Introduction

Congenital clubfoot (talipes equinovarus) is one of the most common lower extremity orthopedic conditions requiring comprehensive treatment. Initial correction of deformity regardless of the type of correction or type of treatment performed may not result in satisfactory long-term outcome due to residual deformity. The treatment of over- and undercorrected clubfoot poses unique challenges to the foot and ankle surgeon as prior procedures performed may not be known and significant shortening and malalignment of the foot and leg may be present.*

When rigid deformities are present, isolated or combined hindfoot and midfoot fusions and osteotomies are indicated for correction. The outcome of such procedures should result in the ankle at a 90-degree angle to the leg and the hindfoot in 5-7 degrees of valgus.

Figure 1. Clinical images of patient after initial treatment for clubfoot deformity with a tibiocalcaneal (TC) fusion.

Statement of Purpose

Talipes equinovarus is sometimes associated with limb hypoplasia resulting in limb length discrepancy. Surgical correction for such deformities may lead to additional shortening of the affected limb. This case study details the technique used to treat a plantigrade functional limb in a patient with clubfoot who presented for a previous malaligned tibiocalcaneal (TC) fusion and a 3 cm limb-length discrepancy. At the time of original presentation, the patient was able to ambulate without pain and could not perform activities of daily living.

Figure 2. Preoperative AP (A) and lateral (B) radiographs. Excessive ankle equinus, hindfoot varus, and cavus with clawing of the digits is apparent. Intertarsal fluoroscopy (C) showing “V” type osteotomy performed through the calcaneus and midfoot.

Procedures

A case is presented of a 58 year-old female with residual equino-cavus deformity and limb length discrepancy following a malpositioned TC fusion performed 40 years prior in the Philippines. She underwent a largescale “Y” osteotomy involving the midfoot and rearfoot as well as focal distal osteotomies with external fixation. At 7 days postoperatively, the patient began lengthening through the fixator at a rate of 0.5 mm per day for 42 days. The footplate with custom-made orthoses was apparent. At 14 weeks, and the frame was removed with custom-made orthoses. The patient was then able to perform osseous fusions for correction of deformities, proper positioning of the ankle and foot is imperative to preserve limb function postoperatively.

Figure 3. AP (A) and lateral (B) radiographs of the left foot and external fixator placement (B) for distal tibial lengthening.

Literature Review

Many surgical and non-surgical treatment options for clubfoot have been previously described. Recurrence of clubfoot deformity after initial treatment is prevalent, and occurs with both surgical and non-surgical intervention.1-2 Mercuri et al. described an 11% recurrence rate of deformity using the Ponseti method,3 and recurrence rates of 13-50% have been observed following initial surgical correction of deformity.4 The most common recurrence of deformity occurs in the midfoot and forefoot,5 with supination and adduction of the forefoot present in up to 95% of recurrent deformities according to Tarr and Carroll.6 Many authors have described reasons for this high incidence of recurrence which include initial undercorrection at the time of primary treatment, undertreatment of under correction, non-union of the site of bone ablation to bring to initial correction, stiff and non-reducible joints that require the need for multiple operations.1-4,8 Eit et al. found no correlation between surgical outcome and number of previous surgeries performed.5

Significant shortening of greater than 0.5 cm of the affected limb has been described in 16-68% of unilateral clubfoot cases.6 10 This is due to shortening of the tibia or, less commonly, the femur.9,11 Surgical procedures may increase the amount of limb length discrepancy present in the affected limb in addition to the baseline hypoplasia. Previous research has described 2 cm of shortening on average of the affected foot in patients who underwent extended posterior extension, posterior, and lateral release without concomitant osseous or fusion procedures.7 Hindfoot arthrodeses, when performed, also result in additional shortening of the limb. When it is desired not to perform osseous fusions for correcting deformities, proper positioning of the ankle and foot is imperative to preserve limb function postoperatively.

Figure 4. Postoperative clinical image with equal limb length.

Discussion

This study presents our methods of treating limb-length discrepancy and equino-cavovarus foot deformity in a patient with a prior malaligned TC fusion utilizing multiple staged surgeries. The patient presented with a functionally limited limb and is now able to ambulate comfortably in regular shoe gear.

Figure 5. Postoperative lateral (A) and AP (B) radiographs following second procedure. Significant reduction of deformities was achieved.

Results

The patient had initial resolution of symptoms for 24 months. At this time, the patient complained of pain at the ankle and underwent the 1st meta-calcaneal malunion which was managed with shoe accommodations for an additional 24 months. The patient had continued pain and additional procedures were then performed to correct her residual cavus deformity. She currently has a plantigrade foot and ambulates in normal shoe gear without pain.10

Figure 6. Postoperative lateral (A) and AP (B) radiographs following third procedure. Significant reduction of deformities was achieved.

References