Mid-Term Follow Up of Tri-Planar Rearfoot Correction using the Modified Calcaneal Scarf Technique

for Pediatric Flat Foot Deformity

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Statement of Purpose

The purpose of this study was to explore radiographic outcomes obtained in adolescent patients treated at our center for symptomatic pes planovalgus deformity with the calcaneal scarf osteotomy. We also include an update on the calcaneal growth technique which we use at our institute for pediatric flat foot deformity.

Methods

Medical records were reviewed to identify patients between the ages of 11 and 17 years who underwent a calcaneal scarf osteotomy with or without adjunctive corrective procedures from ages of 11 and 17 years who underwent a calcaneal scarf osteotomy. We also include an update on the calcaneal growth technique which we use at our institute for pediatric flat foot deformity.

Literature Review

Symptomatic pediatric pes planus has a multifactorial etiology and has been treated historically with a variety of procedures. Many of the classic procedures isolate a single plane of correction. (1,2,3,4,7) However, these classic procedures have proven to be insufficient when performed in isolation and some also have the distinct disadvantage of promoting increased joint pressures in surrounding articulations. (4,7) In order to satisfactorily address the frequently encountered triplane rearfoot deformity encountered in the adolescent flatfoot, more aggressive techniques which include a double calcaneal osteotomy, scarf/z-osteotomy or a combination of single plane procedures is usually needed. Recent literature advocates addressing severe deformity through singular triplanar correction. (5,7,9-12)

Surgical Technique

1. A 6cm full thickness incision anterior to the Achilles, posterior to the peroneal tendons 1 cm proximal to the distal tip of the fibula. The posterior–superior arm, 10mm osteotomy, is created one third of the way between the posterior-most aspect of the calcaneus and the posterior aspect of the subtal joint just anterior to the Achilles tendon. (Figure C)

2. Medialization of the calcaneus 6mm-12mm depending on the amount of correction required. (Figure D)

3. Triplanar correction dialed in with small smooth lamina spreader. (Figure E)

4. The osteotomy is fixated with large gauge headless or headless screws (4.5mm) from inferior anterior to anterior to the calcaneal tubercle to superior and posterior to the subtal joint.

5. Cortical bone graft or bone substitute is tamped into the bone defects, along with any cortical bone shaving. (Figure F)

6. Closure is performed with 3-0 vicryl and 5-0 Vicryl, below the calcaneal fibular ligament insertion

RESULTS

We observed radiographic improvement in hindfoot angles observed on both the lateral and AP weightbearing X-rays at 1 year. Our results suggest that the calcaneal scarf osteotomy is a viable option for pediatric flat foot deformity correction. The advantages of this procedure include its use of a single lateral incision, ability to accommodate 2 point fixation and triplane correction that avoids the physeal growth plate of the calcaneus is paramount. In addition, the calcaneal 2 osteotomy addresses the transverse plane deformity in flatfoot, it also lengthens the lateral column and corrects the forefoot abduction deformity.

In the patients that we have followed the drawback is the deficiency of long term clinical follow up, the limited volume of patients and the retrospective radiographic data. However, this shows that the scarf osteotomy is a competitive procedure for moderate to severe pediatric pes planus.

REFERENCES: