

## Percutaneous Achilles Tenotomy in Idiopathic Clubfoot treatment

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### Abstract

**Introduction;** Percutaneous Achilles tenotomy is a standard procedure in most clubfoot patients treated with Ponseti method as the most widely use method of conservative clubfoot treatment. To our knowledge, there are not studies published in Albanian literature about this technique. Our goal is to present results of conservative treatment of idiopathic clubfoot where this technique was performed.

**Material and Method.** This is a prospective study of all idiopathic clubfoot patients treated in our Institution with Ponseti Method. We performed this technique under sedation anesthesia in operation room, not in clinic. We measured age of patient at time of presentation, gravity according to Pirani score, number of casting, need for Achilles tenotomy).

We measured the degree of angle of dorsiflexion before and after this procedure, the gravity and need for a second procedure.

**Results:** Out 400 clubfeet treated during 2005-2010 we included in our study 372 case that needed the percutaneous Achilles tenotomy performed. Average age at presentation was 3 weeks. Average Pirani score was 5.5. The number of weekly serial cast needed before the tenotomy was 8. Dorsiflexion angle after this procedure was improved by 45 degree (range from 30 to 90 degree). Only 2 cases needed reoperation due to non-compliance with foot abduction bar and physiotherapy

**Conclusion:** The percutaneous Achilles tenotomy is used in 93% of case with idiopathic clubfoot serie of patient. It is an easy technique performed with sedation anesthesia in operation room not with local anesthesia. Achilles tenotomy is an important element to avoid recurrence This supports other studies that have used this method.

**Keyword.** Clubfoot, Ponseti, cast, posteromedial release.

### Introduction

Conservative treatment of idiopathic clubfoot is accepted worldwide by most orthopedic surgeons to be the initial gold standard treatment [1, 2, 3, 4, 5, 6, 7, 8, 9]. Different methods exist but Ponseti method has become popular over the past 3 decades. Ponseti claims to avoid surgery in 89% of cases by using his technique of manipulation, casting and limited surgery<sup>10</sup>. Cooper and Dietz<sup>11</sup> reviewed Ponseti's

cases with an average of 30 years of follow up and found 78% of patients had achieved excellent or good functional and clinical results. Since than many studies have shown very results with Ponseti Technique.

Idiopathic clubfoot is not uncommon in Albania with entire population of 3 million habitants and as white European (Caucasian) population the estimated incidence is 1 clubfoot per 1000 habitants.

In our Institution the standard protocol of conservative treatment of idiopathic clubfoot was Kite method. In 2005 we introduced the Ponseti technique in our Institution and started its application. In this study we present the results of percutaneous Achilles tenotomy as part of Ponseti protocol in treatment of this patients

### Material and Method;

All patients who were referred to our institution from July 2005 until September 2010 were eligible for the present study. Only patients with idiopathic clubfoot and a

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minimum of ten years of follow-up after the initial casting were included. Clinical data were collected prospectively at each clinical visit with use of a templated data sheet. At the time of presentation, the clubfoot deformities were graded with use of the validated 6-point scale of *Pirani et al.* [12]

400 Clubfeet were treated at weekly intervals with above-the-knee casting as described by Ponseti [13, 14, 15], followed by a percutaneous Achilles tenotomy in 372 cases and then with a final cast for three weeks. At the completion of cast treatment, all patients were managed with an abduction orthosis. The open-toed, high-top shoes were fitted by the orthotist and were attached at shoulder width to a Denis Browne bar. Parents were instructed to ensure full-time brace wear for three months, followed by night and naptime wear until at least the age of four years. Any problem with casts, brace wear, and brace compliance was noted

We strove as much as possible to reproduce Ponseti's strict casting protocol faithfully. This calls for forefoot abduction with counter-pressure on the neck of talus, never pronating and never touching the calcaneus. If residual equinus was observed after 6 to 8 weeks of casting and the foot had been abducted 60°, a complete percutaneous Achilles tenotomy was performed and the foot was maximally dorsiflexed. After tenotomy, one more cast was applied and left in place for 3 weeks. The percutaneous Achilles tenotomy was performed in operation room with sedation anesthesia. We did not use local anesthesia. When this cast was removed we allowed 2 days brake before application of foot abduction orthosis which was set at 70° external rotation for the clubfoot and 45° external rotation for the normal foot. For bilateral cases, both feet are set at 70° external rotation. The protocol for the foot abduction orthosis was 23 hours per day for the first 3 month and then nighttime and naptime for 4 years. This is important to avoid recurrence.

All available clinical records, including the prospective clubfoot worksheet, clinic charts, and operative records of all patients were reviewed. Age at the time of initial casting, sex, family history, Pirani score, number of casts, and any clinical complications associated with casting or orthosis wear were noted. All surgical interventions and complications associated with these deformities were noted.

## Results

300 Patients (with 400 affected clubfeet) treated with Ponseti Technique between 2005 and 2010 were reviewed. The mean age of children at time of presentation was 3 weeks. One patient (neglected by parents) started treatment at 2 years of age and finished the course of treatment without recurrence. The pretreatment Pirani score was 5.5.

372 clubfeet out of 400 clubfeet (93%) underwent percutaneous Achilles tenotomy. The percutaneous Achilles tenotomy was performed in operation room with sedation anesthesia. We did not use local anesthesia. The average number of casts was 8.

In functional evaluation Ponseti technique showed good subtalar motion, dorsiflexion of 30° (range 12° - 42°) and plantarflexion of 45° (range 22° - 65°). Also, we noted a calf muscle hypotrophy in 7% of cases. Pain during prolonged walk was found in 5% of cases.

## Discussion

Initial conservative management is the preferred method for the treatment of clubfoot in many institutions today [16], largely because of the promising short and long-term results reported by *Ponseti and others* [17, 18, 19, 28, 29, 30]

Three are the main nonoperative methods used the Ponseti, Kite and French method. In Albania and in our Institution the standard treatment has been the Kite method [30].

*Kite JH* [20] illustrated his method in 1964. He recommended abducting the forefoot against pressure at the calcaneocuboid joint.

*Ponseti* called this maneuver "Kite's error" because it blocks the correction of the hind foot varus and internal rotation.

*Zimble S* [21] showed 10% success rate for 75 patients (90 feet) who were treated with Kite method. Shaw<sup>22</sup> recommended correcting the deformity through dorsiflexing and everting the calcaneus with the index finger and thumb while using the thenar eminence to bring the forefoot into abduction, eversion and dorsiflexion. *Vesely DG* [23] tried to mold the forefoot into a valgus position and the hind foot into valgus and pronation. Both recommendations are contrary with Ponseti's principles, because forefoot pronation creates an increase of the cavus and locks the subtalar joint. Eversion of the calcaneus without first derotating it prevents its correct de-rotation. Another important factor in clubfoot casting is the need for long leg casts. *Kite JH* [20, 24] used below-the-knee casts in children younger than 12 months. A below-the-knee cast is not suitable for holding the foot in abduction and should therefore not be used at any age.

We have noticed retrospectively over the years that most clubfeet patients treated in our Institution with Kite method developed cavovarus foot which needed the Stendler procedure. This observation and the repopularization of the Ponseti technique in the last two decades made us seek another method of nonoperative treatment for our clubfeet patients

Although this new series with Ponseti technique represents our learning curve with this technique, we are very satisfied with the initial results. We had 7% relapses and we believe that this was due to lack of compliance with brace wear. Lack of compliance with brace wear as a contributory factor in the recurrence rate of clubfeet has been reported [18, 25, 26, 27]

Percutaneous Achilles tenotomy is a very helpful procedure that corrects the equinus deformity with minimal incision. It is a day surgery and allows quick correction of equinus. Even though it is a surgical procedure it is included in the Ponseti protocol of nonoperative treatment of

idiopathic clubfoot. We strongly emphasize this procedure to correct the equinus deformity and not use serial casting in order to prevent rocker bottom deformity. As conclusion, Ponseti method is the gold standard treatment for idiopathic clubfoot and percutaneous Achilles tenotomy is very important part of it in success rate.

### Conclusion:

The percutaneous Achilles tenotomy is used in 93% of case with idiopathic clubfoot serie of patient. It is an easy technique performed with sedation anesthesia in operation room not with local anesthesia. Achilles tenotomy is an important element to avoid recurrence This supports other studies that have used this method.

### Declaration of Conflicting Interests and Ethics:

The authors declare have no conflict of interest. This research study complies with research publishing ethics. The scientific and legal responsibility for manuscripts published in Albanian Journal of Trauma and Emergency Surgery – AJTES, belongs to the author(s).

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