Congenital vertical talus open reduction surgery: Technique description and our twenty-years personal experience

Federica De Rosa, Giorgio Cecarini, Cristina Lazzotti, Daniele Sini, Carlo Origo

Orthopedics Department, SS. Antonio e Biagio and Cesare Arrigo Children’s Hospital, Alessandria, Italy

Abstract

Congenital vertical talus foot is a complex deformity, characterized by a dislocation of the talus-calcaneal navicular joint. It is a rare form of congenital flat foot, where the hindfoot is valgus and equine, the midfoot dorsiflexed and the forefoot abducted.

Introduction

Congenital vertical talus foot (rocker bottom foot) is a complex deformity, characterized by a dislocation of the talus-calcaneal navicular joint. It is a rare type of congenital flat foot in which the forefoot is adducted, the midfoot is dorsiflexed, and the hindfoot is valgus and equine. One in 10,000 live births is the estimated prevalence, and 50% of these are “non-isolated forms,” or forms linked to syndromes, genetic, or neurological disorders.1

There have been numerous classification proposals because not all congenital vertical talus feet share the same traits. The classification proposed by Coleman et al. is the most popular because it considers the only talus-navicular dislocation (type I) or the association with calcaneus-cuboid dislocation (type II).2 No matter the classification, the therapeutic strategy and prognosis must consider the foot’s functionality and motility.3,4 A thorough medical history focuses on the foot’s “loss of movement,” which is more accurately described as being non-reducible or non-propulsive. Always be done an X-ray. A gap between the talus and the cuneiform due to the scaphoid’s dislocation, increased talus calcaneal divergence, and an external deviation of the foot with respect to the ankle can all be seen in the dorsoplantar projection.5 However, the lateral projections in maximum dorsal or planar flexion are crucial because they express the deformity’s potential reducibility. In actuality, planar flexion allows one to assess the forefoot’s reducibility to the hindfoot while dorsiflexion examines the equinus’ reducibility.6

Restoring the proper anatomical relationships between the talus calcaneus and the scaphoid is the treatment’s goal. Early intervention is crucial because as time goes on, the retraction of the soft tissues becomes more structured and the bone deformity evolves, making non-operative correction impossible.
Initial treatment is manipulative. After 3 months of age, it is possible to think about soft tissue surgery. The surgical approach of reference is open reduction and fixation with K-wires. On the other side, bony surgery, reserved for the worst cases, includes arthrodesis or multiplanar correction with external fixator.

Materials and Methods

In this study, congenital vertical talus feet treated at the Pediatric Orthopedics Department of SS. Antonio Biagio and Cesare Arrigo Children’s Hospital of Alessandria from 1995 to 2022 were analyzed. Meeting the inclusion criteria, the clinical and radiological data of 8 patients for a total of 12 feet were reviewed. Respectively 5 female and 3 male patients, in 4 children the involvement was bilateral, in the remaining 4 unilateral, with left-sided involvement in 3 out of 4. Six patients (10 feet) did not have positive familiarity or pathognomic signs for pathology syndromic or neurological, while a patient is suffering from oro-facio-digital syndrome and a child with VACTERL syndrome. The taking charge at our facility took place on average at the advanced 3rd year of age.

The mean follow up is 13 years.

Only the two infants were treated with corrective plaster casts.

Through only two surgical approaches (posterior and medial), all patients underwent lengthening of the Achilles tendon, section of the calcaneosaphoid ligament, posterior capsulotomy, anterior and medial subtalar capsulotomy, T-capsulotomy of the talus-scaphoid joint, open reduction of the talus-calcaneus-navicular joint, fixation with Kirschner wires (one longitudinal along the inner column and one vertical between talus and calcaneus), capsular retensioning of the talus-scaphoid joint and legamente, shortening suture of the posterior tibial tendon according to the technique described in Tachdjian’s Pediatric Orthopedics. The average age at surgery was 3 years and 8 months. At follow up only 2 patients (3 feet) were treated by exosenotarsal calcaneus stop arthrosis for flat foot in the pre-adolescent age. Solely one foot received arthrodesis of the mid-tarsal joint at the age of 14. For the remaining 9 feet (75%) no subsequent surgical operation was necessary.

All patients were further reviewed and subjected to the American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Score. Global functional result was good with a minimum value of 89 for 3 feet, 91 for 1 foot, 95 for 3 feet and 100 for the remaining 3 feet examined (Figure 1, 2, and 3).

Discussion

The goal of the treatment of congenital vertical talus foot is to restore the correct anatomical relationships between the talus, calcaneus and the scaphoid, considering the talus as the fulcrum, therefore the reduction of the calcaneus and navicular must be sought around to the talus. Treatment must be as early as possible, since the retraction of the soft parts tends to structure and the bone deformity becomes evolutionary, making non-operative correction impossible. While always keeping in mind that a complete correction of the deformity cannot be achieved, the initial manipulative treatment aims to reduce stiffness and make the need for subsequent surgical treatment easier. Surgery before skeletal maturity must be dosed case by case, skillfully combining approaches on the soft parts and the skeleton, remembering that no technique is exempt from the risk of stiffness, hyper or hypocorrection and evolutionary degenerative arthrosis.
Conclusions

An intricate and pernicious deformity is congenital vertical talus foot. A correct diagnosis is crucial. The goal of the early manipulative and surgical gestures are adapted case-by-case to the various clinical presentations, but the final goal remains to give the child a foot that is “propulsive”. Post-operative X-rays are rarely satisfactory, and occasionally invasive surgical procedures are needed, which are now rarely used for other pathologies. However, the functional outcome, as shown by the renowned AOFAS score, provides us with justification. By using the Heyman-Herndon technique, we were able to expand the foot, which would have otherwise been prevented by the vertical talus, which acts as an “ax”.

References