

## Original research article

## A Comparison of Regular Ponseti and Accelerated Ponseti in the Therapy of Congenital Talipes Equinovarus (CTEV)

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### Abstract

**Aim:** The aim of the study to analyze the efficacy and functional outcome between Ponseti and accelerated Ponseti in the management of CTEV.

**Material and methods:** This was an analytical study conducted in Department of Physical Medicine & Rehabilitation (PMR), Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India for the period of 2 years, after taking the approval of the protocol review committee and institutional ethics committee. A total of 100 children (120 feet) were treated. Among these 100 children, 50 children (60 feet) were treated by standard Ponseti method and 50 children (60 feet) were treated by accelerated Ponseti method.

**Results:** In the standard Ponseti group, 10 children had bilateral clubfoot, 20 were unilateral on left side, and 20 were unilateral on right side. Among 50 children, 33 (66%) were male and 17 (34%) were female. Mean age at presentation was 25.3 days. Total mean Pirani score at presentation was 4.89. Most of the cases required six casts for correction, with a mean of 5.66. Tenotomy was performed in six cases (12%). The mean number of days the child was in cast was 53.4. Eight cases (16%) had a relapse. All relapses were corrected by repeat casting. Mean Pirani score at 6 months follow-up was 0.081. In the accelerated Ponseti group, 10 children had bilateral clubfoot, 21 were unilateral on left side, and 19 were unilateral on right side. Among 50 children, 27 (54%) were male and 23 (46%) were female. Mean age at presentation was 27.5 days. Total mean Pirani score at presentation was 5.036. The mean number of casts required for correction was 6.04. Tenotomy was performed in 11 cases (22%). The mean number of days the child was in cast was 40.12. 11 cases (22%) had a relapse, among which two case of equinus was treated with repeat tenotomy and others were corrected by repeat casting. Mean Pirani score at 6 months follow-up was 0.12.

**Conclusion:** we conclude that accelerated Ponseti method with plaster changes two times a week is as effective as Ponseti method in the treatment of idiopathic CTEV.

**Keyword:** Accelerated ponseti method, Idiopathic clubfoot, Standard ponseti.

### Introduction

Congenital clubfoot (CTEV) is a frequent congenital deformity.<sup>1</sup> It most likely represents congenital abnormalities of all musculoskeletal tissues distal to the knee.

To reach this result, several researchers looked at individuals who were thought to have had optimal non-surgical or operational treatment yet had some degree of functional impairment afterward.<sup>2</sup>

Congenital clubfoot has four components: cavus, adductus, varus, and equinus. Congenital clubfoot occurs in roughly 1.2 per 1,000 live births.<sup>3</sup>

If a clubfoot is left malformed, the bones undergo multiple late adaptive alterations. These alterations are dependent on soft-tissue contractures and walking.

In untreated adults, some joints may spontaneously fuse or develop degenerative alterations. Ignacio Ponseti established and refined a consistent treatment for clubfeet in the late 1940s based on pathoanatomy from stillborn babies with clubfeet and functional anatomy from radiography of normal feet and clubfeet.<sup>4</sup>

Although Ponseti's clubfoot treatment has been known for a long time, it has just recently been evaluated in terms of long-term patient outcomes.<sup>5</sup>

After an initial period of manipulation, the Ponseti casting technique calls for weekly cast changes.

This arbitrary gap between two consecutive casts has recently been questioned. The accelerated Ponseti treatment is as safe and effective as the regular procedure. In accelerated Ponseti, casting is done every five days, two or three times a week.<sup>6</sup>

They excluded individuals with a pretreatment Pirani score of less than 4, but their results were similar to those of Elgohary and Abulsaad.<sup>7</sup> Reduced treatment duration could lead to higher compliance through several benefits.

The study's goal was to compare the functional outcome of Ponseti and accelerated Ponseti in the management of CTEV.

### **Material and Methods**

This was an analytical cross sectional study conducted in the Department of Physical Medicine & Rehabilitation (PMR), Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India, for the period of 2 years, after taking the approval of the protocol review committee and institutional ethics committee.

### **Methodology**

A total of 100 children (120 feet) were treated. Among these 100 children, 50 children (60 feet) were treated by standard Ponseti method and 50 children (60 feet) were treated by accelerated Ponseti method. The patients were randomized by computer generated numbers to either the standard Ponseti or the accelerated Ponseti method. All children were treated on an outpatient basis to reduce any bias from altered compliance and enabling us to directly compare the efficacy of two methods in terms of correction of the deformity.

Each clubfoot was scored each week using Pirani scoring system before cast application. Children were made to sleep by giving breast milk before cast application. In the standard Ponseti group, each foot was manipulated weekly and corrective above knee casts with knee in 90° of flexion were given. Step by step correction as recommended by Ponseti was followed. First cavus is corrected followed by varus and equinus is corrected at last. In the accelerated group, each foot was manipulated twice in a week at fixed intervals. The principle of correction was the same as that of Ponseti technique.

In both the groups, tenotomy was done when cavus, adductus, and varus are fully corrected but ankle dorsiflexion remained < 10° above neutral. It was made certain that abduction was adequate before performing tenotomy. Percutaneous Achilles tenotomy was done as an outpatient procedure using local anesthesia. Before the application of final cast or tenotomy, measurements were taken so that when the child comes for final cast removal, brace would be ready. Immediately after the removal of final cast, a Dennis Browne splint was applied. In the case of unilateral CTEV, brace was set at 70° external rotation on involved side and 40° rotation on uninvolved side. In cases of bilateral CTEV, both feet were set at 70° external rotation.

## Results

A total of 100 children (120 feet) were treated; of which 50 children (60 feet) were treated by standard Ponseti method and 50 children (60 feet) were treated by accelerated Ponseti method. In the standard Ponseti group, 8 children had bilateral clubfoot, 17 were unilateral on left side, and 17 were unilateral on right side. Among 50 children, 33 (66%) were male and 17 (34%) were female. Mean age at presentation was 25.3 days. Total mean Pirani score at presentation was 4.89. Most of the cases required six casts for correction, with a mean of 5.66. Tenotomy was performed in six cases (12%). The mean number of days the child was in cast was 53.4. eight cases (16%) had a relapse. All relapses were corrected by repeat casting. Mean Pirani score at 3 months follow-up was 0.081. In the accelerated Ponseti group, 10 children had bilateral clubfoot, 15 were unilateral on left side, and 15 were unilateral on right side. Among 50 children, 27 (54%) were male and 23(46%) were female. Mean age at presentation was 27.5 days. Total mean Pirani score at presentation was 5.036. The mean number of casts required for correction was 6.04. Tenotomy was performed in 11 cases (22%). The mean number of days the child was in cast was 40.12. 11 cases (22%) had a relapse, among which two case of equinus was treated with repeat tenotomy and others were corrected by repeat casting. Mean Pirani score at 6 months follow-up was 0.12. In our study, idiopathic clubfoot was seen more common in male child than female child. Both standard Ponseti technique and accelerated Ponseti technique for correction of CTEV were done Table 1. We used Pirani scoring system for comparing the correction of CTEV in both standard and accelerated Ponseti techniques. The Pirani score was higher in accelerated Ponseti than standard Ponseti at the time of presentation Table 2. Based on the Pirani score, the patients who had undergone standard Ponseti method of correction had lower relapse rate than patients corrected with accelerated Ponseti method Table 3. 6 months follow-up mean Pirani score showed better result in standard Ponseti method of correction than accelerated method of correction for CTEV Table 4.

**Table 1: Gender distribution**

Procedure	Male (%)	Female (%)	Total
Standard ponseti	33 (66)	17 (34)	50
Accelerated ponseti	27 (54)	23(46)	50

**Table 2: Mean pirani score at presentation**

Procedure	Score
Standard ponseti	4.89
Accelerated ponseti	5.036

**Table 3: Relapse rate**

Procedure	Relapse rate (%)
Standard ponseti	16
Accelerated ponseti	22

**Table 4: Mean pirani score at 6 months follow-up**

Procedure	Mean pirani score at 6 months follow-up
Standard ponseti	0.081
Accelerated ponseti	0.12

## Discussion

At present, the Ponseti technique is the most often utilised modality for care of CTEV. The classic Ponseti technique of weekly manipulation and casting is affordable, has a relatively low

learning curve, and has achieved great outcomes in both in short- and longterm investigations.<sup>8,9</sup>

Although Giesberts et al.<sup>10</sup> have published a review study revealing that accelerated treatments have a similar efficacy and safety profile as the standard protocols, no appropriate casting interval has been recommended.

Our purpose was to establish the effectiveness of a twice-weekly accelerated treatment vis-à-vis the standard procedure in our study.

CTEV is one of the most prevalent congenital malformations occurring in children.<sup>11</sup>

The approach of serial manipulation and casting devised by Ponseti for congenital clubfoot was introduced in an effort to obtain a plantigrade, functional foot without the need to resort to extensive surgical intervention. The Ponseti approach was generally accepted and practised, delivering reliably long-term benefits.

We treated clubfoot cases using Ponseti and accelerated Ponseti approach, which involves replacing the plaster 2 times in a week. We performed special clubfoot clinics and did our casting on fixed days in a week so that we gave the chance of new patient's parents to meet old patient's parents and assure them about treatment and compliance.<sup>1,4</sup>

We followed Pirani scoring system and performed tenotomy, whenever necessary.

Following cast correction, a Dennis Browne splint was inserted and bracing procedure followed. The mean age at which the presentations were made was 28.5 days in both groups.

For rectification, the mean number of casts required in the expedited group (6.04) was comparable to that in the conventional group (5.66).

The mean number of days spent in the cast was 40.12 days in the accelerated group and 53.4 days in the standard group in the accelerated group.

Despite the fact that the tenotomy rate was greater in the expedited group (22 percent) than in the conventional group (12 percent), the difference was not statistically significant between the two groups.

When comparing the accelerated and standard groups, the accelerated group has a slightly higher Pirani score (5.036) than the standard group (4.89). At 6 months follow-up, 78 percent of cases in the expedited group had remained corrected, which is equivalent to 84 percent in the regular group.

The relapse rate in the accelerated group was 22 percent, while it was 16 percent in the regular group, which is statistically insignificant. According to our findings, the majority of the relapses were of the forefoot adduction and equinus types, which were primarily treated by casting. Relapses were shown to be mostly caused by failure to adhere to the bracing technique. By emphasising the necessity of braces at each visit and scheduling follow-up appointments at regular intervals, this could be minimised.

We instructed the parents on how to put on the braces and kept an eye on them while they were doing so. The use of the accelerated Ponseti approach, if the long-term results are comparable to those obtained using the regular Ponseti procedure, may be beneficial to patients in a number of ways.

The number of days the youngster spent in plaster was reduced when the procedure was used more quickly. This would offer the parents with the option of obtaining more quick medical attention.

Some other advantages include less danger of plaster slipping and the opportunity for more intensive instruction about the need of braces, which can be accomplished through a greater number of visits over a shorter period of time.<sup>12,13</sup>

After being immobilised with above-knee plasters for a period of time, Morcuende et al. reported that they had developed osteopenia; nevertheless, these findings resolved within a few months of the plasters being removed.<sup>14</sup> It is possible that the faster procedure will be able to further lessen this problem's severity.

### Conclusion

According to the findings of the current investigation, the clubfeet treated by the standard Ponseti procedure and the accelerated Ponseti approach are identical. In the treatment of idiopathic CTEV, the accelerated Ponseti approach, which includes two plaster changes each week, is equally successful as the traditional Ponseti method.

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