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Orthopedics

Conservative Treatments for Idiopathic Clubfoot: Ponseti's Versus Kite and French Methods

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Abstract: 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 cause issues with walking. The treatment of clubfoot has developed over time and can generally be divided into many approaches like: Kite method, Ponseti method, French Method and other surgical method. To examine the efficiency rate of different clubfoot treatment method (Kite method, Ponseti method & French Method). This study was a cross sectional and comparative study. During study the 200 patients with idiopathic legs with clubfoot 240 treated initially with the Ponseti technique that 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 underling soft tissue and bony anatomy. A foot can be assessed in less than a minute and no technical equipment is required. Ponseti method is very much useful and effective treatment for clubfoot patients rather than Kite and French methods.

Keywords: Clubfoot, birth defect, Kite method, French Method.

INTRODUCTION

Disability has created as a general therapeutic issue far and wide. Youth disability one of them and it remains concealed in many country like Bangladesh. Around one out of each 1,000 youngsters is conceived with a foot that is curved. Which may have an odd shape and point in the wrong direction, so that it seems to be crooked, or even nearly upside down. Specialists call this clubfoot [1].

Clubfoot is a birth abnormality where one or the two feet are turned inwards and downwards. The influenced foot, calf, and leg might be littler than the other. Most cases are not related with different issues. Without treatment, individuals walk on the sides of their feet which causes issues with walking. The treatment of clubfoot has created after some time and can for the most part be isolated into numerous methodologies like: Kite technique, Ponseti strategy, French Method and other surgical technique.

Fig-1 a,1b,1c,1d & 1e: Patients of Clubfoot, Kite method, Ponseti method , French Method and successful recovery after treatment

Ponseti and Smoley described the results in 67 patients with 94 clubfeet who were treated at their clinic by means of serial managements and castings in 1963[1]. The primary success rate was about 80%. Meanwhile 1990s this technique was refined later on and has been used throughout the world particularly after the longstanding successful result was reported during an average of more than 30-year follow-up. In more and more medical centers this method was familiarized. Herzenberg *et al.*[2] treated 34 feet, of which only 1 foot required widespread posteromedial release after serial casting with or without percutaneous Achil¬les tenotomy[3]. Colburn and Williams reported an initial improvement rate of 95%[4]. However, other hospitals in different nations also informed that 92%–100% clubfeet in their patients, whose age at the time of demonstration was usually less than 1 year, responded to initial manipulation and casting as described in the Ponseti procedure[5]. Verma *et al.* originate that the Ponseti method was also operative in children between the ages of 1 to 3 years, and they reported an initial efficacious rate of about 89% [6]. The Ponseti technique is also effective in the non-idiopathic clubfoot. Morcuende *et al.* and Boehm *et al.* reported an preliminary correction rate of 94% and 100%, respectively [7,8] Gerlach *et al.* reported that they attained initial full correction in 96% of the myelomeningocele-related clubfeet[9]. Also 86% of clubfeet in patients experiencing posteromedial release were responsive to the Ponseti procedure [10]. In the orthopedic community whereas for Kite's Method this practice is a conservative method of curing clubfoot, which is now no longer usually used or recognized. The Kite method was established by Dr Kite in the USA in the 1930's. After he became dissatisfied with the poor results of surgical treatment and the often traumatic outcomes following forcible manipulations of clubfoot deformity using the Thomas Wrench, popular at the time kite sought to realize a non-invasive treatment strategy for clubfoot. In Kite's technique the treatment consists of a series of manipulations and castings followed by night splinting with the feet held in dorsiflexion and slight abduction [2].

Daily managements of the newborn's clubfoot, stimulation of the muscles acting on the foot to maintain the reduction achieved through manipulation, and foot immobilization using no elastic adhesive strapping includes in the French Technique. When compared to the Ponseti technique, french technique treatment typically takes over a course of almost two months and is then progressively reduced. Development typically happens within the first three months and is achieved at a slower amount [3]. In this study our optimum goal was evaluate the efficacy rate of different clubfoot treatment method by comparing among them.

Objective

General Objective

- To examine the efficiency rate of different clubfoot treatment method (Kite method, Ponseti method & French Method)

Specific Objective

- Identify most suitable method for clubfoot treatment
- Evaluate relapse of Clubfoot after Treatment with the Ponseti Method and Other Methods.

METHODOLOGY

- **Study Type**
  This study was a comparative and descriptive study.

Study Place and Period

This comparative study including patients' information during treatment period was conducted 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 2011 to 30th September 2014 and other method result is obtained from many report and cases.

Method

Throughout the study the 200 patients with idiopathic legs with clubfoot 240 treated primarily with the Ponseti technique that had relapse of their clubfoot were identified. Relapse was well-defined as a return to casting or surgery due to recurrent deformity. Data collected included demographics, treatment and brace adherence. Patients who continued initial relapse before the age of two years were compared with those who sustained initial relapse after the age of two years.

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

The Pirani Scoring System is mainly 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. At birth many degrees of severity and rigidity of Clubfoot are found. Failures in treatment are

related more often to faulty technique of manipulation and casting rather than severity of deformity. Kite method and French method result was taken from different cases and report in this experiment. After that by comparative study and statistical analysis by SPSS software different method result was compared among each other

RESULTS

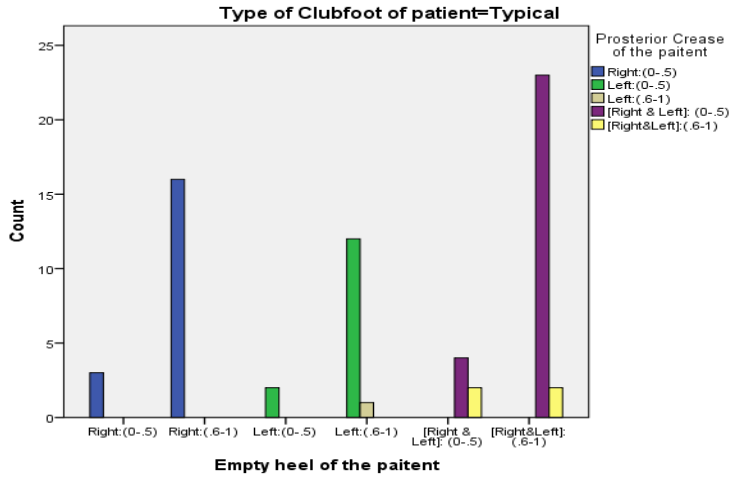

Fig-2

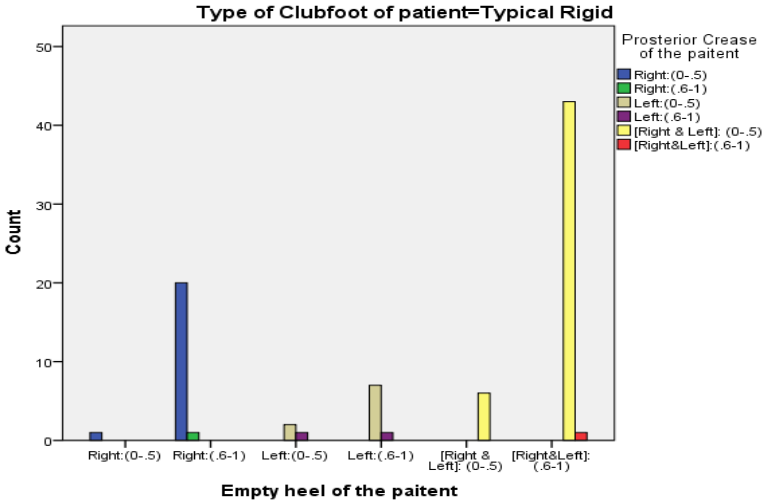

Fig-3

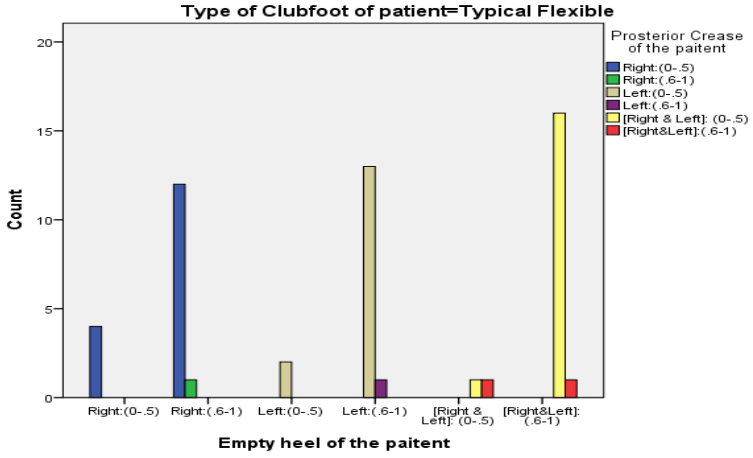

Fig-4

Table-1: Chi-Square Tests

Type of Clubfoot of patient		Value	df	Asymptotic Significance (2-sided)
Typical	Pearson Chi-Square	136.508[b]	20	.000
	Likelihood Ratio	139.195	20	.000
	Linear-by-Linear Association	59.067	1	.000
	N of Valid Cases	65		
Typical Rigid	Pearson Chi-Square	171.222[c]	25	.000
	Likelihood Ratio	154.503	25	.000
	Linear-by-Linear Association	77.602	1	.000
	N of Valid Cases	83		
Typical Flexible	Pearson Chi-Square	115.616[d]	25	.000
	Likelihood Ratio	117.228	25	.000
	Linear-by-Linear Association	47.416	1	.000
	N of Valid Cases	52		
Total	Pearson Chi-Square	412.607[a]	25	.000
	Likelihood Ratio	417.947	25	.000
	Linear-by-Linear Association	186.002	1	.000
	N of Valid Cases	200		
a. 26 cells (72.2%) have expected count less than 5. The minimum expected count is .07.				
b. 25 cells (83.3%) have expected count less than 5. The minimum expected count is .03.				
c. 32 cells (88.9%) have expected count less than 5. The minimum expected count is .01.				
d. 34 cells (94.4%) have expected count less than 5. The minimum expected count is .04.				

Table-2: ANOVA

Description		Sum of Squares	df	Mean Square	F	Sig.
Empty heel of the patient	Between Groups	13.277	2	6.638	2.149	.119
	Within Groups	608.598	197	3.089		
	Total	621.875	199			
Prosterior Crease of the patient	Between Groups	10.498	2	5.249	1.702	.185
	Within Groups	607.457	197	3.084		
	Total	617.955	199			
Equinus of the patient	Between Groups	11.080	2	5.540	1.810	.166
	Within Groups	602.900	197	3.060		
	Total	613.980	199			
Medical Crease in hind foot sore of the patient	Between Groups	10.899	2	5.450	1.819	.165
	Within Groups	590.121	197	2.996		
	Total	601.020	199			
Lateral head of talus in hindfoot sore of patient	Between Groups	11.449	2	5.724	1.848	.160
	Within Groups	610.306	197	3.098		
	Total	621.755	199			
Curved lateral border in hindfoot sore of patient	Between Groups	11.396	2	5.698	1.903	.152
	Within Groups	589.759	197	2.994		
	Total	601.155	199			

Ponseti's method vs Kite's method and French Method

According to Peng He et al. the rates of poor and fair results, relapse, and condition for additional operations were investigated in three studies. The results displayed that there were significant differences in all three issues between Kite's method and Ponseti's technique. All three rates were significantly lower with Ponseti's technique than with Kite's method. ($P < 0.05$). The rates of poor and fair results, relapse, and requirement for additional operations were investigated in two studies. The results displayed that there were no significant differences in any of these three factors between the French method and Ponseti's method [4].

Table-3: Characteristics of eligible studies in this meta-analysis

Authors/reference	Method	N	Dimeglio score	Duration	Cast
Herzenberg *et al.*	Ponseti	34	Null	Null	Null
	Traditional cast	34	Null	Null	Null
Aurell *et al.*	Ponseti	9	12.44 ± 2.19	Null	Null
	Copenhagen	19	9.95 ± 2.00	Null	Null
Cosma *et al.*	Ponseti	74	10.8	5 ± 1w	4 ± 2
	Romanian	74	10.6	15 ± 6w	5 ± 2
Sud *et al.*	Ponseti	36	14.39 ± 3.20	49.42 ± 18.9d	6.2 ± 2.3
	Kite	31	16.19 ± 2.81	91.24 ± 53.6d	10.71 ± 5.40
Richards *et al.*	Ponseti	267	12.2	Null	Null
	French	119	12.8	Null	Null
Sanghvi and Mittal	Ponseti	30	Null	10 ± 1w	7 ± 1
	Kite	34	Null	13 ± 2w	10 ± 1
Chotel *et al.*	Ponseti	103	Null	Null	Null
	French	116	Null	Null	Null
Derzsi *et al.*	Ponseti	106	12.14 ± 6.81	11.34 ± 5.87w	Null
	Kite	129	12.12 ± 7.34	20.13 ± 8.53w	Null
Saetersdal *et al.*	Ponseti	160	Null	Null	Null
	Pre-Ponseti cast	134	Null	Null	Null

Null: data unavailable, d: day, w: week.
Source: Peng He *et al.* [4]

DISCUSSION

In numerous studies reports that mostly 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.[5] Long-term investigation and results studies have revealed 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 technique. If patient keep 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 fruitful long-term correction. Despite adherent bracing, some feet seem nearly destined to relapse, whereas poorly braced feet sometimes maintain correction over the long period. In other study proved that till first week of lifespan ponseti method offers superior results, compared with Kite method. It is worthy observing that, in baby's , not only the Dimeglio score was most significantly improved but also the 6 months' rate of relapses was also lower in the Ponseti group, this observation being in line to other investigations[5, 6]. Ponseti method superiority was also demonstrated for the correction rate and functional outcome. The median success rate is 58% to 79% for Kite and 78% to 98% for Ponseti technique [7, 8]. The superiority of Ponseti method was agreed, for both primary correction and uncorrected plus relapsed feet but the risk for over-correction and stiff scar healing was higher after Ponseti than Kite method in many studies [5, 9]. Its superiority is also connected on the lower cost and higher effectiveness and can also improve significantly the Kite recurrent clubfeet.[10][11] In several other study also determined that the initial correction rates of the clubfoot deformities were high with both approaches (94.4% with Ponseticasting and 95% with the French functional method). This is consistent with the current literature in which several short-term studies with use of the Ponseti technique found initial correction rates in the range of 90% to 100% [12-15].

CONCLUSION

With the French strategy, the patient is almost followed by the physical therapist in a fashion similar to the Ponseti technique. The orthopaedist sees and detected the tyke each month amid the early treatment time frame and afterward quarterly once the support program is started. The success of the French strategy is relying on parents who must take in the system what's more, dependably play out the extending, taping, and supporting. Despite the substantial effort to train parents to the task, many report still found relapses in 29% of the clubfeet treated with this method. Overall, 33% of the patients treated with this method required operative intervention. After investigation several method result of clubfoot treatment it is almost clears that Ponseti method is very much useful and effective treatment for clubfoot patients rather than other two methods.

REFERENCES

1. Islam, ANM Muyedul, Sk Akthar Ahmad, Md Rashedul Kabir, Md Kaoser Bin Siddique, and AtiaArefin. "Effectiveness of French Physiotherapy in Treating Congenital Clubfoot Deformity."
2. Dobbs MB, Gurnett CA. Update on Clubfoot: Etiology and Treatment. Clin OrthopRelat Res.

2009; 467(5): 1146-1153.Pirani S, Zeznik L, Hodges D. Magnetic resonance imaging study of the congenital clubfoot treated with the Ponseti method. Journal of Pediatric Orthopaedics. 2001 Nov 1;21(6):719-26.

3. Richards BS, Faulks S, Rathjen KE, Karol LA, Johnston CE, Jones SA. A Comparison of Two Nonoperative Methods of Idiopathic Clubfoot Correction: The Ponseti Method and the French Functional (Physiotherapy) Method. J Bone Joint Surg Am, 2008; 90: 2313-2321.
4. He JP, Shao JF, Hao Y. Comparison of different conservative treatments for idiopathic clubfoot: Ponseti's versus non-Ponseti's methods. Journal of International Medical Research. 2017 Jun;45(3):1190-9.
5. Delbrück H, Schaltenbrand M, Schröder S, Rauschmann M, Schwenninger C. Clubfoot treatment through the ages: the Ponseti method in comparison to other conservative approaches and operative procedures. Der Orthopade. 2013 Jun;42(6):427-33.
6. Weimann-Stahlschmidt K, Krauspe R, Westhoff B. Congenital clubfoot. Orthopade. 2010; 39:1071–1084.
7. Sanghvi AV, Mittal VK. Conservative management of idiopathic clubfoot: Kite versus Ponseti method. J Orthop Surg (Hong Kong). 2009; 17:67–71.
8. Shyam AK. Comparison of Ponseti and Kite's method of treatment for idiopathic clubfoot. Indian J Orthopedics. 2011; 45:188.
9. Matos MA, de Oliveira LA. Comparison between Ponseti's and Kite's clubfoot treatment methods: a meta-analysis. J Foot Ankle Surg 2010; 49:395–397.
10. Shabtai L, Specht SC, Herzenberg JE. Worldwide spread of the Ponseti method for clubfoot. World J Orthop 2014; 5:585–590.
11. Nagaraju KD, Vidyadhara S, Shetty AP, Venkatadass K, Rajasekaran S. Use of Ponseti's technique in recurrent clubfeet following Kite's method of correction. Journal of Pediatric Orthopaedics B. 2008 Jul 1;17(4):189-93.
12. Colburn M, Williams M. Evaluation of the treatment of idiopathic clubfoot by using the Ponseti method. J Foot Ankle Surg. 2003;42:259-67.
13. Herzenberg JE, Radler C, Bor N. Ponseti versus traditional methods of casting for idiopathic clubfoot. J PediatrOrthop. 2002;22:517-21.
14. Lehman WB, Mohaideen A, Madan S, Scher DM, Van Bosse HJ, Iannacone M, Bazzi JS, Feldman DS. A method for the early evaluation of the Ponseti (Iowa) technique for the treatment of idiopathic clubfoot. J PediatrOrthop B.2003;12:133-40.
15. 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;113:376-80.