



A Comparative Study Between Ponseti and Accelerated Ponseti Technique in Treating Patient Visiting a Tertiary Care Centre in Belagavi

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ABSTRACT:

Background: Aims: The aim of this study was to compare the results of weekly once Ponseti casting technique to an accelerated twice weekly regimen in the CTEV patient.

Methods: A prospective randomised controlled study which was conducted in 50 consecutive CTEV patients. 25 were randomised to each group and were treated with ponseti and accelerated ponseti methods respectively and followed up for 6 months.

Results: Initial mean Pirani score was 4.44 ± 0.78 in the standard group and 4.36 ± 0.71 in the accelerated group, and the score decreased to 0.38 ± 0.37 and 0.31 ± 0.32 , respectively. The average number of casts required to correct all deformities was 6.15 ± 1.4 in standard group and 6.08 ± 1.9 in accelerated group ($p=0.43$). Average time spent in cast was 68.2 ± 8.3 days in standard and 44.5 ± 5.2 days in accelerated group ($p<0.001$). Percutaneous Achilles tendon tenotomy was done in 88% and 84% in standard and accelerated group respectively ($p=0.66$).

Conclusions: These results suggest that even though the final results of both methods are similar accelerated Ponseti technique has shown to significantly reduces the correction time and that it is equally safe and slightly more effective as the traditional Ponseti technique.

INTRODUCTION

Congenital clubfoot, or congenital talipes equinovarus (CTEV), is one of the most common congenital deformities^[1]. It most likely represents congenital dysplasia of all musculoskeletal tissues (musculotendinous, ligamentous, osteoarticular, and neurovascular structures) distal to the knee. Congenital clubfoot is a complex three-dimensional deformity consisting of four components: cavus, adductus, varus, and equinus. The incidence of congenital clubfoot is approximately 1.2 per 1,000 live births^[2]. In the late 1940s, Ignacio Ponseti developed and refined a uniform treatment for clubfeet.^[3]

The Ponsetti technique was then widely accepted in the 1990s^[4]. It is a systematic series of casting and orthotic bracing treatments that permanently and non-surgically correct club foot in young children. The standard regimen of the Ponseti casting technique involves weekly change of cast after an initial period of manipulation. However, more recently, this interval between two consecutive casts has been challenged. The frequency of Ponseti casting technique in it is increased to 2 times a week and is called accelerated Ponseti protocol^[5,6].

This study was done with an aim to determine the effectiveness of a shorter duration of treatment which has obvious advantages in a country like India where due to lack of proper knowledge patient compliance is less and case rapid improvement is not seen.



MATERIALS AND METHODOLOGY

A prospective, observational, and comparative study was conducted in the Orthopaedics Outpatient Department of Belagavi Institute of Medical Sciences, Belagavi, over a period of 18 months from January 2024 to June 2025. A total of 50 patients with congenital talipes equinovarus (CTEV) who met the predefined inclusion and exclusion criteria were enrolled. Participants were randomly allocated into two groups of 25 each and managed using either the Ponseti method or the accelerated Ponseti method. All patients were followed for a duration of six months.

Data were collected using a structured proforma during hospitalization. Demographic information, including age, sex, and contact details, was documented, along with a brief clinical history of mode of injury and comorbidities. Clinical evaluation comprised assessment using Pirani's score^[7], which, together with a general examination, was performed at baseline and at each follow-up visit.

Written informed consent was obtained from the parents or legal guardians of all patients. Ethical approval for the study was granted by the Institutional Ethics Committee.

Detailed maternal and perinatal history was also obtained, with particular attention to maternal exposure to radiation or drugs during pregnancy, type and place of delivery, birth order, history of birth asphyxia, familial predisposition, associated deformities, and any prior interventions received. Inclusion criteria included age less than 6 months, Idiopathic CTEV, Informed consent given by parents and the Exclusion criteria included age more than 6 months, syndromic CTEV, previously operated CTEV, relapsed CTEV.

Steps were the same in both the standard and accelerated Ponseti techniques^[8,9,10] except for the duration of cast immobilization. The two phases in the management were as follows:

(1) **Treatment phase:** consisted of weekly gentle manipulation and casting in the standard group and twice weekly in the accelerated group. Manipulation was done for 1-2 minute in each group.

(2) **Maintenance phase:** consisted of bracing with a foot abduction orthosis after removal of the final cast ideally for 23hrs in a day.

All components of the clubfoot deformity were corrected simultaneously, except for the equinus, which was addressed in the final cast. When tendoachilles tenotomy was performed, the final cast was maintained for three weeks with the foot positioned in more than 15° of dorsiflexion and 70° of abduction.

Following cast removal, a foot abduction brace was applied for 23 hours per day for the first three months and could be removed only for bathing and cleaning the baby once in the morning. Subsequently after 3 months the duration was reduced to only night-time and afternoon nap-time. The first follow-up was conducted at one week to assess brace compliance, followed by monthly visits up to three months, and thereafter at 6 months interval. At every visit the Pirani's score was checked.

The Pirani scoring system is widely employed to assess the severity of clubfoot deformity. It consists of six parameters: heel emptiness, reducibility of the lateral talar head, equinus rigidity, presence of a posterior crease, curvature of the lateral foot border, and the medial crease. Each parameter is graded as 0 (normal), 0.5 (moderately abnormal), or 1 (severely abnormal). The scores are summed to yield a total ranging from 0 to 6, with higher values reflecting greater deformity severity^[11].

RESULTS

A total of 50 cases were included in the study. These were equally divided in both groups. Of all the patients 26 (52%) had bilateral involvement, 11 (22%) had left side involvement and 13 (26%) had right side involvement.

Table 1: Side Involvement

	Standard	Acc group	P-value
Bilateral involvement	12	14	0.774
Left side involvement	7	4	0.354
Right side involvement	6	7	0.821

Side Involvement - In the ponseti group, 12 (48%) had bilateral involvement, 7 (28%) had left side involvement and 6 (24%) had right side involvement. While in the Acc. Ponseti group had bilateral, left and right side cases of 14 (56%), 4 (16%), 7 (28%) respectively. P value showed no significant difference between the 2 groups

Table 1: Gender Involvement

	Male	Female
Standard	16 (64%)	9 (36%)
Accelerated	17 (68%)	8 (32%)



Gender Involvement- Both groups showed a male predominance with 16 males in the standard group and 17 in the accelerated group. While there were 9 female kids and 8 female kids in standard and accelerated groups respectively.

Table 3: Mean Age

	Range	Mean age	SD
Standard	7-112 days	40.4 days	22.6
Accelerated	3-102 days	37.4 days	19.7
P value	0.551 - Not Significant		

Mean Age- The average age of babies in the standard group was 40.4 +/- 22.6 days with a range of 4-112 and accelerated group showed a average age of 37.4 +/- 19.7 days (ranged from 3-102 days).

Table 4: Pirani's Score

	Standard	Accelerated	P-value
Initial pirani score	4.44 +/- 0.78	4.36 +/- 0.71	0.341
Post t/t phase	0.38 +/- 0.37	0.31 +/- 0.32	0.523
At 6 months	0.53 +/- 0.41	0.50 +/- 0.27	0.553

Pirani's Score - There was statistically insignificant variance among groups under investigation in terms of score before the start of casting and even post treatment and at 6 months (Last follow up).

Table 5: No. Of casts

	Range	Mean age	SD
Standard	4-9	6.15	1.4
Accelerated	4-9	6.08	1.9
P value	0.43 - Not Significant		

No. Of casts- There was statistically insignificant variance among groups under investigation regarding average number of casts per foot as the P-value was 0.43.

Table 6: Days spent in cast

	Range	Mean days	SD
Standard	35-63 days	43.4days	6.3

Accelerated	18- 35 days	21.5 days	3.2
P value	<0.001 - Significant		

Days spent in cast- a statistically significant variance has been detected regarding Duration from first cast to removal of final cast as the p-value was significantly lower than 0.001.

Table 7: Percutaneous Tenotomy

	Tenotomy done	Not done
Standard	22 (88%)	3 (12%)
Accelerated	21 (84%)	4 (16%)
P-Value	0.729 Not Significant	

Percutaneous Tenotomy- There was statistically insignificant variance among groups under investigation regarding tenotomy as the P-value was of 0.729 and 88 and 84% of all the cases underwent tenotomy in Standard and acc groups respectively.

Table 8: Complications

	Standard	Accelerated	P-value
Rashes around groin	1	2	0.913
Tight cast causing swelling of feet	1	0	0.371
Wound due to Cast	2	1	0.547
Irritation due to cast	6	2	<0.001
Loosening of cast	5	2	<0.001

Complications- During the treatment phases 5we came across 5 different complications. Complications like Rashes around groin, Swelling of feet secondary to tight cast, and wound due to cast showed no statistically significant difference between the 2 groups.

However, Irritation due to cast, loosening of the cast were nearly 3 times more in the standard group than the accelerated group and this difference was statistically significant.



Figure 1: At Presentation



Figure 2: Weekly Casting



Figure 3: Post Tenotomy



Figure 4: Post - treatment phase



Figure 5: Continuation phase- with steenbeek brace

DISCUSSION

The Ponseti method is widely recognized and practiced, consistently delivering reliable long-term outcomes. The traditional Ponseti technique of weekly manipulation and casting is inexpensive, has a relatively short learning curve, and has yielded excellent results in both in short- and long-term studies. The Ponseti method continues to be the best approach for correction of typical congenital clubfeet. Our findings indicate that, in the short term, comparable results can be achieved using an accelerated approach with plaster changes 2 times per week.

The study analyzed a total of 76 feet, with 37 in the standard group and 39 in the accelerated group. No statistically significant differences were observed between the groups regarding age, sex, Pirani score, number of casts required, or the need for tenotomy.

Additionally, our outcomes were consistent with those of Harnett P *et al.* [12] who concluded that comparable outcomes can be achieved with an accelerated Ponseti method to standard method while making the patient be in plaster for lesser number of days.

The present study demonstrated that there was statistically insignificant variance among groups under investigation in terms of score before and after the treatment and at 6 months followup based on piranis scoring. Also no statistically significant difference was



seen in tenotomy among the groups examined in this study.

If the accelerated method continue to be comparable to those of the standard Ponseti method, it can offer patients a number of benefits. The financial burden on parents can be reduced by either admitting the patient for three weeks or arranging nearby hostel accommodation. It will also reduce the time off work and the time away from other dependants in the family. The patient compliance also increases due to the faster visible recovery. If tenotomy is necessary, the final cast can potentially be removed and the boots and bars fitted at a clinic nearer to the patient's home. Other potential advantages are a reduction in the likelihood of plasters slipping and the irritation due to cast.

The strength of this study lies in its design as a prospective randomized controlled trial comparing the accelerated method with the standard treatment. However, the follow-up period is relatively short, with fewer than twelve months for all patients. Ongoing monitoring of recurrence rates will be necessary to determine whether patients treated with the accelerated method experience late recurrence. The most critical factor influencing recurrence during follow-up is adherence to the abduction brace^[13] which was not examined in this study. Haft, Walker, and Crawford^[14] found that patients whose parents did not adhere to bracing had a fivefold higher risk of recurrence.

CONCLUSION

These results suggest that even though the final outcome of both methods are similar accelerated Ponseti technique has shown to significantly reduces the correction time and that it is equally safe and effective as the traditional Ponseti technique. It also has shown reduction in complications like loosening of cast and irritation due to cast. We hope this will serve as a valuable alternative, especially for patients who must travel long distances for treatment or those who struggle to adhere to weekly plaster applications.

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