The Ponseti Method of Treatment for Congenital Clubfoot: Importance of Maximal Forefoot Supination in Initial Casting

STEVEN L. FRICK, MD

abstract

The correction of cavus deformity requires further supination of the forefoot. In the Ponseti method, the initial cast is applied with the forefoot supinated such that the plane of the metatarsal heads is parallel to the long axis of the tibia. This study reviewed Pirani scores of 27 patients with 38 clubfeet treated over an 18-month period by the Ponseti method to evaluate changes in midfoot deformity after the initial cast. Initial average scores for severity of the lateral border deformity, medial crease, and talonavicular joint reducibility decreased from 0.92, 0.75, and 0.75, respectively, to 0.73, 0.25, and 0.5, respectively, after the first cast. The improvement in Pirani scores provides support for the efficacy of the initial cast to reduce the cavus and also increase the reducibility of the midfoot. Failure to address the cavus deformity with the initial cast as described by Ponseti may lead to persistent rigidity and incomplete correction.

The Ponseti method of treatment for congenital clubfoot deformity has become more widely used in the past few years as long-term follow-up studies from Iowa document excellent outcomes,1 and centers outside Iowa report similar success.2 For physicians who are just beginning to use the Ponseti method, however, their casting method may differ significantly from the method described by Ponseti. Often not considered is the importance of supinating the forefoot in relation to the hindfoot in the first cast to address the cavus component of the clubfoot deformity.

Ponseti has described the cavus component as resulting from a pronated position of the forefoot relative to the more supinated hindfoot.3,4 This concept is difficult to grasp initially, as the forefoot is in a supinated position in relation to the leg. Ponseti has addressed the danger of attempting to correct this relative supination with pronation of the foot, noting this leads to an increase in the cavus deformity and often a stiff, irreducible foot.3,5

The initial cast in the Ponseti method should focus on realigning the forefoot to the hindfoot, reducing the cavus deformity. This is done as the first step in manipulation by supination of the forefoot (Figures 1 and 2) and is clearly described by Ponseti in his publications, yet it is not always recognized by others describing the Ponseti method.6 Correction of the adduction/varus deformity is then accomplished by abducting/externally rotating the calcaneopodial block over the fulcrum of the talar head, with the forefoot maintained in a supinated position.

This study hypothesized initial manipulation and casting of the clubfoot with the forefoot maximally supinated would result in increased flexibility and passive reducibility of the forefoot/midfoot deformity. Pirani scores of clubfoot treated by the Ponseti method were reviewed to evaluate changes noted in the midfoot deformity after the initial cast.

MATERIALS AND METHODS

Patients with congenital clubfoot were graded according to the Pirani method7 (S. Pirani, personal communication, September 2000) at the initial visit prior to casting and immediately after removal of subsequent casts to assess improve-
ment in the foot deformity. The initial cast was placed with the forefoot in supination to match the more supinated hindfoot, without an attempt to abduct the calcaneopedal block over the fulcrum of the talus. Correcting the adduction-varus deformity by abducting the foot over the fulcrum of the talar head is carried out in subsequent casts after the cavus deformity has been corrected. Prior to placement of the first cast, parents were informed the foot would “look worse” in the initial cast.

Although all six elements of the Pirani score were recorded at each visit, this study examined only the three elements that make up the midfoot score:

- Appearance of the lateral border of the foot, which was graded as severely curved (1.0), moderately curved (0.5), or straight (0),
- Medial crease, which was graded as deep (1), superficial (0.5), or absent (0), and
- Reducibility of the talonavicular joint, which was graded as fixed and subluxated (1.0), partially reducible (0.5), or completely reducible (0).

This research protocol was approved by our Institutional Review Board.

**RESULTS**

Twenty-seven patients with 38 clubfeet presented for treatment over an 18-month period. The patients had not received any prior treatment.

Average Pirani score for severity of the lateral border deformity decreased from 0.92 initially to 0.73 after the first cast. Of the 38 feet in the study, this score decreased after the first cast in 12 feet and remained the same in 26 feet.

Average Pirani score for the medial
crease decreased from 0.75 initially to 0.25 after the initial cast. This score decreased after the first cast in all but one of the 38 feet.

Average Pirani score for the talonavicular joint reducibility decreased from 0.75 initially to 0.5 after the first cast. Of the 38 feet in the study, this score decreased in 19 feet after the first cast (indicating increased reducibility) and remained the same in 19 feet.

**DISCUSSION**

The Ponseti method of manipulation and casting has been used at the University of Iowa with little modification of the technique since the late 1940s.3,4,8 Excellent short- and long-term outcomes have been reported.1,2,4

As with any technique, certain principles and methods must be followed to achieve a successful outcome. This article highlights one part of the Ponseti method: correction of cavus deformity by supinating the forefoot to match the hindfoot in the initial cast. This simple maneuver results in a marked increase in the flexibility of the foot, making further correction of the adduction and varus deformity easier.

The improvement noted in the Pirani scores for the midfoot after the initial cast provides objective support for the efficacy of the initial cast in accomplishing this goal. The Pirani score has been found to be reproducible and reliable by its namesake (personal communication), as well as by others.7 It cannot, however, escape the fact that all clubfoot rating scales depend on subjective assessments of the degree of severity of the various components.

An intriguing finding of this study is the improvement noted in the talonavicular reducibility score in half the patients, indicating the initial cast loosens up the foot, allowing increased flexibility and reducibility of the talonavicular joint. In the author’s experience, this initial cast in maximal supination of the foot has been the “magic move” of the Ponseti method, often “unlocking” a stiff foot and allowing further correction of the clubfoot deformity with subsequent manipulation and casting.

**REFERENCES**


