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EFFECTS OF MANIPULATION AND CASTING OF PONSETI METHOD OUTCOME IN CHILDREN WITH IDIOPATHIC CLUBFOOT.

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Abstract

Introduction: One of the most prevalent paediatric foot deformity is clubfoot. Idiopathic clubfoot is a condition for which there is no known cause. The Ponseti Technique became the best choice for treating clubfoot all around the world. The Ponseti method of treating idiopathic clubfoot includes weekly serial manipulations and castings until the foot can be abducted to 60 degrees. The patient is subsequently placed in a foot abduction orthosis to maintain the correction made and prevent the deformity from relapsing after Achilles tendon tenotomy and casting. **Objective:** To determine the effects of manipulation and casting of Ponseti method outcomes in children with idiopathic clubfoot. **Methodology:** This descriptive cross sectional study was conducted in orthopaedic department of PMCH Hospital Nawabshah from August 2022 to February 2023. 100 children of both genders with idiopathic clubfoot were included. After enrolment complete history and physical examination of all children were carried out. Informed written consent was taken from parents or guardians of the children. Data were entered in excel sheet and analyzed in SPSS version 21. Qualitative variables were presented in percentage and frequencies while quantitative variables were presented in mean and standard deviation. Paired sample t test was applied. **Results:** According to our results, 100 children with clubfoot were included in this study. 50 children were male and 50 children were female. The mean ages of children were 4.02 months. Bilateral clubfeet were 53% and unilateral clubfoot was 47%. The right club foot was 32% and 20% was left side. The average no: of cast were 5.45. 41% of children need tenotomy. The initial Pirani score was 3.140. The final Pirani score mean was 0.60. Post stratification data analysis revealed statically significant between initial and final Pirani score with P-value (0.001). **Conclusion:** Clubfoot can be effectively treated with the Ponseti method of casting and manipulation.. It is the simplest approach. Therefore, we advise using this method as the first line of treatment for infants with idiopathic club feet.

Key words: Ponseti method, clubfoot, Pirani score

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INTRODUCTION

One of the most prevalent paediatric foot deformities is clubfoot, which affects one to two children per 1,000 live births annually. If the deformity is not corrected, the foot will continue to hurt and have functional restrictions.[1] In Pakistan, club foot deformity affects 1.4 to 1.5 out of every 1000 live newborns. [2,3] The both feet are typically implicated in 30% to 50% of patients.[4] Nevertheless, the aetiology is uncertain in 80.0% of cases, in which case the condition is classified as idiopathic clubfoot. Many genetic and environmental factors, some of which are connected to arthrogryposis, myelomeningocele, and amniotic bands, have been implicated in the etiopathogenesis of clubfoot.[4] For the past 30 years, the Ponseti Method has improved and is now the greatest option for treating clubfoot.[5] The Ponseti method of treating idiopathic clubfoot includes weekly serial manipulations and castings until the foot can be abducted to 60 degrees. After Achilles tendon tenotomy and casting, the patient is then given a foot abduction orthosis to preserve the correction and stop the deformity from relapsing.[6] Clubfoot surgery is a form of treatment that has worse long-term results than the Ponseti approach. There have been reports of complications, including pain, stiffness, and weakness in the foot, which ultimately required additional surgeries.[7] The majority of patients get a percutaneous Achilles tenotomy before the final cast is put on to ensure optimal correction. 90% of patients who used the Ponseti approach reported being satisfied with the results during the course of their treatment.[3] In a different study, 78% of Ponseti procedure patients achieved satisfactory to excellent results 30 years after their initial therapy.[8] Our study's goal is to identify clubfoot's effects so that people with this condition can obtain better treatment.

METHOD AND MATERIALS

This descriptive cross sectional study was conducted in orthopaedic department of PMCH Hospital Nawabshah from August 2022 to February 2023. 100 children of both genders have age less than one year with idiopathic clubfoot was included. Children with neurologic, neuromuscular, syndromic clubfoot and previously treated clubfoot in other centers were excluded in our study. After enrolment complete history and physical examination of all children were carried out. The parents or legal guardians of the youngsters were asked for their informed written approval. The posterior foot crease, the equinus, the medial crease, the degree of lateral boarder curvature, and whether or not the talus head was covered were all taken into consideration when calculating the pre casting Pirani score.[9, 10] The minimum (best) and maximum (worst) aggregate total scores for all categories are 0 and 6, respectively. The severity of the clubfoot can be determined using the Pirani grading system, which can also be used to track the correction. Post casting Pirani score was interpreted as excellent outcome (0 and 1 score), good outcome (1.5 and 2.5 score) and poor outcome (≥3 score).[11]

Those children who eligible for percutaneous Achilles tenotomy (15 degree dorsiflexion and 70 degree abduction) under local anesthesia were treated.[12] After attaining complete correction, the post-treatment Pirani score was determined, and Dennis-Brown foot bracing was used for the

maintenance phase. Data were entered in excel sheet and analyzed in SPSS version 21. Quantitative factors were provided as mean and standard deviation, whilst qualitative variables were presented as percentages and frequencies. To determine the statistical difference between the pre- and post-treatment Pirani scores, a paired sample t test was used. P value less than 0.05 was regarded as significant.

RESULTS

According to our Study, 100 children with clubfoot were enrolled in this study. Out of 100, 50 children were male and 50 children were female. The mean ages of children were 4.02 months and SD was ±2.137. Bilateral clubfeet were 53% and unilateral clubfoot was 47%. The right club foot was 32% and 20% was left side and both right and left feet were 48%. The total feet treated 153. The average no: of cast were 5.45 (range 1 – 8). 41% of children need tenotomy. (Table no: 1). the initial Pirani score was 3.140 with SD±1.4892. The final Pirani score mean was 0.60 with SD±0.5505. Overall 92% had excellent outcome and 8% had Good outcome. (Table no 02) Post stratification data analysis revealed statically significant between initial and final Pirani score with P-value (0.001). (Table no: 03)

Table no: 01

Parameters		
Gender	Male	50%
	Female	50%
Age	Below 1 year	4.02 months
Foot involved	Unilateral	47%
	Bilateral	53%
Side of foot	Right	32%
	Left	20%
	Both	48%
No of cast	Range 1 to 8	5.45 (mean)
Tenotomy	Yes	41%
	No	59%

Table No: 02

Excellent outcome	92%
Good outcome	8%
Poor outcome	0

Table no: 03

Initial Pirani score	Mean score: 3.14	**P value**
Final Pirani score	Mean score: 0.6	0.001

DISCUSSION

The goal of the current study was to assess the results of casting and manipulation in kids with idiopathic clubfoot. One of the most prevalent congenital abnormalities is clubfoot. It is a challenging deformity to treat since it includes equinus, varus, adductus, and cavus. The treating doctor and the patient's parents should work diligently and devotedly to have the deformity corrected. [13]

Treatment's goal is to lessen or totally fix these irregularities so that the patient has a plantigrade foot without any discomfort, mobile, and free of calluses and does not require special shoes.[13] To ensure high success rates, several researchers suggest initiating manipulation and casting immediately or very shortly after delivery. [14,15] Nevertheless, compliance to bracing, which is more difficult in older children, is essential for the overall outcome and success.[6]

Many scoring systems were developed in response to the increased interest in the Ponseti technique of managing clubfoot, one of which is the Pirani scoring system because of very easily it can be used. In terms of demographics, the average age of children with clubfoot in our research was 4.02 months. Idiopathic clubfoot affected 100 youngsters, 50 of whom were female and 50 of whom were male. Bilateral clubfoot was present in 67.2% of the 61 individuals evaluated in a prior study, while unilateral clubfoot, evenly distributed on the left and right, was present in 32.8% of the patients. The outcome of Awang et al. is comparable to this.[16] In our study 47% children had unilateral and 53% children bilateral clubfoot. 32% children had involved right foot and 20% children had involved left foot. Our research's average number of casts was 5.45, which is consistent with a prior study that found 5.1 was the average number of castings needed. [17]

The Ponseti approach is regarded as the most successful for treating clubfoot and, in the majority of instances, results in an initial full repair. It includes serial casting, percutaneous Achilles tenotomy, and bracing (reported correction rates range from 89 to 98 percent).[18] Because Ponseti method of casting and manipulation can be successfully managed by non-specialist professionals and only requires a relatively low level of expertise, it has been demonstrated to be valuable. It is less invasive and expensive, two aspects that are essential for developing nations.

The Pirani score has been effectively utilised globally by allied healthcare professionals, such as cast technicians, as a diagnostic tool for clubfoot therapy utilising the Ponseti technique.

The number of predicted casts needed to rectify the deformity may be estimated using the Pirani score, according to numerous researchers. It also foretells if the patient will require a tenotomy.[19] In our study the initial Pirani score was 3.14 and final Pirani score after casting was 0.60. The comparison between initial and final Pirani score was highly significant with p value of 0.001. Another investigation found

The Pirani scoring system's entire correction, as determined by the Ponseti method of manipulation and serial casting, was completed in 63 (90%) feet. In our study out of 100 children 41% of them had

tenotomy while 59% did not have tenotomy. In previous studies, 102 feet underwent Ponseti treatment, and 65.7% had tenotomy while 34.3% did not. [16] For the purpose of correcting equinus, 43 (61.4%) feet underwent an Achilles tenotomy. While 27 (38.6%) feet with Ponseti casting and no tenotomy had corrected feet. [20] Limitations of our study was that our sample was small. We did not include children with age above 1 year. We did not determine any complications. So further studies required to accomplish better outcome.

CONCLUSION

The Ponseti method of casting and manipulating is extremely effective in treating clubfoot. That is the cheapest and simplest technique. With the Ponseti procedure, a plantigrade foot that is aesthetically pleasing can be obtained. Consequently, we suggest starting with this approach for treating babies with idiopathic club foot.

Ethics approval: The ERC gave ethical review approval

Consent to participate: written and verbal consent was taken from subjects and next of kin

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