



## Non-surgical Management of Clubfoot (*Talipes equinovarus*) in a Tertiary Care Children Hospital in Bangladesh

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**Abstract: Introduction:** Clubfoot or talipes equinovarus (TEV) is the most common and significant congenital orthopedic deformities present in pediatric surgery. The incidence is 1:900 and about 5000 child born with clubfoot in Bangladesh per year. Etiology of clubfoot is not clear yet, most commonly idiopathic but there are many theories that favors both genetic and environmental factors are responsible. Other risk factor includes oligohydromnios, family history, first baby, male baby, twin pregnancy. Neglected clubfoot deformity leads to long-term disability for the children, limited socialization, limited opportunities to work and burden for a family in lower middle income country (LMIC). As talipes equinovarus is an obvious deformity, no specific investigation is required to diagnose although it can be diagnosed prenatally by high resolution ultrasonogram during second trimester of pregnancy. Ponseti method of treatment is considered gold standard for clubfoot deformity. **Methods and Results:** It is a retrospective study and sample was taken from Dhaka shishu (children) hospital, which is the largest dedicated children hospital in Bangladesh. Clubfoot child attend at surgery out patient department (SOPD) and manage at TEV clinic. The child with clubfoot assessed by surgeon and classified by Pirani score. All clubfoot patient below the age of three months included and who had arthrogryposis multiplex congenita, spine deformity and had history of surgical intervention were excluded from this study. A total of 322 patient attended at TEV clinic from January'19 to December'19. Among them 93 patient were enrolled as new in this study year. Other patients were continuing their treatment and follow up. Among these new patients, male 55(59.14%) child were predominant that is 1.69:1. Mean age was 23days. Bilateral involvement were 36(38.71%), Total 71 (76.34%) patients needed tenotomy. Most of the patients' needs 6 to 7 serials of plaster (30.10 to 36.56%). **Conclusion:** Nonsurgical management of clubfoot patients has good outcome and less complications if they attend in health center early of age. Ponseti methods is effective and less chances of recurrence and reduce the need of surgical treatment. Effective awareness campaign and counseling of parents can show good compliance to treatment.

**Keywords:** Clubfoot, Talipes equinovarus (TEV), Ponseti method.

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## INTRODUCTION

Clubfoot or talipes equinovarus (TEV) is the most common and significant congenital orthopedic deformities present in pediatric surgery [1, 2].The

incidences of TEV is approximately 1:900 birth and about 5000 children born with clubfoot in Bangladesh per year [3].Clubfoot deformity involve all component of musculoskeletal system of lower

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extremity that includes bones, muscles, tendons, ligaments and joints. The primary deformities are Cavus (Curve at medial arch), adduction of forefoot, varus at hind foot and equinus at ankle joint [4, 5]. There is abnormal relationship between talus and tarsal bones, tarsal bones are in flexion in position, medially rotated and inverted while talus in planter flexed [6]. These changes are leads to lower extremity to equines and varus deformity of heel. Soft tissues of lower limb below knee are shortened and contracted [7]. Etiology of clubfoot is not clear yet, most commonly idiopathic but there are many theories that favors both genetic and environmental factors are responsible [8]. Other risk factor includes oligohydromnios, family history, first baby, male baby, twin pregnancy [9]. Neglected clubfoot deformity leads to long-term disability for the children, limited socialization, limited opportunities to work and burden for a family in lower middle income country (LMIC) [10]. As talipes equinovarus is an obvious deformity, no specific investigation is required to diagnose although it can be diagnosed prenatally by high resulation ultrasonogram during second trimester of pregnancy [11]. Management of clubfoot with splints, bindings and plaster cast has been evident across hundreds of years. In the 20<sup>th</sup>

century these conservative management were largely subsumed by surgical management that is posterior medial release (PMR) [12, 13]. In the 21<sup>th</sup> century, surgical correction (PMR) has been firmly denounced [14]. Success rate of clubfoot treatment was 90% to 98% nonsurgically by Ponseti method [15, 16]. Ponseti method of treatment is considered gold standard for clubfoot deformity [6].

**METHODS AND RESULTS**

It is a retrospective study and sample was taken from Dhaka shishu (children) hospital, which is the largest dedicated children hospital in Bangladesh. Clubfoot child attend at surgery out patient department (SOPD) and manage at TEV clinic. All clubfoot patient below the age of three months included as new patient. Who had arthogryposis multiplex congenita, spine deformity and had history of surgical intervention were excluded from this study. The child with clubfoot assessed by surgeon and classified by Pirani score [17,18]. It gives score 0-6, More score represents the more severe of disease.

**Pirani score:**

Parameter	Mild	Moderate	Severe
<b>Mid foot</b>			
Curved lateral border	0	0.5	1
Medial foot crease	0	0.5	1
Talar head coverage	0	0.5	1
<b>Hind foot</b>			
Posterior crease	0	0.5	1
Rigid equines	0	0.5	1
Empty heel	0	0.5	1

Maximum score is 6; minimum score is 0. Higher the score, the more severe the deformity

The sequence of treatment was to correct cavus first than adduction and supination and lastly equines and varus correction. Residual equines was corrected by percutaneous tenotomy of Achilles tendon (PTA) [19]. These procedure were maintained by manipulation and serial plaster and re-assess weekly for four to nine weeks. After that advised to use foot brace for last 3-5 years to prevent recurrence.

A total of 322 patient attended at TEV clinic from january'19 to december'19. Among them 93 patient were enrolled as new in this study year. Other patients were continuing their treatment and follow up. Among these new patients, male 55(59.14%) child were pre-dominant that is 1.69:1. Mean age was 23days. Bilateral involvement were 36(38.71%), Total 71(76.34%) patients needed tenotomy. Most of the patients needs 6 to 7 serials of plaster (30.10 to 36.56%).



**Table-1: Distribution of gender of patients**

Gender	No	%
Male	55	59.14
Female	38	40.86

**Table-2: Age at which patient attended to TEV clinic**

Age of attend	No	%
1 <sup>st</sup> week	17	18.27
2 <sup>nd</sup> week	23	24.73
2 <sup>nd</sup> week to neonatal period	31	33.33
5 <sup>th</sup> week to 2 months	13	13.97
>2months to 3 months	10	10.75

**Table-3: Distribution of involvement of foot**

Site	No	%
Bilateral involvement	36	38.71
Unilateral	57	61.29
Unilateral Left foot	31	33.33
Unilateral Right foot	26	27.96

**Table-4: Number of serial plaster needed**

No of plaster needed	No of patient	%
4	6	4.30
5	12	12.90
6	28	30.10
7	34	36.56
8	8	8.60
9	5	5.38

## DISCUSSION

Approximately 25000 child born per year worldwide and about 80% of that reported from developing countries. If these child remain untreated, it may causes permanent disability and burden for the family [9]. Previously most of the

patient were untreated due to illiteracy and gape of information about the disease and treatment protocol of TEV and also the outcome of this disease. Now a day there are many centre in Bangladesh where the management of clubfoot is available and cheap. Some orthopedic surgeons are serving in

rural areas also. Dhaka shishu (children) hospital, which is the largest dedicated children hospital in Bangladesh. Clubfoot child attend at surgery out patient department (SOPD) and manage at TEV clinic. In our study showed that male child were more affected which was similar to other study [9]. Unilateral clubfoot was more common in our study 57(61.29%) but other study shows the bilateral are more common [20], some study reported that unilateral and bilateral club foot are equal in number [21]. A study from United kingdom in 2002 reported unilateral (55%) was more common than bilateral (45%) [8]. Hussain SA showed 23(32.8%) patients had bilateral and 47(67.2%) patients had unilateral club foot among 70 patients [22]. Cardy AH shows 51% bilateral and 49% unilateral [23]. In our study 71(76.34%) patients' needs percutaneous Achilles tenotomy which was performed before the last cast and that cast was removed after one month and then advice for use foot brace which is almost similar to Ahmad I (2020) that was (77.2%) of his patients [9]. Doobs MB performed 91% of his patients [10].

Cast required in our study is 4 to 9 in number and maximum patient needs 7 cast 34 (36.56%) which was similar to other study [9]. Ponseti method has now become the gold standard for the management of clubfoot globally because of non surgical, easy, effective, non expensive and having good correction rate of 90 to 98% of patients [5]. It has low rate of complications and low chances of recurrence. Ponseti methods reduce the need of surgical treatment of clubfoot patients and which was cost effective. In this method serial casting is required to correct the deformity which is easy to learn by health workers. In Bangladesh there are many centers for clubfoot management and serve the population throughout the country.

In our study we include the child below three months of age but sometimes patient come in older age due to lack of awareness.

## CONCLUSION

Nonsurgical management of clubfoot patients has good outcome and less complications if they attend in health center early of age. Ponseti methods is effective and less chances of recurrence and reduce the need of surgical treatment. Effective awareness campaign and counseling of parents can show good compliance to treatment.

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