In Situ Rearfoot Arthrodesis for Neglected Congenital Vertical Talus

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STATEMENT OF PURPOSE

Congenital vertical talus is an uncommon foot deformity that is present at birth resulting in a semi-rigid to rigid flatfoot deformity. These rigid deformities are typically recognized early and treated with favorable results within the first 3 years of life. Adults who present with pain, deformity, and arthritis associated with untreated vertical talus have relatively few treatment options available. The surgeon and patient should expect normalization of foot structure with late stage surgical treatment due to the rigid nature of the condition, congenital malformation of the talus, and degeneration of the talonavicular and adjacent joints. We present a case in which clinical findings were treated symptomatically with in situ arthrodesis of the subtalar and talonavicular joints without expectations for normal talonavicular alignment.

LITERATURE REVIEW

Congenital vertical talus or convex pes valgus is characterized with a rigid flatfoot with dorsal dislocation of the navicular on the talus (1-2). The dorsal dislocation of the navicular on the talus and neck gives way to the misshapen talus, ankle equinus, and contractures of the Achilles tendon, long flexors, posterior ankle capsule, peroneal tendons, and anterior compartment tendons (10,12). This congenital deformity is an uncommon foot deformity present at birth with an estimated incidence of 1 in 10,000 (7). The exact etiology of vertical talus is relatively unknown and it is thought to have a genetic basis (1). Treatment yields more favorable results when addressed early. Manual manipulation and serial casting has produced good results in ages less than 12 months (3). As children age, closed reduction has been an indicator of poor outcomes, as more invasive procedures are necessary to correct deformities. Many surgical procedures during infancy include soft tissue releases. Numerous studies are available on treatment in the pediatric population, but little is described about specific treatment and outcomes of adult patients who have untreated congenital vertical talus. It has been stated that those who are not treated by age 3 are left with a rigid deformity and open reduction and internal fixation is not adequate to achieve correction (1-3). Late stage treatment typically involves navicular excises, talarctomy, triple arthrodesis, or other reconstructive variable results (8). A recent case study highlighted major reconstructive surgery in an adult patient with bilateral neglected congenital vertical talus (9). Surgery involved late heel resection, flexor hallucis longus transfer to the neck of the first metatarsal, and a split bilhals anterior tendon transfer to the lateral calcaneus which was anastomosed to the peroneal brevis tendon, to the bilhals posterior tendon and superficial digitalis ligament was plaited and reinforced to the adjacent tendons of the posterior bilhals and anterior bilhals. The tendon transfers allowed lateral translation of the calcaneus under the talus to reduce over pronation. The subtalar joint was also fused in an effort to maintain reduction. They noted decreased foot pain and ankle pain at 21 months following surgery. A review of our case study, literature is sparse concerning adult correction of congenital vertical talus. Significant bone resection and rearfoot fusions are likely procedures of choice for adult patients with neglected vertical talus. Further research is necessary to provide a predictable postoperative course and insight into function following arthrodesis of rearfoot joints and major reconstruction.

CASE STUDY

We present a case study of a 20-year-old male who presented with progressively worsening right foot and ankle pain. He denied recent injury or trauma. He did note a significant inversion type sprain 6 years ago. He was noted to have a severe equinus deformity with significant forefoot abduction. He reported both clinical and radiographic findings consistent with a talocalcaneal coalition and weight bearing lateral radiograph is shown in Figure 1. He could not recall how long his foot has been flat, but denies any acute changes to his foot. He related trouble walking on uneven surfaces and progressively worsening pain to the dominoeffect and weight bear. He was diagnosed with neglected congenital vertical talus. He was provided custom inserts to accommodate the deformity with anticipation of surgical intervention in the future. Within 6 months, he failed all conservative treatment options and elected to undergo surgical intervention. After extensive discussion of treatment options, the decision was made to pursue an in situ arthrodesis of his subtalar and talonavicular joints without expectations of deformity correction.

Surgery was performed in the supine position with the patient under general anesthesia and preoperative regional block of the right lower extremity. Prior to thigh tourniquet inflation, bone marrow aspirate (BMA) was obtained from the posterior calcaneus. A 10 cc syringe and an 8 gauge Jamshidi needle were used (Figure 2). Roughly 6 cc of aspirate was obtained with further advancement of the Jamshidi needle into the calcaneus after each 2 cc to aspirate to ensure BMA over peripheral blood aspirate. Once the bone marrow aspirate was obtained it was stored on the back table and allowed to clot for ease of placement into the fusion sites. Standard lateral incision was made for access to the subtalar joint. A near vertical incision was made over the medial foot seen in figure 3 in anticipation of a plantarflexed talonavicular and dorsi-flexed talotarsal navicular. Partial resection of the navicular and talus was needed for adequate bone to bone contact for fusion. Both joints were placed in similar fashion with a flexible osteotome, rongeur, and burr. Following adequate prep to expose the sub-chondral bone plate, subchondral drilling was undertaken with a 2 mm drill. Cannulated screw was procured as part of the joint prep process and bone marrow aspirate was packed into the fusion sites prior to fixation. An effort was made to minimize the amount of pronation through the subtalar joint and to accomplish re-articulation of the talonavicular joint prior to hardware placement.

The patient was placed in a removal boot which allowed ankle range of motion exercises while he remained non-weight bearing for 10 weeks. At 10 weeks, computed tomography of the subtalar and talonavicular joints was noted on plain film radiographs and he was instructed on progressive weight bearing in a walking boot and transition to regular shoe gear over the next four weeks (Figures 4 and 5). On follow up, he noted significant improvement in pain. In moderate to mild degrees of pain, the patient was comfortable without discomfort with plantarflexion and increased ambulation. At 10 months follow up, the patient was noted to have gained improved weight bearing function with no pain or discomfort.

ANALYSIS & DISCUSSION

In situ fusion of affected joints with arthrodesis correction is a reasonable treatment option for pain and arthritis associated with neglected congenital vertical talus in adult patients. The talus is not very amenable to corrective osteotomy and therefore, internal fixation is often contraindicated or results in complications. The surgery produced expected results that were on par with patients possessing normal foot alignment. The talonavicular joint improved with limited mobility.

REFERENCES