

ORIGINAL RESEARCH

Short term follow up of infants with congenital talipes equino varus deformity treated with serial ponsetti casting – a cross-sectional study

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Received: 20 February, 2023

Accepted: 26 March, 2023

ABSTRACT

The goal is to evaluate the effectiveness of the serial casting by Ponseti method for the treatment of club foot. Cross-sectional research design. Location: Orthopaedics Department, Chirayu Medical College and hospitals, Bhopal. Timeframe: from March 2022 to December 2022. Methods & Materials:- The research included all patients with clubfoot who visited the orthopaedics department. The Pirani scoring method was used to categorize patients before manipulation and once-weekly above-knee casts were applied. After the fourth to sixth plaster, equinus was evaluated, and if necessary, a percutaneous tenotomy was performed. After the final plaster was removed, patients were monitored for a further six months. In SPSS Version 25, all the data was input and examined. **Results:** The patients' median age was 37 weeks. 27 infants under the age of six months, five between six and twelve months, and nine between one and two years were among the total 41 patients. 25 of the 41 kids had unilateral participation, and 16 had bilateral involvement. There were 41 kids, of which 26 were boys and 15 were girls. In our research, an average number of casts was 6.290.93. The mean Pirani score using the 10-point Pirani scoring method was 3.460.515 at baseline and 0.03170.130 after treatment, respectively. 82% of the results were excellent, 12% were acceptable, and 4% were only fair. **Conclusion:** The Ponseti technique is dependable and efficient. Our study's findings are positive and satisfying, and our institute can use them to treat all clubfeet.

Key words: Congenital Club Foot, Manipulation and Serial Casting, Ponseti Technique, Pirani Scoring System

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INTRODUCTION

A common congenital foot abnormality is clubfoot. Additionally, hereditary talipes equinovarus is a name for it. (CTEV). The disorder is present from infancy. It has an impact on 1000 live pregnancies on average¹. Hippocrates was the first to describe clubfoot deformity more than 2000 years ago². Clubfoot deformity can be caused by myelodysplasia, arthrogyposis, or a mix of congenital anomalies. But it usually manifests as an unrelated idiopathic birth abnormality³. During the second trimester of pregnancy, a foot that is typically developing turns into a clubfoot. Turco describes the mechanism as the talus being driven medially by the underlying calcaneus and navicular in equinus. The calcaneus is inverted beneath the talus, with the anterior end

moved medially and downward and the posterior end propelled laterally and upward⁴. Orthopaedic doctors still face a clinical problem with clubfoot. The issue is especially serious in developing nations due to late presentation, a higher likelihood of treatment cessation, and superstitious beliefs associated with this congenital illness⁵. There is a wealth of knowledge about various treatment choices in the books, ranging from bandages and plaster casts to surgical intervention, but no single modality has succeeded in treating patients in the long run. Children with idiopathic clubfoot who got nonsurgical therapy frequently showed only modest improvement, whereas children who underwent surgery frequently experienced severe soft tissue scarring and ongoing pain. However, those who use the Ponseti technique

of casting and serial manipulation have typically disregarded these comments⁶. Due to its superior outcomes from a variety of manipulation methods, Ponseti has received wide acceptance⁷. The Ponseti method significantly decreased the amount of sporadic clubfoot surgeries. This success has led to a global acceptance of the strategy⁸. Currently, closed management techniques like serial casting are the gold standard for clubfoot therapy. Excellent outcomes using the Ponseti manipulation technique and serial casting have been reported in long-term studies. This method showed a higher degree of motion and push-off strength when compared to surgical release⁹. The aim of current study is determine the efficacy of serial casting of ponseti technique for treating club foot.

MATERIAL & METHODS

The Department of Orthopaedics, Chirayu Medical College and Hospitals, Bhopal, carried out this cross-sectional study. The research lasted for a time duration from March 1st 2022 to December 31st 2022. The study's sample size consisted of all clubfoot patients who visited the orthopedics division during the study's time frame.

INCLUSION CRITERIA

All patients of either age, age below two years having clubfoot (both uni or bilateral).

EXCLUSION CRITERIA

- Age > 2years,
- Previous treatment with other plaster cast technique
- Prior surgery for clubfoot,
- Patients having other continental defect/ illness
- Secondary or atypical clubfoot

DATA COLLECTION PROCEDURE

All club foot deformity patients at Chirayu Medical College and Hospitals, Bhopal, outpatient orthopaedics department were included in this research after the Ethical Review Committee gave its approval. Consent was obtained from the parents. All patients had their medical histories and clinical images collected, and they underwent thorough general examinations. After getting a background, the foot's mobility was evaluated. A patient was classified

using the Pirani scoring method, and then underwent manipulation and weekly above-knee castings. After the fourth to sixth plaster, equinus was evaluated, and if necessary, a percutaneous tenotomy was performed. Final results were recorded when the cast was finally removed. The feet were then held in foot abduction after that. Parents were advised to keep their child's feet in a brace for the first three months for a total of 23 hours per day and 12 to 14 hours per night and sleep. After the final plaster was removed, patients were monitored for a further six months. In SPSS Version 25, all the data was input and examined. Quantitative information was shown as mean S.D. Frequency and percentages were used to show qualitative data. P-values less than 0.05 were regarded as significant when using the chi-square test.

RESULTS

In the present study, the Ponseti method of serial casting was used to treat clubfoot in 41 children. The average patient age was 37 weeks. 27 infants under the age of six months, five between six and twelve months, and nine between one and two years were among the total of 41 patients. 25 of the 41 kids had unilateral participation, and 16 had bilateral involvement. There were 41 kids, of which 26 were boys and 15 were girls. 27 patients (65.85%) belonged to the lower socioeconomic class, 11 (26.58%) the middle, and only 3 (7.31%) the higher. Each child was born at full gestation. 27 patients (65.85%) were delivered naturally vaginally, 9 (21.95%) underwent cesarean sections, and 5 (12.19%) needed episiotomies to hasten delivery.

In this research, the average number of casts was 6.29±93. At baseline, the mean Pirani score was 3.46±0.515, and after therapy, it was 0.0317±0.130. Overall mean pirani score was 3.4283±0.60. The original Pirani score and the quantity of casts necessary for the correction were correlated. A greater score needed a greater number of casts. On any of the feet, no significant soft tissue relief was required. In 6 feet, the deformity returned. Three of them underwent Achilles tenotomies and replastering. Two individuals had their tibias lateralized. 82% of the results were excellent, 12% were acceptable, and 4% were only fair.

Total Number of Patients	Frequency(%)
Gender	
Male	26
Female	15
Socio economic Status	
Low	27(65.85%)
Middle	11(26.58%)
High	3(7.31%)
Family History of Club foot	
Yes	7(17.03%)
No	34(82.97%)
Mode of Delivery	
Vaginal	27(65.85%)

C-Section	9(21.95%)		
Episiotomy	5(12.19%)		
Side			
Bilateral	16(39.02%)		
Right	9(21.95%)		
Left	16(39.02%)		
Table-I. Clinical-Socio-demographic features of Patients (n=41).			
	Mean	Standard Deviation	P-Value
Baseline Pirani Score	3.46	0.515	0.000
Final Pirani Score	0.0317	0.130	
Mean Pirani Score	3.4283	0.60	
Table-II. Pirani score of the patients			
Outcome	Number of Foot	Percentage	
Excellent	34	82.92	
Good	5	12.19	
Fair	2	4.87	
Table-III. Final outcome of the ponseti technique			

SEQUENTIAL PICTURES FOLLOWING PONCETI CAST



DISCUSSION

Clubfoot is a challenging foot issue that takes a lot of time and effort to treat. Treatment for severe club feet has consistently been difficult. The introduction of the Ponseti technique significantly altered clubfoot treatment. Despite the safety and affordability of this

technique, clubfoot is still a common condition worldwide¹⁰. Nowadays, manipulation and successive casting are the best methods for treating clubfoot¹¹. The current prospective randomized control study was carried out in the orthopedic outpatient clinic of Independent University Hospital Faisalabad, a tertiary

care facility serving a sizable patient population from residents of Faisalabad and the surrounding districts, with the aim of improving the management of club foot. In the present study, the Ponseti method of serial casting was used to treat clubfoot in 41 children. The cases ranged in age from 1 to 56 weeks. 27 infants under the age of six months, five between six and twelve months, and nine between one and two years were among the total of 41 patients. There were 41 kids, of which 26 (63.41%) were boys and 15 (36.58%) were girls. Male patients are more dominant than female patients, according to several other research. Avinash et al.'s research included 37 children, of which 29 (78%) were male and 8 (21%) were female¹². In a different research by Fahmi et al., 58.3% of the participants were men and 41.7% were women¹³.

Similar findings were also recorded by a study from Hyderabad Sindh, where 61.3% of the participants were men and 38.7% were women¹⁴. Of the 41 patients in our research, 27 (65.85%) belonged to the lower socioeconomic class, 11 (26.58%) to the middle class, and only 3 (7.31%) to the upper class. Each child was born at full gestation. 27 patients (65.85%) were delivered vaginally, 9 (21.95%) underwent caesarean sections, and 5 (12.19%) required episiotomies to help with delivery. A study from Lahore, Pakistan, revealed findings that are similar¹⁵. Bilateral or unilateral clubfoot malformation is possible. Bilateral club foot was slightly less prevalent than unilateral in 1983, according to Cartlidge I. Out of the 41 kids, 16 had symmetrical involvement and 25 had unilateral involvement, with a right and left deformity of 21.95% and 39.02%, respectively. Hussain SA reported in 2008 that 47 patients (67.2%) had unilateral club foot deformity and 23 (32.8%) had symmetrical club foot deformity in a group of 70 patients with club foot deformity from KPK¹⁶. In a research by Fahmi et al., out of 49 patients, 18 (36.73%) had bilateral involvement, 31 (63.27%) had unilateral involvement, 17 (54.84%) had right foot involvement, and 14 (45.16%) had left foot involvement¹³. When compared to other studies, the mean casts required for our study were 6.290.93, which was analogous. Comparable findings have been found in other research. The average number of casts in a research by Hallaj et al. was 5.7 times. It was higher than Panjavi et al.'s research, which cast participants under general anesthesia¹⁷.

Our study's final findings revealed that 82% of participants had excellent outcomes, 12.19% had good outcomes, and 4.87% had fair outcomes. Comparable findings have been found in other research. According to Fahmi et al., 13 feet had a favorable outcome at the conclusion of treatment, 8 cases (53.3%) had an excellent outcome, 5 cases (33.3%) had a good outcome, and 2 feet had a fair outcome. (13.3%)¹³. Avinash et al have also reported similar results in which results were excellent in 45 (88.3%) and good in 6 (11.7%).¹²

CONCLUSION

Ponseti is a dependable and efficient technique for treating club feet. It significantly decreased the need for conventional, extensive procedures. The findings of our research are positive and encouraging, and this method can be used to treat all clubfoot patients at our facility. In remote regions of a developing nation like India, this technique is very simple, safe, and effective for managing clubfoot. The proper parental motivation and persuasion for brace therapy can aid in maintaining the correction for a longer time and preventing relapse.

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