



International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2020; 6(3): 374-378
© 2020 IJOS

www.orthopaper.com

Received: 28-05-2020

Accepted: 30-06-2020

Dr. Rahul Verma
Associate Professor,
Orthopaedics Department GMC
Bhopal, Madhya Pradesh, India

Dr. Sanjeev Gaur
Professor and Head of
Department GMC Bhopal,
Madhya Pradesh, India

Dr. Saurabh Sharma
Assistant Professor,
Orthopaedics Department GMC
Bhopal, Madhya Pradesh, India

Dr. Anurag Tiwari
Assistant Professor,
Orthopaedics Department GMC
Bhopal, Madhya Pradesh, India

Dr. Nandram saryam
Resident Orthopaedics
Department GMC Bhopal,
Madhya Pradesh, India

The relapse pattern in clubfoot treated by ponseti method and there treatment modalities

Dr. Rahul Verma, Dr. Sanjeev Gaur, Dr. Saurabh Sharma, Dr. Anurag Tiwari and Dr. Nandram saryam

DOI: <https://doi.org/10.22271/ortho.2020.v6.i3f.2227>

Abstract

Background: Congenital talipes equino varus is the most common congenital foot disorder. Relapse of clubfoot deformity occurs after the treatment by ponseti method. We evaluate the relapse pattern of clubfoot basis of bhasker *et al.* then treat the patient by ponseti technique.

Methods: This is a Retrospective and Prospective study. We are conducting a clubfoot clinic since 2013 in Department of Orthopaedics Gandhi medical college Bhopal. We register all clubfoot patient at our clubfoot clinic on his/her first visit. All the clubfeet assessed with pirani scoring system on the initial presentation to our institution and treat by ponseti method. During this study there were a total of 558 children with 713 idiopathic clubfeet registered at our clinic. A total of 49 idiopathic clubfeet in 34 children presenting with relapse were included in our study.

Results: We found that The incidence of relapse feet in our study is 6.87% (49 feet out of 713 feet The total involvement of relapse feet on the basis of laterality, the unilateral 403 feet out of 713 feet and relapse is 19 feet (4.71%) and bilateral involved feet 310 out of 713 & there relapse is 30 feet (9.68%). The incidence of relapse feet more on bilateral feet involvement.

The post treatment pirani score after relapse treatment is 0.

Conclusion: Ponseti technique is a simple, effective, inexpensive method for treatment of clubfeet there is, no requirement of special setup with limited resources and less rate of recurrence/complication than the surgical treatment It has been concluded that Ponseti method is a effective technique to treat congenital idiopathic clubfeet with success rate is 91% in our study.

Keywords: Relapse pattern, clubfoot treated, ponseti method, treatment modalities

Introduction

Congenital talipes equino varus is the most common congenital foot disorder. Talipes is derived from Latin word talus meaning ankle and pes meaning foot (the deformity causes the patient to use ankle as foot). It is also called clubfoot as it resembles to the club of a golf stick. Congenital talipes equino varus (CTEV) or clubfoot is a commonest pediatric foot deformity which occurs at 1 in 1000 live births. It consists of four components: Ankle equinus, hind foot varus, forefoot adductus, and mid foot cavus. (Dobbs MB *et al.*, 2009) ^[1]

In 1963, Ponseti developed a conservative method, called as Ponseti method. The Ponseti method consists of 2 equally important phases: the corrective phase and the maintenance phase and consist of serial manipulation, casting and tenotomy of the Achilles tendon. This is followed by the use of foot abduction brace to prevent the occurrence of relapse in maintenance phase (Turco v *et al.*, 2014) ^[2]

The main goal of Ponseti method is to reduce if not eliminate all elements of the clubfoot deformity, hence leaving a functional / pain- free, normal-looking, plantigrade, mobile foot. (Staheli, L 2003) ^[3]

The most important relapses occur in the hindfoot, first in the equinus, and then in the heel varus. In our experience, most relapses develop gradually and may be difficult to recognize in the early stages. A relapse is detected when there is an appearance of a slight equinus and varus deformity of the heel, most often without increased adduction and cavus in the forefoot. When walking, the child tends to put more weight on the outside of the sole of the foot (Ponseti IV, 2002) ^[4].

Corresponding Author:
Dr. Nandram saryam
Resident Orthopaedics
Department GMC Bhopal,
Madhya Pradesh, India

We have one of the largest clubfoot clinic in central India at our institute.

These study is aimed to analyse the data of the clubfoot clinic & evaluate relapse pattern in clubfoot treated with Ponseti technique and its management.

Material and Method

This is a Retrospective and Prospective study. We are conducting a clubfoot clinic since 2013 in Department of Orthopaedics Gandhi medical college Bhopal. We register all clubfoot patient at our clubfoot clinic on his/her first visit. After the registration, treatment protocol as per Ponseti method along with prognosis was explained to parents by counsellor. All the clubfeet assessed with pirani scoring system on the initial presentation to our institution and treat by ponseti method. During this study there were a total of 558 children with 713 idiopathic clubfeet registered at our clinic. A total of 49 idiopathic clubfeet in 34 children presenting with relapse were included in our study

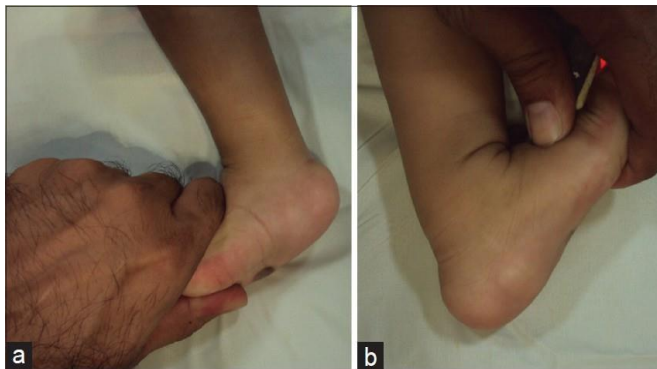
Patient inclusion criteria

- Children with idiopathic clubfoot
- Registered in clubfoot clinic of Hamidia hospital
- Treated by Ponseti method
- Patient of either age & sex and given informed consent.

Patients exclusion criteria

1. Children with neurogenic clubfoot or syndromic clubfoot
2. Other deformity then clubfoot
3. Treated by other method or treated in other centre

Criteria for evaluation of result Classification Bhasker *et al.* [5]
Five relapse patterns:



- 1 Grade IA, decrease in ankle dorsiflexion from 15° neutral with the knee in extension with passive stretch
2. Grade IB, dynamic supination or adduction on walking



3. Grade IIA, fixed ankle equinus of any degree



Grade II B, fixed adduction which is not correctable by passive abduction of foot



5) Grade III, combination of fixed hind foot equinus plus forefoot adduction and cavus or complete rigid equino-cavo-varus foot



TENDOACHILIES TENOTOMY



POST TENOTOMY CAST



AT PRESENTATION



CAVUS CORRECTION CAST



CAST IN ABDUCTION

Results

Table 1: Distribution of patient according to relapse feet

	bilateral	unilateral	total
Total no. of feet of patient	310	403	713
No. of Relapse feet	30	19	49
Percentage	9.68%	4.71%	6.87%

Table no.1 reveals the distribution of relapse feet. out of 713 feet 49 feet (6.87%) relapse occurred. Out of bilateral 310 feet, 30 feet (9.68%) relapse & out of unilateral 403 feet, 19 feet (4.71%) was relapse

Table 2: Comparing age with pre treatment and post treatments pirani score

		Pretreatment		Post –treatment	
Age of patients (YEAR)		Right	Left	Right	Left
1-2	Mean	4.100	3.750	1.000	.833
2-5	Mean	2.947	3.227	.528	.385
5-10	Mean	3.714	3.800	1.143	.900

Discussion

All these patients are treated by Ponseti method previously, in our as well as other hospitals. & all patients are of age 1 or greater than 1 year.

The average follow up in our study is 3 year (range 0-5year). The incidence of relapse feet in our study is 6.87% (49 feet out of 713 feet The total involvement of relapse feet on the basis of laterality, the unilateral 403 feet out of 713 feet and relapse is region & due to lack of social bias and poor literacy.

In our study 44.11% is unilateral & incidence of relapse in unilateral clubfeet is 4.71% (19 feet out of 403 clubfeet) & 55.88% is bilateral & incidence is 9.68% (30 feet out 310 clubfeet). The incidence of relapse is found more in bilateral clubfeet as compared to unilateral clubfeet.

In our study bilateral clubfeet is 56% and unilateral involvement is 44% 19 feet (4.71%) and bilateral involved feet 310 out of 713 & there which is similar to Mahan *et al.* bilateral (53%) and unilateral is 47% relapse is 30 feet (9.68%). The & Birhau ayana (2014) had 50% incidence of relapse feet more on bilateral feet involvement.

In our study male to female ratio is similar (male: female., 3:1) in comparison to other studies of Cowell⁶ and Wein & Yamamoto⁷ (male: female 3:1) and Ankur⁸ gupta & Panka jpatel have higher male to female ratio (4:1) than unilateral and 50% bilateral involvement. In bhaskar *et al.* studies the bilateral involvement is four time as compared to unilateral.

In our study average number of casting in our study on non-relapse patient was 7 and on relapse patient this was 10, which is quite similar to other studies like Abhinav Sinha & other studies. Palmer⁹ explained this Anil Mehtani (2016) calculated by suggesting that female require a average number of cast 12.8, Dr. greater number of redisposing Arun Kumar Seshadrinath N (2017) factors than male to produce a calculated average number of cast 7.6 15 clubfoot deformity. The incidence of clubfoot involvement is thrice in male Amr S Elgazzar mean 10 cast. (2014) applied a (415 male) as compared to female but incidence of relapse feet were twice in female 15feet (10.49%) as compared to male. Goldstein *et al.* ^[10] noted that female gender was risk for relapse due to Social bias and increased attention towards the male. Female patient were neglected in our In our study 15 feet (30%) had Grade IA relapse. ^[4] feet (8.16%) had dynamic supination (grade IB) on walking. ^[14] feet (28.5%) had true ankle equinus (grade IIA). ^[12] feet (24.48%) had fixed adduction deformity of forefoot (Grade IIB). & ^[4] feet (8.16%) had two or more deformity. In our study the decrease dorsiflexion, ankle equinus and forefoot adduction was most common relapse deformity which was similar to other studies. Nusrat Rasheed. ^[16] (2018) 193 (55%) feet had adduction deformity. 91 (26.3%) feet had hind foot equinus deformity Tarraff and Carrol ^[17] (1992) reported forefoot adduction and dynamic supination was most common residual deformity.

N. Ken *et al.* ^[18] (2008) reported forefoot adduction was most common clubfoot relapse deformity. In our study dynamic supination deformity managed by full tibialis anterior tendon transfer. The tendon is transfer to lateral cunifrom, we had used Percutaneous achillis tenotomy to correct the alle quinus deformity. We did percutaneous achillis tenotomy in feet (40.8%). In mixed deformity we managed combined by corrective cast and achillistenotomy.

In our study in the bilateral clubfeet (40%) had decrease dorsiflexion (Grade IA) which higher to bhaskar *et al.* (28%). Dynamic supination Grade IB (10%) in our study and bhaskar *et al.* had (34%). Grade IIA fixed equinus deformity is (11%)

& Bhaskar *et al.* (16%). Grade IIB forefoot adduction in our study 30% and Bhaskar *et al.* had (9.7%). Grade III Mixed deformity in our study (10%) and Bhaskar had (10%).

In unilateral clubfeet in our study Grade IA (24%) and Bhaskar *et al.* (38%). Grade IB (7%) Bhaskar had (33%). Grade IIA that is Fixed equinus (41%) and Bhaskar *et al.* had (11%). Grade IIA in our study (41%) and Bhaskar *et al.* [11]. Grade IIB fixed adduction deformity in our study (21%) & Bhaskar *et al.* (11%) & Grade III mixed deformity in our study (7%) and Bhaskar had (5%).

In our study we managed Grade IA decrease dorsiflexion by corrective cast and tenotomy and Bhaskar *et al.* managed this deformity by recast.

Grade IB Dynamic supination we managed by tibialis anterior tendon transfer in two feet & two feet managed conservatively & Bhaskar *et al.* did 6 cases also managed by tibialis anterior tendon transfer (TATT) and 24 patient managed by foot abduction brace for 3 month.

Grade IIA Fixed equinus deformity we had 14 feet in our study were managed by percutaneous achillis tenotomy and cast & Bhaskar *et al.* managed by posterior capsule release & tenotomy.

Grade IIB fixed adduction deformity 12 feet involved was managed by corrective cast, 4 patient had residual forefoot adduction deformity and advised for surgery but refuse by parents due to pain free, cosmetically acceptable foot and Bhaskar *et al.* performed lateral column wedge osteotomy and medial column lengthening combined procedure on 10 feet.

Grade III mixed deformity was managed by tenotomy and corrective cast combined and Bhaskar performed subtalar release.

There was a male predominance in our study which is supported by different authors. In our study the relapse in male were 19 (55.9%) out Age of relapse presentation of 34 patients & incidence is 4.58% (415 patients) and female were 15 (44.1%) & incidence is 10.49% (143 patients) which was quite similar to the study conducted by Dr. Arunseshadrinath N (2017) they found [24] (65%) male and 13 (35%) females.

Table 8: While evaluating the age in this study the average age at relapse presentation was came out to be 48 months.

Studies	Average age
F Laurenco (2007) [19]	3.9 year
Bhaskar <i>et al.</i>	48 month
Verma A <i>et al.</i> (2012) [20]	2.03 year
Anil Mehtani (2016)	3.02
Prem <i>et al.</i> [21]	5 year
Our study	48 month

The average age of presentation in our study was higher than that of most study.

In our study there is no family history of club feet, higher incidence of club feet was noted by Dr. Arun Kumar Seshadrinath N (2017) found family history in 9 (24%) patients.

In our study average duration of immobilization in a cast was 3.1 month which is lower than other studies.

While in study conducted by A F Lorenco, JA Morcuende 22 (2007) the average duration of immobilization of in a cast was 3.9 months. Amr S Elgazzar (2014) calculated mean period of immobilization in a cast of 8.9 weeks.

In our study average pirani score at the time of presentation was 3.33, which is quite lower than the study conducted by Ahinav Sinha & Anil Mehtani (2016) who found average pirani score is 5.41. AF Lorenco, JF Morcuende (2007) found

their patient in a range between 4 to 5. Bhaskar A (2013) found average pirani score is 5.

We found lower pirani score it may be because of that our study was conducted on relatively older children (average age of presentation was 4.19 years) than Abhinav Sinha & Anil Mehtani (2016) who found average age 3.02 years.

This should be noted that pirani score comes falsely low in older children due to absence of posterior & medial crease & empty heel sign irrespective of severity of clubfeet.

In our study we used foot abduction brace for 23 hours during first 3 months & subsequently at night time & naptime for 2 to 4 year, which is quite similar Bouchoucha *et al.* suggest that brace should be worn full time (23 hours) for 3 months followed by part time for 12 to 14 hours a day.

We have low rate of posterior medial soft tissue release than other studies AF Lowrenco, JA Morcuende (2017) required posterior-medial soft tissue release 33.33% of patients & Shah Alam (2010) required posterior- medial soft tissue release in 28% of their patients 3 patients were not corrected in which two are not on follow up and one patient not ready to take treatment Although in this patient we were not able to fully correct the feet by ponseti technique but serial casting significantly reduce the need of extensive surgeries like corrective osteotomies & triple arthodesis.

In our study patients had dynamic supination during walking. 2 patient required tibialis anterior tendon transfer in which tibialis anterior tendon was transfer to the third cuneiform.

Complication of casting were seen in 4 patients (11.76%), they develop redness, swelling & skin erosions which were simply managed by delaying the subsequent cast for 1-2 weeks. We were able to achieve correction in approximately 91% patients by Ponseti method all patients achieve painless plantigrade cosmetically acceptable feet without need for any surgery except percutaneous tenotomy and TATT.

Conclusion

We were able to achieve correction in approximately 91% patients by Ponseti method all patients achieve painless plantigrade cosmetically acceptable feet without need for any surgery except percutaneous tenotomy and TATT. These patient became able to walk without a limp and participated in normal activities of daily living. Ponseti technique is a simple, effective, inexpensive method for treatment of clubfeet there is, no requirement of special setup with limited resources and less rate of recurrence/complication than the surgical treatment It has been concluded that Ponseti method is a effective technique to treat congenital idiopathic clubfeet with success rate is 91% in our study

Reference

1. Dobbs MB, Gurnett CA. Update on clubfoot: etiology and treatment. Clinical orthopaedics and related research. 2009; 467(5):1146. pmid:19224303.
2. Turco V. Clubfoot: current problems in orthopaedics. New York: Churchill Livingstone, 1981
3. Staheli L. Clubfoot: Ponseti Management. Global HELP Publications, 2003, 1–32.
4. Ponseti IV. Congenital clubfoot, Fundamentals of treatment, Oxford University Press, London, 1996.
5. Bhaskar A, Patni P. Classification of relapse pattern in clubfoot treated with Ponseti technique. Indian journal of orthopaedics. 2013; 47(4):370.
6. Cowell HR, Wein BK. Genetic aspects of club foot. JBJS. 1980; 62(8):1381-4.

7. Yamamoto H. A clinical, genetic and epidemiologic study of congenital club foot. Japanese journal of human genetics. 1979; 24(1):37-44.
8. Gupta A, Singh S, Patel P, Patel J, Varshney MK. Evaluation of the utility of the Ponseti method of correction of clubfoot deformity in a developing nation. International orthopaedics. 2008; 32(1):75-9.
9. Wang JH, Palmer RM, Chung CS. The role of major gene in clubfoot. American journal of human genetics. 1988; 42(5):772.
10. Goldstein RY, Chu A, Sala DA, Lehman WB. Age of recurrence in idiopathic clubfoot treated with the Ponseti method. Bulletin of the NYU Hospital for Joint Diseases. 2017; 75(3):193.
11. Mahan ST, Spencer SA, May CJ, Prete VI, Kasser. Clubfoot relapse: does presentation differ based on age at initial relapse? J. R. Journal of Children's Orthopaedics 2017; 11(5):367-372.
12. Ayana B, Klungsøyr PJ. Good results after Ponseti treatment for neglected congenital clubfoot in Ethiopia: A prospective study of 22 children (32 feet) from 2 to 10 years of age. Acta orthopaedica. 2014; 85(6):641-5.
13. Chand S, Mehtani A, Sud A, Prakash J, Sinha A, Agnihotri A. Relapse following use of Ponseti method in idiopathic clubfoot. Journal of children's orthopaedics. 2018; 12(6):566-74.
14. Dutta A, Sipani AK, Kumar P. A comparative study between standard and accelerated ponseti method in management of idiopathic congenital talipes equinovarus. International Journal of Orthopaedics. 2019; 5(2):359-63.
15. Elgazzar AS. Ponseti management of clubfoot after walking age. The Egyptian Orthopaedic Journal. 2014; 49(1):29.
16. Rasheed N, Khani GM, Zaidi IH. Club Foot after Treatment. The Professional Medical Journal. 2018; 25(04):514-9.
17. Loza ME, Bishay SN, El-Barbary HM, Hanna AA, Tarraf YN, Lotfy AA. Double column osteotomy for correction of residual adduction deformity in idiopathic clubfoot. The Annals of The Royal College of Surgeons of England. 2010; 92(8):673-9.
18. Kuo KN, Hennigan SP, Hastings ME. Anterior tibial tendon transfer in residual dynamic clubfoot deformity. Journal of Pediatric Orthopaedics. 2001; 21(1):35- 41.
19. Lourenco AF, Dias LS, Zoellick DM, Sodre H. Treatment of residual adduction deformity in clubfoot: the double osteotomy. Journal of Pediatric Orthopaedics. 2001; 21(6):713-8.
20. Verma A, Mehtani A, Sural S, Maini L, Gautam VK, Basran SS *et al.* Management of idiopathic clubfoot in toddlers by Ponseti's method. Journal of Pediatric Orthopaedics B. 2012; 21(1):79-84.
21. Prem H, Zenios M, Farrell R, Day JB. Soft tissue Ilizarov correction of congenital talipes equinovarus-5 to 10 years postsurgery. Journal of Pediatric Orthopaedics. 2007; 27(2):220-4.
22. Ponseti I, Morcuende JA, Mosca V, Pirani S, Dietz F, Herzenberg J *et al.* Clubfoot: Ponseti management. Global-HELP Organisation. 2005, 8.