Correction of valgus deformity of the hindfoot using a medial approach for a triple fusion has only recently been described for patients with tight lateral soft tissues which would be compromised using the traditional lateral approach. We present a series of eight patients with fixed valgus deformity of the hindfoot who had correction by hindfoot fusion using this approach.

In addition, we further extended the indications to allow concomitant ankle fusion. The medial approach allowed us to excise medial ulcers caused by the prominent medial bony structures, giving simultaneous correction of the deformity and successful internal fixation.

We had no problems with primary wound healing and experienced no subsequent infection or wound breakdown. From a mean fixed valgus deformity of 58.8° (45° to 66°) pre-operatively, we achieved a mean post-operative valgus angulation of 13.6° (7° to 23°). All the feet were subsequently accommodated in shoes. The mean time to arthrodesis was 5.25 months (3 to 9).

We therefore recommend the medial approach for the correction of severe fixed valgus hindfoot deformities.

Patients with longstanding valgus deformity of the hindfoot present a surgical challenge because the lateral soft-tissue envelope is often already compromised such that correction to neutral places undue tension on the soft tissues, and can lead to problems with skin closure and healing of wounds.

Traditionally, triple arthrodesis is performed through an incision laterally with a smaller incision medially or dorsally to gain access to the talonavicular joint. Recently, an entirely medial approach has been described for this procedure and the senior authors (PHC, RJS) have adopted it for correction of valgus deformity of the hindfoot. This approach has been shown to provide both excellent correction of the deformity and good rates of fusion. More recently, a cadaver study has confirmed that satisfactory preparation of the subtalar, talonavicular and calcaneocuboid joint surfaces can be achieved through a single medial incision.

We aimed to assess the medial approach independently to determine if it reduced commonly encountered wound problems, and gave adequate correction of the deformity with rates of fusion similar to those of the standard lateral approach.

In addition to applying the technique to triple fusions in one patient, we also used it when undertaking a simultaneous triple and tibiotalar-calcaneal fusion using an intramedullary nail.

Patients and Methods

Between January 2006 and November 2006 eight patients with a large fixed valgus deformity unsuitable for a lateral incision underwent correction through a medial approach. Four patients had deformity secondary to rheumatoid arthritis, two had diabetes mellitus and Charcot collapse and two had degenerative collapse. There were four men and four women with a mean age of 67.5 years (56 to 78).

One patient underwent isolated subtalar arthrodesis to correct the fixed hindfoot valgus before a staged total ankle replacement (TAR) was undertaken. Four had subtalar and talonavicular fusion with no attempt at fusion of the calcaneocuboid joint and two had triple fusions.

Two patients had pre-operative problems with recurrent ulceration medially. Of these, one had a previously failed pantalar fusion with recurrence of the valgus deformity and medial ulceration with osteomyelitis of the
medial malleolus. This was corrected by excision of the infected tissue and concurrent revision of the arthrodesis using a retrograde tibiotalar-calcaneal intramedullary nail.

All the procedures were performed by one of two dedicated orthopaedic foot and ankle surgeons (PHC, RJS). The surgical technique used was as described by Myerson et al.1 First, the peroneal tendons were lengthened through a short proximal incision sited well away from the compromised lateral skin, to aid correction of the hindfoot. An 8 cm medial incision was made beginning from the tip of the medial malleolus and centred over the talonavicular joint. The talonavicular joint capsule was incised longitudinally. Subperiosteal exposure of the talonavicular joint, including a release of any remnant of the tendon of tibialis posterior, although this was usually absent, allowed necessary access. The interosseous ligament was divided under direct vision to allow exposure of all three facets of the subtalar joint. The rest of the talonavicular joint capsule was sharply dissected allowing the joint to be distracted and the sinus tarsi to be cleared of soft tissue. The subtalar and talonavicular joints were then denuded of articular cartilage taking care to protect the tendon of flexor hallucis longus and the more posteriorly positioned neurovascular bundle.

Access to the calcaneocuboid joint was more difficult. The calcaneocuboid joint capsule and bifurcate ligament were released by sharp dissection. Using a lamina spreader in the remnant of the talonavicular joint the flat surfaces of the calcaneocuboid joint were prepared. The joints were then fixed internally by a combination of screws and staples. No bone grafting was used. Patients were immobilised in a non-weight-bearing cast for six weeks. They then mobilised in a weight-bearing cast for a further six weeks. When they were fully weight-bearing without pain, and there was radiological sign of fusion, they were allowed to mobilise freely in custom-made footwear.

In the presence of medial skin ulceration the technique was modified to allow excision of the infected tissue. When concurrent arthrodesis of the ankle was also performed the incision was extended proximally and the distal portion of the medial malleolus was excised to allow access to the ankle.

Correction of the valgus deformity was measured on pre-and post-operative anteroposterior (AP) standing radiographs, by measuring the angle between the axis of the tibia and a line between the centre of the subtalar joint and the axis of the calcaneum, using the pre-operative and the best available post-operative films. Two surgeons (RJS, WFMJ) measured the angles independently. The pre-operative radiographs were compared with the best available radiograph at follow-up. Evidence of union was made from clinical and radiological assessment. Clinical evidence of fusion was defined as full painfree weight-bearing with no change in position of the foot. Radiological union was defined as when bone could be seen crossing the joint. The wounds were routinely assessed at two, six and 12 weeks post-operatively and any evidence of infection or breakdown of wound was noted. The minimum duration of follow-up was 12 weeks in two patients. Any compromise of the soft-tissue envelope would have been observed by three months and therefore we accepted a minimum follow-up.

Results
There were no problems in regard to primary wound healing and no infections or subsequent breakdowns of the wounds. Excision of necrotic tissue associated with medial ulceration was successful in the affected cases and no deep infection occurred in the subsequent fusions.

The mean pre-operative fixed valgus deformity of 58.8˚ (45˚ to 66˚) was corrected to a mean of 13.6˚ (7˚ to 23˚). The patients all showed evidence of fusion clinically and radiologically and had stable upright feet which could be accommodated by shoes (Fig. 1). The mean time to fusion was 5.25 months (3 to 9).

The main outcome was the avoidance of soft-tissue complications while achieving good correction of the deformity.

Discussion
Correction of severe valgus hindfoot deformity is possible through a medial approach as described by Myerson et al.1 and Jeng et al.2,3 We have been able to reproduce these results with correction of the deformity while allowing preservation of the lateral structures and obtaining a satisfactory arthrodesis. We have had no problems with any of the medial wounds.

In addition, the medial approach has allowed excision of any medial ulcers which may have been present and may have compromised internal fixation through a lateral approach. We had been able to modify the incision to allow
a concomitant ankle fusion. The AOFAS score was not particularly helpful in assessing this technique since it focuses extensively on mobility (both of the joint and walking). Patients likely to require this operation often already have stiff feet and multiple other comorbidities. The presence of rheumatoid arthritis and Charcot disease significantly affects their pain score and mobility irrespective of their foot problems.

The main aim of the procedure was to correct the deformity and to reduce the risks of skin breakdown and deeper infection.

We believe that the medial approach has advantages over the standard lateral approach in cases with severe fixed valgus deformity and agree with previous studies which have demonstrated that good views of all the joints can be obtained to allow satisfactory preparation of the joint surfaces and good correction of the deformity.

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References