

Relapse of Clubfoot after Treatment with the Ponseti Method

Dr. Md. Shariful Haque¹, Dr. Mohammad Mushfiqur Rahman²,

Dr. Khaleda Perveen³, Dr. Mahmuda Sharmin⁴

¹ MBBS, D-Orth, Associate Professor, Dept. of Orthopedics & Traumatology, Prime Medical College, Rangpur

² MBBS, MS (General Surgery), Associate Professor, Dept. of Surgery, Prime Medical College, Rangpur

³ MBBS, Lecturer, Dept. of Forensic Medicine, Prime Medical College, Rangpur

⁴ Physiotherapist & Clinic Manager, Walk for Life, Prime Medical College, Rangpur

Corresponding author: Dr. Md. Shariful Haque

Abstract:

Background: During the last decade, Ponseti clubfoot treatment has become more effective and popular because of its high initial correction rate. But the problem affecting the long-term successful outcome is relapse of the deformity. The major problem is Non-compliance with Ponseti brace protocol associated with relapse. Although more comfortable braces have been reported to develop the compliance, they all have the same design and no significant changes have been made to the protocols. After refinement in the Ponseti method and emphasizing the significance of brace to parents, the relapse rate has been noticeably decreased.

Objective: To evaluate relapse of Clubfoot after treatment with the Ponseti Method

Methodology: A Cross sectional study including patients' information during treatment period was done at outpatient basis in Prime Medical College, Rangpur, Bangladesh and the sample was 200 patients under Ponseti clubfoot treatment over a period of three years from 1st October 2014 to 30th September 2017. The 200 patients with idiopathic legs with clubfoot 240 treated initially with the Ponseti technique who had relapse of their clubfoot were identified. Relapse was defined as a return to casting or surgery due to recurrent deformity. Data collected included demographics, treatment and brace adherence. Patients who sustained initial relapse before the age of two years were compared with those who sustained initial relapse after the age of two years.

Results: After initial relapse prior to age two, bracing adherence does not affect likelihood of subsequent recurrence. Among the 200 patients with 240 legs with clubfoot after treatment with the Ponseti Method only 15 legs were relapse. Therefore from the study findings we can say that though there is some complications in Ponseti method but the treatment outcome is better than other methods.

Conclusion: Patients with idiopathic clubfoot who experienced recurrence prior to age two years are significantly more likely to be non-adherent with bracing than those who sustain recurrence after age two.

Key Words: Clubfoot, Ponseti method, Relapse, Foot abduction orthosis

Date of Submission: 03-06-2018

Date Of Acceptance: 21-06-2018

I. Introduction

Clubfoot is a birth defect where one or both feet are rotated inwards and downwards. The affected foot, calf, and leg may be smaller than the other. Most cases are not associated with other problems. Without treatment, people walk on the sides of their feet which causes issues with walking.^{[1][2]} In 1963, Ponseti and Smoley reported the results in 67 patients with 94 clubfeet who were treated at their clinic by means of serial manipulations and castings¹. The initial success rate was about 80%. Since 1990s this method was refined later on and has been used throughout the world particularly after the long-term successful result was reported during an average of more than 30-year follow-up. In more and more medical centers this method was introduced.² Herzenberg et al. treated 34 feet, of which only 1 foot required extensive posteromedial release after serial casting with or without percutaneous Achilles tenotomy³. Colburn and Williams reported an initial correction rate of 95%.⁴



Figure 1a, 1b, & 1c: show clubfoot patient and after Ponseti treatment of patient⁽³⁾

Moreover, other medical centers in different nations also reported that 92%–100% clubfeet in their patients, whose age at the time of presentation was usually less than 1 year, responded to initial manipulation and casting as described in the Ponseti protocol.⁵ Verma et al. found that the Ponseti method was also effective in children between the ages of 1 to 3 years, and they reported an initial successful rate of about 89%.⁶ The Ponseti method is also effective in the non-idiopathic clubfoot. Morcuende et al. and Boehm et al. reported an initial correction rate of 94% and 100%, respectively.^{7,8} Gerlach et al. reported that they obtained initial full correction in 96% of the myelomeningocele-related clubfeet.⁹ Also 86% of clubfeet in patients undergoing posteromedial release were responsive to the Ponseti method.¹⁰

II. Objective of the study

The general objective of the study is to evaluate relapse of Clubfoot after Treatment with the Ponseti Method and Other Methods.

III. Materials and Methods

➤ Study Type:

This study is a cross sectional and observational study.

➤ Methods:

A Cross sectional study including patients' information during treatment period was done at outpatient basis in Prime Medical College, Rangpur, Bangladesh and the sample was 200 patients under Ponseti clubfoot treatment over a period of three years from 1st October 2014 to 30th September 2017. The 200 patients with idiopathic legs with clubfoot 240 treated initially with the Ponseti technique who had relapse of their clubfoot were identified. Relapse was defined as a return to casting or surgery due to recurrent deformity. Data collected included demographics, treatment and brace adherence. Patients who sustained initial relapse before the age of two years were compared with those who sustained initial relapse after the age of two years.

In this study Pirani Score is used because the Pirani Score is a simple and reliable system to determine severity and monitor progress in the Assessment and Treatment of Clubfoot. This Scoring System uses the different views of the foot to help visualize the issues in the underlying soft tissue and bony anatomy. A foot can be assessed in less than a minute and no technical equipment is required.

The Pirani Scoring System is based on 6 well-described Clinical Signs of Contracture characterizing a severe clubfoot:

- If the sign is severely abnormal it scores 1
- If it is partially abnormal it scores 0.5
- If it is normal it scores 0

Scoring the foot at each visit during treatment enables the health care worker treating the child to document how the foot is responding to manipulation and casting. Many degrees of severity and rigidity of Clubfoot are found at birth. Failures in treatment are related more often to faulty technique of manipulation and casting rather than severity of deformity.

IV. Results

Profile of the Patients:

In figure-2 shows age of the patient, where most of the clubfoot patient age range is 1 month-5 month (57%) and lowest patient age range is 3-year 6 month-4-year age patient (.50%). The following figure is given below:

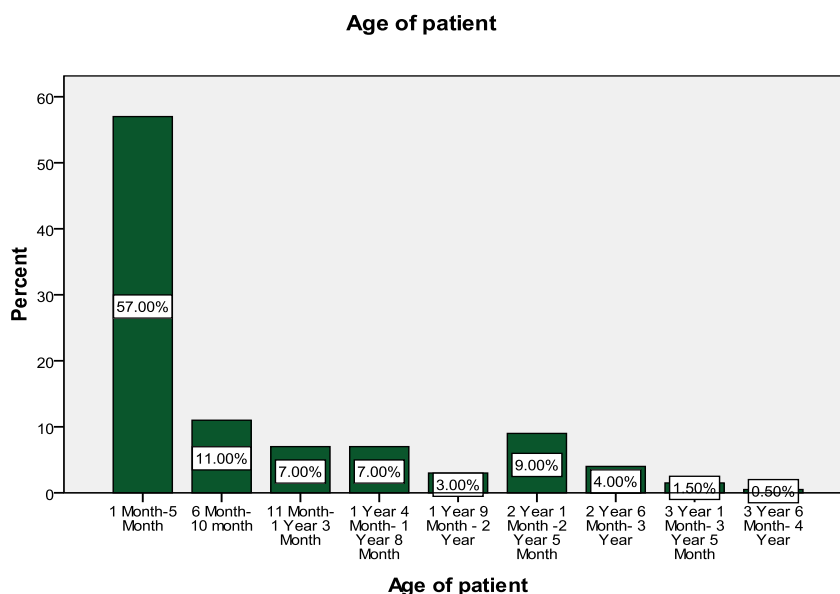


Figure 2: Age group of the Clubfoot patient

In table-1 shows, Delivery status of patients mother, where most of the delivery status is Normal (83.5%). Following table is given below:

Table1: Delivery Status

	Delivery type	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	167	83.5	83.5	83.5
	Caesar	33	16.5	16.5	100.0
	Total	200	100.0	100.0	

In Table-2 shows overall percentage and frequency empty heel of the patient, during data collection both right and left foot result was taken and Right and left foot range (.6-1) frequency and percent is highest among others. Following figure is given below:

Table 2: Empty heel of the patient

	Position	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Right:(0-.5)	8	4.0	4.0	4.0
	Right:(.6-1)	50	25.0	25.0	29.0
	Left:(0-.5)	7	3.5	3.5	32.5
	Left:(.6-1)	35	17.5	17.5	50.0
	[Right & Left]: (0-.5)	14	7.0	7.0	57.0
	[Right & Left]:(.6-1)	86	43.0	43.0	100.0
	Total	200	100.0	100.0	

In Table-3 shows overall percentage and frequency Prosterior Crease of the patient, during data collection both right and left foot result was taken and Right and left foot range (0-.5) frequency and percent is highest among others. Following Table is given below:

Table 3: Prosterior Crease of the patient

	Position	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Right:(0-.5)	56	28.0	28.0	28.0
	Right:(.6-1)	2	1.0	1.0	29.0
	Left:(0-.5)	38	19.0	19.0	48.0
	Left:(.6-1)	4	2.0	2.0	50.0
	[Right & Left]: (0-.5)	93	46.5	46.5	96.5
	[Right & Left]:(.6-1)	7	3.5	3.5	100.0
	Total	200	100.0	100.0	

In Figure 3 shows about Equinus of the patient, during data collection both right and left foot result was taken and Right and left foot range (0-.5) percent (46.50) is highest among others. Following figure is given bellow:

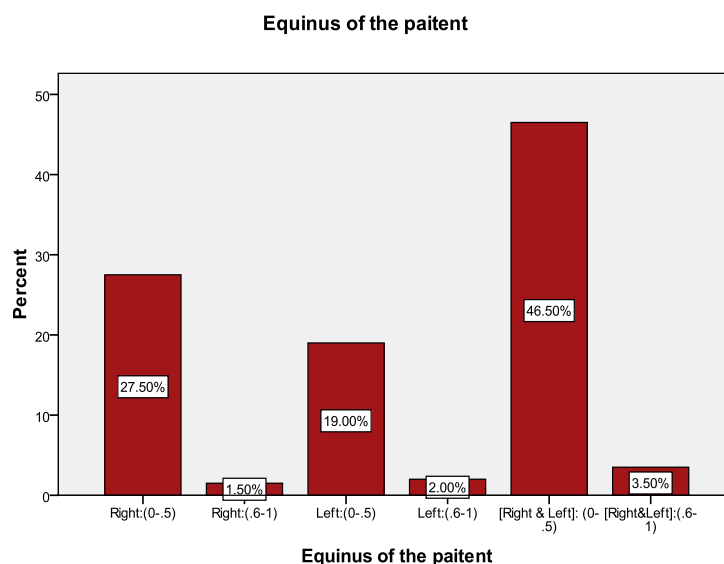


Figure3: Equinus of the patient

In figure 4 shows Medical crease of the patient. during data collection both right and left foot result was taken and Right and left foot range (0-.5) percent (49.50) is highest among others. Following figure is given bellow:

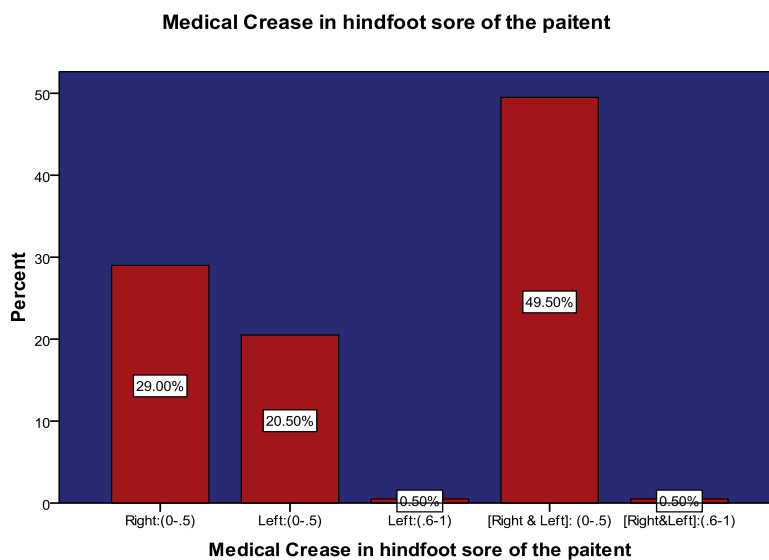


Figure 4 : Medical crease of the patient.

In figure 5 shows Lateral Head of talus in hindfoot sore of the patient. during data collection both right and left foot result was taken and Right and left foot range (0-.5) percent (46.50) is highest among others. Following figure is given bellow:

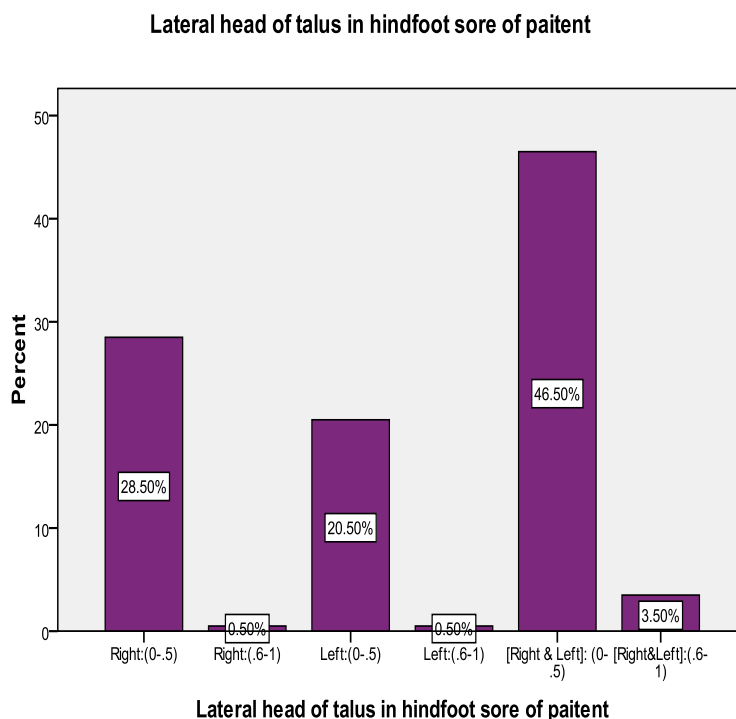


Figure 5: Lateral Head of talus in hindfoot sore of the patient

In figure 6 shows Curved lateral border in hindfoot sore of the patient. during data collection both right and left foot result was taken and Right and left foot range (0-.5) percent (49.00) is highest among others. Following figure is given bellow:

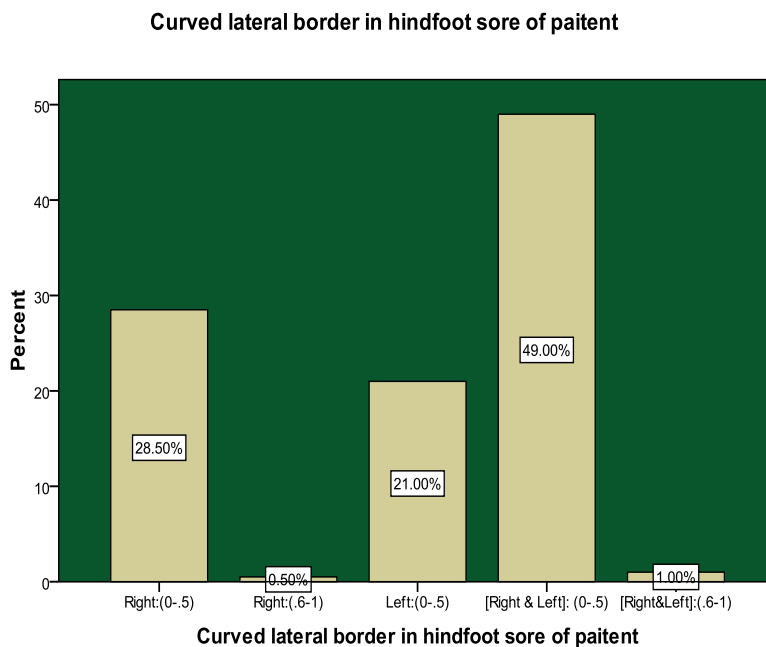


Figure 6 : Curved lateral border in hindfoot sore of the patient

In figure 7 shows Clubfoot family history of patients, where almost all of the patients do not have any history (99.50) of clubfoot in past. Following figure is given bellow:

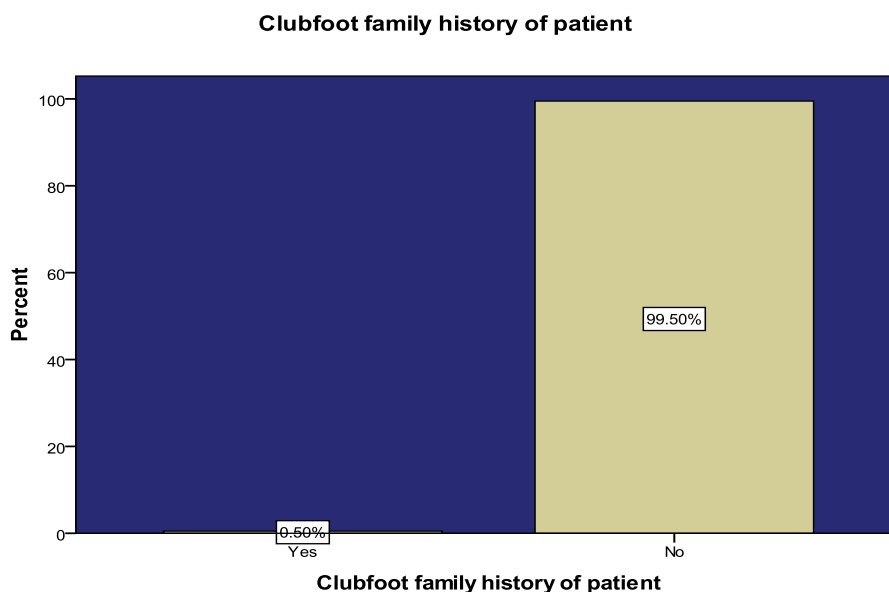


Figure 7: Clubfoot family history of patient

In figure 8 shows Types of clubfoot, where typical rigidity (41.50%) is found mostly in the patient. The following figure is given below:

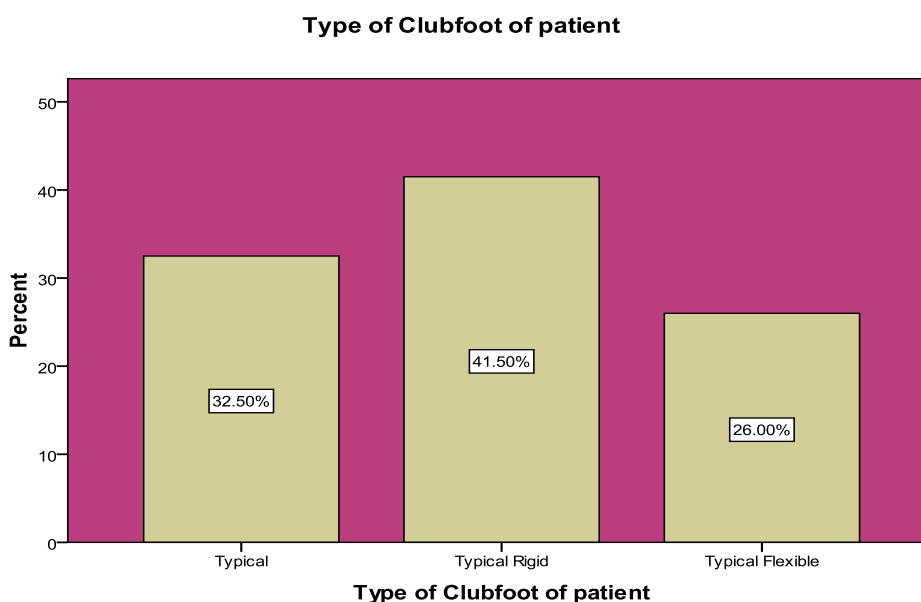


Figure 8: Type of clubfoot

In table-4 Total score of clubfoot patient treatment was taken combinly from both right and left total score of foot. Where total number of total score of clubfoot patient is 222 , Mean is 3.10 Population Standard Deviation is 1.63,Variance is 2.65 ,Sum is 688 and Standard Error of the Mean is 0.109, Following table is given below:

Table 4: calculation of mean , Sum , Sample Standard Deviation ,Variance (Sample Standard), Population Standard Deviation, σ ,Standard Error of the Mean (SE \bar{x}) for treatment of total score of clubfoot patient

Table 4: Total score of clubfoot

Total Number (N)	Mean	Population Standard Deviation	Variance	Sum	Standard Error of the Mean
222	3.101	1.626	2.657	688	0.109

Among the 200 patients with 240 legs with clubfoot after treatment with the Ponseti Method only 15 legs were relapse. Therefore from the study findings we can say that though there is some complications in Ponseti method but the treatment outcome is better than other methods.

V. Discussion

In many studies reports that mainly Mutations in genes involved in muscle development are risk factors for clubfoot, specifically those encoding the muscle contractile complex (MYH3, TPM2, TNNT3, TNNI2, and MYH8) that's why Idiopathic clubfoot treatment is quiet challenging^[4] Long-term analysis and outcomes studies have shown that the Ponseti method of treatment to be superior to prior surgical techniques, which has resulted in the majority of providers who treat clubfeet switching to the Ponseti method. If patient maintain that correction during early childhood then most patients with clubfoot can achieve satisfactory initial correction. Adherence with the foot-abduction brace has been shown in multiple studies to decrease likelihood of recurrence, however, adherence with bracing does not guarantee successful long-term correction. Despite adherent bracing, some feet seem almost destined to relapse, whereas poorly braced feet sometimes maintain correction over the long term.

VI. Conclusion

Patients with idiopathic clubfoot who experienced recurrence prior to age two years are significantly more likely to be non-adherent with bracing than those who sustain recurrence after age two. After initial relapse prior to age two, bracing adherence does not affect likelihood of subsequent recurrence.

References

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Dr. Md. Shariful Haque "Relapse of Clubfoot after Treatment with the Ponseti Method." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 17, no. 6, 2018, pp 56-62