and success. The use of a medialising step plate with variable degrees of osteotomy displacement has improved the surgical experience from the use of axial screws.

The Case



Patient Profile

A 60 year-old female presented with a 2 year history of pain with bearing weight, in the posteromedial hindfoot and also at the tip of the fibula of her right foot. After busy days on her feet, she would occasionally experience nocturnal pain. During the 2 year period, she noticed that her foot had changed shape and that she also experienced posteromedial swelling. Medial arch supports had provided some relief especially when used in conjunction with above ankle boots. She had no relevant past medical history of note.



Clinical Findings/Preoperative Analysis

Examination revealed normal body habitus with a normally aligned left foot. Inspection showed a mild planovalgus deformity of the right foot. Specific Silfverskiold's assessment of the Achilles tendon revealed no tightness. The planovalgus deformity was fully correctable. She experienced tenderness over the course of the tibialis posterior tendon when palpated.

Weightbearing radiographs demonstrated the planovalgus footshape and no evidence of arthrosis (Figure 1 – 3).



Figure 1



Figure 2



Figure 3



Surgical Treatment

Under general anaesthesia and an ipsilateral peroneal block and with antibiotic cover, the patient was positioned supine on the operating table. A support was placed under the ipsilateral buttock to internally rotate the entire lower limb at the hip. A thigh tourniquet was used after elevation and inflated.

Utilising an oblique skin incision from immediately anterior to the Achilles tendon insertion to the origin of the plantar fascia, a lateral approach to the heel was fashioned. With meticulous haemostasis and care to reflect branches of the sural nerve, the lateral wall of the calcaneus was exposed. The periosteum was divided with sharp dissection and reflected. An oblique osteotomy, in line with the skin incision, was performed using a 5 cm thin saw blade as far as the medial wall of the calcaneus. The medial wall of the calcaneus was then breached with osteotomes to complete the osteotomy.

The medial periosteum was then reflected away from the osteotomy to ease displacement. The 10 mm step plate was then applied to the posterior aspect of the calcaneus and locked into position once it was established that the osteotomy was displaceable and that the bone surfaces were well apposed. Using the central screw hole in the plate overlying the anterior calcaneal fragment, a non-locking screw was applied so that this screw pushes the posterior fragment medially. Once the osteotomy was fully displaced, the two neighbouring screw holes were filled with locking screws and the non-locking screw was removed. At this stage, the lateral wound is closed and the support is removed from the ipsilateral buttock to allow the lower limb to lie in an externally rotated position on the operating table.

A long medial approach to the base of the first ray, midfoot and hindfoot is then fashioned making sure that this incision lies along the plantar aspect of the medial arch. Meticulous haemostasis is required as there are many veins traversing this skin incision. The sheath of tibialis posterior was divided revealing an extremely inflamed and degenerate tendon. The tendon stump was therefore resected. With the tendon removed, the sustentaculum tali was readily palpable and inferior to this, an incision was made in the fibro-osseous tunnel to reveal the flexor digitorum longus tendon (FDL). Pulling the FDL into the wound and then kept under tension, the course of the tendon distally was then released as far distally as the Knot of Henry.

With the foot in maximal adduction and plantar flexion, the FDL was then sectioned with as much working length as possible. A whip stitch was then placed in the tendon end and covered in a saline soaked swab. Attention was then directed at repair of the spring ligament and preparation of the navicular bone tunnel.

The spring ligament was then divided in line with the lateral aspect of the talonavicular joint. A 5 mm section of this ligament was excised and subsequent defect was then closed with a series of heavy vicryl sutures. The superior and inferior surfaces of the navicular are then exposed to allow a 5.5 mm drill hole to be made in the navicular from inferior to superior. Using a suture passing device, the whipstitched ends of the FDL tendon can then be pulled through the navicular. With sufficient FDL length, the FDL can be sewed back onto itself and also secured to the navicular periosteum inferiorly and superiorly. Assessment of the recreated arch of the foot was then performed making sure that there was no residual Achilled tightness at the end of the procedure.

The skin was then closed in layers and temporary plaster of Paris slabs were applied below the knee maintaining a plantigrade foot.



Intraoperative Findings

The significant intra-operative findings were that there was considerable inflammation and degeneration of the tibialis posterior tendon.



Postoperative Treatment

The patient was encouraged to elevate the operated limb as much as possible whilst employing crutch weight bearing for the first 6 weeks postoperatively. During the first 6 weeks, the patient was given oral thromboprophylaxis therapy.

At 2 weeks post-op, the temporary plaster was removed for wound inspection and a new lightweight cast was reapplied. After 6 weeks, that cast was removed and the patient was encouraged to commence bearing weight using a removable walking boot. This boot was then abandoned at 12 weeks, when radiographs were taken (Figure 4 – 6) and physiotherapy commenced.



Figure 4



Figure 5



Figure 6



Conclusion

6 months after surgery the patient was discharged from the clinic with complete pain relief and improved foot shape. The step plate range offers a choice of osteotomy displacement together with ease of use in applying that displacement together with good hold in the bone. The plate is smoothly contoured and low profile making it less likely to become palpable once the swelling subsides, and thus, less chance of requiring further surgery to remove the metalwork.



References

- 1) Chadwick C, Whitehouse SL, Saxby TS. Long-term follow-up of flexor digitorum longus transfer and calcaneal osteotomy for stage II posterior tibial tendon dysfunction. Bone Joint J. 2015;97-B(3):346-352. doi:10.1302/0301-620X.97B3.34386
- 2) Wacker JT, Hennessy MS, Saxby TS. Calcaneal osteotomy and transfer of the tendon of flexor digitorum longus for stage-II dysfunction of tibialis posterior. Three- to five-year results. J Bone Joint Surg Br. 2002;84(1):54-58. doi:10.1302/0301-620x.84b1.1184784(1): 54-8.

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