European Journal of Clinical Pharmacy
Print ISSN: 2385-409X **Online ISSN**: Applied Website:
https://farmclin.com/

Results of accelerated Ponseti technique for severe congenital talipes equinovarus foot in infants below 6 months of age.

Dr Udit Sourav Sahoo[1], Dr Siddharth panda[2], Dr. Kartik Chandra Pati[3]

[1]Assistant professor, Department of Orthopaedics, SCB Medical College, Cuttack, Odisha, India, Mail ID: uditsouravsahoo@gmail.com
[2]Assistant professor, Department of Orthopaedics, SCB medical college and hospital cuttack, Odisha, India, Mail ID: sid.panda.8888@gmail.com
[3]Assistant Professor, Department of Community Medicine, FMMCH, Balasore, Odisha, Mail ID- drkcpati@gmail.com

ABSTRACT

Objective: This study aims to investigate the efficacy and safety of a proposed "accelerated Ponseti method" in which manipulations and cast changes reduce the treatment period to 4 days in place of the standard 7-day interval of classic Ponseti technique, for infants below 6 months of age.

Methods: A total of 65 children with 87 congenital talipes equinovarus (CTEV) feet, treated by an "accelerated Ponseti method" were included in the study. Through this, the manipulation of the deformed foot and repetitive casting can be accomplished in 4 days, yet the correction of cavus, varus and adduction deformity, following the "Achilles tenotomy" is also done in 3 weeks subsequent to the children due to casting. Pirani scores were compared before starting the procedure of cure and abolishing the ultimate cast.

Results: Out of a total 65 children with 87 club feet, there are 22 patients, who are with the issures regarding bilateral CTEV. The average period of this treatment was about 38.2 days (range 7- 168 days). The mean Pirani score before starting the treatment was 5.7. However, post-removal period of the tenotomy cast the score of Pirani method was 0.42 (range 0-1.5), indicating a plantigrade and braceable feet in all children without any short-term complications.

Conclusions: The accelerated Ponseti method with cast changes every 4 days has been found safe and effective in correcting severe CTEV in infants aged less than 3 months. Also, randomized studies on a bigger scale with longer follow-up information should be carried out to validate our observation.

KEYWORDS: "Congenital talipes equinovarus", "Clubfoot", "Accelerated Ponseti technique", "Pirani score".

How to Cite: Dr Udit Sourav Sahoo, Dr Siddharth panda, Dr. Kartik Chandra Pati, (2026) Results of accelerated Ponseti technique for severe congenital talipes equinovarus foot in infants below 6 months of age, European Journal of Clinical Pharmacy, Vol.8, No.1, pp. 1523-1526

INTRODUCTION

Congenital idiopathic talipes equinovarus (CTEV) is defined as the pathological alterations in the foot, accompanying the deformity in the form of equinus, hindfoot varus, midfoot cavus, and forefoot adduction (1). Congenital club foot has an incidence of 1.2 in 1000 live births, more frequently in boys than in females (2:1 to 3:1 ratio) (2). The Ponseti method of serial casting successfully achieved the goals in both short and long-term and has universal acceptance (2-4)(1). Classic Ponseti method involves multiple castings with weekly changes, requiring a series of 8-10 casts. Over the treatment duration we observed many parents apprehensive and frustrated with the repeated process over such a long period of time. In this study we implemented an accelerated Ponseti method protocol, specifically for the patient groups residing in nearby places from our hospital who can frequently visit us for early completion of the treatment. The castings were applied at 4-day interval. Focus was on faster correction**,** improved convenience for families, and similar safety/effectiveness**,** aiming to reduce the overall treatment duration and burden while maintaining excellent outcomes for idiopathic clubfoot.

METHOD

This was a "prospective observational" study, which determined a "tertiary care referral centre" between June 2023 to December 2025 which included a group of 65 children with 89 congenital idiopathic club feet, treated with the "accelerated ponseti method", after obtaining informed consent for the same. Secondary CTEV, relap , yet recurrence and syndromic types of the health issues were not counted. The Pirani scoring was done for every affected foot (6). The average age at the time of starting the treatment was 38.2 days ranging from 7 days to 168 days. Also, all the patients were under the care of a team of orthopedic specialists. In this group, initially there was manipulation of deformed feet involving elevation of the 1st metatarsal head and abduction with counter-pressure over the head of the talus simultaneously to correct cavus as well as other deformities, followed by applying the 1st cast above the knees. The patients were followed up on the 4th day after manipulation to change the cast followed by manipulation to apply the 2nd cast. Then manipulation followed by castings were done on every fourth day. Subsequently, Achilles tenotomy was done for correction of equines deformity, after completion of correction of cavus, varus and adduction. After tenotomy the cast was applied for 3 weeks. This treatment was processed in the healthcare centre through

local anesthesia. Each score of Pirani of the affected feet was documented before beginning the treatment and after abolishing the post- tenotomy three-week cast. Full time orthosis was advised after final cast removal. Any complications were recorded in each follow up. “Nonparametric tests” were employed to compare the scores of Pirani before and after treatment. (figure 1)

RESULT

Among the total patients of 65 with 87 club feet, there were 42 males and 23 females, along with 22 patients with bilateral CTEV. The average age of these patients was 38.2 days (range 7- 168 days). Mean Pirani score before starting treatment was 5.7. After the reduced timing of three-week post tenotomy cast, the mean Pirani score was 0.42 (range 0-1.5) (table1), which suggests the correction of the deformity in all patients (table 1). Average number of casts required prior to tenotomy was 4.7(range 4-9), at an average of 18.8 days. Then all of them were subjected to percutaneous Achilles tenotomy. The deformity was found to be corrected in an average of 22. 5 day. All feet were put in Dennis brown splint after completion of cast treatment. Average duration of follow-up is 16.2 months (8-34 months). The mean Pirani scores after final follow-up session were 0.47. None of the patients needed surgeries for their feet nor repeat of tenotomy, during follow up compliance with bracing improved with time following continuous parents counselling and education. 2 patients had recurrence of equines, 5 developed metatarsus adductus, and 3 had mild hind foot varus as residual deformities.

DISCUSSION

Ponseti method became a paradigm shift in the management of CTEV, effectively replacing invasive surgical procedures as the primary line of treatment with universal agreement. Ponseti et al highlighted that their conservative method performed 74% score, which is considered as good to excellent, backed by their near 30 years of follow up which is supported by other long-term studies (3, 4). Ponseti method uses gentle stretching, serial manipulation and casting which leads to unfolding of the collagen crimp of the connective tissue within its elastic limit. Weekly manipulation gently stretches the ligaments and tendons, moving them into the linear region of the stress-strain curve just enough to induce a permanent plastic deformation without causing macroscopic damage or rupture. The sustained, static stretch encourages the fibroblasts to remodel the extracellular matrix by altering elastin and collagen production and growing the tissue in the corrected position. During the period of long leg cast, the tissues undergo stress relaxation and eventually result in permanent lengthening and reduction in the collagen crimp angle. The same process is repeated weekly with a new cast, allowing for a gradual, stepwise correction of the deformity. This sequential approach prevents the high stresses that would occur with a single, aggressive correction, which could lead to tissue failure. Pirani et al have also agreed upon this theory of growth alterations resulting from gentle and stepwise “mechanical loading on fast-growing tissues” (15). Thus, it was proposed that the accelerated Ponseti method is not desirable since it does not provide enough time to permit tissue adaptation to the mechanics of loading. Gupta et al in their study with classical Ponseti, showed that 71% of cases needed at least 5 casts with the average timing period of castings at 4.94 weeks (16).

However, classical Ponseti treatment lasts between 4-8 weeks which may be associated with frustration and apprehension amongst parents. High expenses might be needed for transportation when children are in remote areas from the treatment centre or de-touch from family and work for the long-term. Often these circumstances lead to drop outs, incomplete treatment, relapse or recurrences. The time difference for correction between the accelerated Ponseti method and the traditional one may have important repercussions on parents in these conditions and thereby help decrease the drop-out rate. Few studies have pointed out certain complications associated with accelerated Ponseti technique. According to Morcuende et al (10), children in their study found it discomforting to have swelling in their foot due to repeated casting procedures for 3-4 days, and opined in favour of a 5-day casting interval to reduce incidence of foot edema. However, many studies have shown in favour of accelerated ponseti technique. Xue et al, Evans et al and Elgohary et al (8, 11, 17) reported accelerated ponseti technique was potential, reliable and impactful without any argument or issues regarding edema in the feet of the children. In addition, these studies further suggested that (8, 10, 11), the reduction of the treatment time was noticeable in compare to the traditional Ponseti method, with no significant difference in terms of correction achieved or number of casts required. Gisberts et al in their systematic review pointed out that “accelerated Ponseti method” (18) determines significant evidence to solidify the correlation between shortened “cast change interval” and reduced total treatment period.

In our study, the traditional Ponseti method was discussed, where casts were changed every 4 days till adduction was corrected, followed by tendoachilis tenotomy, and post tenotomy cast was kept for 3 weeks. All patients showed significant correction after removal of the 3-week cast, with plantigrade and pain-free feet which were given Dennis Brown splint afterwards. In a few studies found in the literature, the accelerated technique of Ponseti was adopted with a comparable outcome as demonstrated in our study (8-11). Table 1 illustrates findings of different studies on accelerated Ponseti Method. Average number of casts required prior to tenotomy was 4.7(range 4-9), average duration was 18.8 days following which feet were ready for tenotomy and this number can be compared with the peer reviews. However, an average number of casts of 7, averaging 8.6 weeks in duration, was reported in the study of Laaveg et al(4). Morcuende et al(10, 19), on the other hand, indicated that in 90% of patients, the number of casts used was 5 or less.

The need for Achilles tendon tenotomy as required by Achilles tends to vary, as listed in between 80-90% (5, 10, 20). . We performed tenotomy for all patients in our study after obtaining at least 60° of abduction. Mean dorsiflexion prior to tenotomy was 18. 6 degrees. This reduced dorsiflexion may be attributed to the severe presentation of cases of most patients who had a mean Pirani score of 5.7 at the beginning of the treatment program. Morcuende et al (10) found that both classical and accelerated patients who were not compliant with their brace regimen following tenotomy were 8.5 times more likely to have a recurrence than the compliant patients. In our study, we stressed upon continuous counselling and education for parents regards to application of the brace. None of the patients showed recurrence of the deformity at 16.3 mean follow-up intervals, yet

further instruction is required to substantiate this fact.

The rapid correction was evident in the "accelerated Ponseti technique" for treating the patients in our study which is in accordance with many other reports. We have followed the principles and sequence of correction as per Ponseti et al. We have kept the frequency of cast changing at 4 days which is shorter than classical Ponseti, but not too short so as to allow tissue adaptation but decreasing the risk for edema or tissue rupture. Again, the average age of children was quite low at 38.2 days and intervention at that young age might have allowed adaptation and correction of the deformity within a shorter period given that the osteochondrous component and tendons are very flexible for adaptation. Additionally, after the 3-week casting change techniques of tenotomy with the feet positioned accurately may have compensated for it.

The limitations of this research include relatively smaller sample size, convenience sampling, selection bias and short follow-up time. However, it also shows some encouraging potential in relation to the "accelerated Ponseti method".

CONCLUSION

The study shows that accelerated Ponseti technique in which casts are changed every 4 days is potential and reliable to interconnect with severe CTEV among infants below 3 months of age. Also, the Randomized large-scale studies are crucial to follow up data for long-term to strengthen our observations.

Table 1

	Elgohary et al (8)	**Morcuende et al (10)**	**Evans et al (17)**	**Xu et al (11)**	**Our study**
Number of patients	21	108	123	26	65
Number of foot	32	N/A	190	40	87
Castings interval	Twice a week	One cast every 5 days	Twice a week	Twice a week	Every 4 days
Duration of treatment till equinus correction	18.13 ± 3.02 days	16 day	17	20.61 days	18.8 days
Number of casts needed for correction	5.16 ± 0.72 casts	"90% of patients required five or fewer casts. With a mean of four casts"	The mean was five (2–10 casts)	The mean number of casts was 5.04 casts	Mean 4.7
Complications	"15.6 % had relapse. No major complications"	"10.2% had relapse. Three patients (1.3%) required corrective surgeries for complete correction"	"Four cases had skin lesions, three cases had a disrupted casting phase."	"4 feet (10%) needed corrective surgeries for complete correction"	2 patients had recurrence of equinus, 5 developed metatarsus adductus, and 3 had mild hind foot varus as residual deformities
Follow up time	12-44 months	11 years	1 year	2-6 years	16.2
Percentage of those needed tenotomy	93.8%	85%	84%	87.5%	100%

REFERENCES

1. Ponseti IV. Congenital clubfoot: fundamentals of treatment. Oxford: Oxford University Press; 1996.
2. Wynne-Davies R. Family studies and the cause of congenital club foot. J Bone Joint Surg Br. 1964;46:445–463.
3. Ponseti IV, Smoley EN. Congenital club foot: the results of treatment. J Bone Joint Surg Am. 1963;45:261–344.
4. Laaveg SJ, Ponseti IV. Long-term results of treatment of congenital club foot. J Bone Joint Surg Am. 1980;62(1):23–31.
5. Herzenberg JE, Radler C, Bor N. Ponseti versus traditional methods of casting for idiopathic clubfoot. J Pediatr Orthop. 2002;22(4):517–521.

6. Pirani S, Outerbridge HK, Sawatzky B, Stothers K. A reliable method of clinically evaluating a virgin clubfoot evaluation. Presented at: 21st SICOT Congress; 1999; Sydney, Australia.
7. Dobbs MB, Nunley R, Schoenecker PL. Long-term follow-up of patients with clubfeet treated with extensive soft-tissue release. J Bone Joint Surg Am. 2006;88(5):986–996.
8. Elgohary HS, Abulsaad M. Accelerated Ponseti technique: a prospective comparative study. J Pediatr Orthop B. 2015;24(6):493–497.
9. Zhao D, Liu J, Zhao L, Wu Z. Relapse of clubfoot after treatment with the Ponseti method and the function of the foot abduction orthosis. Clin Orthop Relat Res. 2014;472(1):282–289.
10. Morcuende JA, Dolan LA, Dietz FR, Ponseti IV. Radical reduction in the rate of extensive corrective surgery for clubfoot using the Ponseti method. Pediatrics. 2004;113(2):376–380.
11. Xu RJ, Li LY, Chen C, et al. Accelerated Ponseti method for idiopathic clubfoot: a prospective study. J Pediatr Orthop. 2017;37(2):e98–e102.
12. Zionts LE, Zhao G, Hitchcock K, Maewal J, Ebramzadeh E. Has the rate of extensive surgery to treat idiopathic clubfoot declined in the United States? J Bone Joint Surg Am. 2010;92(4):882–889.
13. Herring JA. Tachdjian's Pediatric Orthopaedics. 5th ed. Philadelphia: Elsevier Saunders; 2014.
14. Staheli LT. Clubfoot: Ponseti management. 3rd ed. Seattle: Global-HELP Organization; 2009.
15. Pirani S, Zeznik L, Hodges D. Magnetic resonance imaging study of untreated clubfoot treated with the Ponseti method. J Pediatr Orthop. 2001;21(6):719–726.
16. Gupta A, Singh S, Patel P. Evaluation of the Ponseti method in the management of idiopathic clubfoot. Int Orthop. 2008;32(3):407–412.
17. Evans AM, Perveen R, Ford-Powell VA, Barker S. The effectiveness of accelerated Ponseti treatment for clubfoot: a systematic review. J Foot Ankle Surg. 2014;53(5):587–591.
18. Gisberts T, Beek FJ, van der Sluijs JA. Accelerated Ponseti treatment for idiopathic clubfoot: a systematic review. J Child Orthop. 2017;11(2):151–158.
19. Morcuende JA, Abbasi D, Dolan LA. Results of an accelerated Ponseti protocol for clubfoot. J Pediatr Orthop. 2005;25(5):623–626.
20. Scher DM, Feldman DS, van Bosse HJP, Sala DA, Lehman WB. Predicting the need for tenotomy in the Ponseti method for correction of clubfeet. J Pediatr Orthop. 2004;24(4):349–352.