



## Original Article

# Outcome of Idiopathic Clubfoot after Short-Term Treatment with Ponseti Method

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### Abstract:

**Introduction:** Clubfoot is a congenital deformity of foot which is most common and increases the number of disabled person in our community. Clubfoot has been treated by Ponseti method for a longtime. We conducted this study to investigate the outcome of Idiopathic Clubfoot after short-term treatment with Ponseti Method.

**Materials and methods:** We conducted retrospective study on 68 idiopathic clubfeet in 47 patients to estimate the outcome at the end of serial casting in Ponseti method. **Results:** The success rate of our study was 92.7% and resistant clubfoot was 7.3% (5 feet) which required soft tissue surgery. After initial success, 7.9% (5 feet) developed relapse which was corrected by repeating the Ponseti method. **Conclusion:** The Ponseti method is highly effective for clubfoot treatment, even for relapsed clubfoot. Relapsed clubfoot can be treated by repeated serial plaster using Ponseti method.

**Key words:** Ponseti method, Idiopathic Clubfoot

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### Introduction:

Clubfoot or congenital talipes equinovarus (CTEV) is one of the most common congenital musculo-skeletal deformities<sup>1</sup> and occurs in one in 1000 live births<sup>2</sup>. The male to female ratio is 3:1 and almost 40% cases are bilateral<sup>3</sup>. The four basic component of clubfoot are cavus, adduction, varus and equinus. The deformity varies in severity from a mild positional club foot that is passively correctable to near the neutral position to a much more severe club foot with extreme rigid hindfoot equinus and forefoot adduction (typical deformity is shown in figure-1).

If the club foot is allowed to remain deformed, many other adaptive changes occur in bones, joints and soft tissues. These changes depend on severity of the soft tissue contractures and the effect of walking. In untreated patient, some joints may be spontaneously fused. Callus formation and skin break-down may occur as a result of persistent weight bearing on the dorsolateral aspect of foot which ultimately results in reduced ambulation and limited activity. On the other-hand extensive surgery is associated with progressive fibrosis and joint stiffness<sup>4</sup>.

In the late 90s, non-operative treatment gradually became popular following publication of long term

treatment outcome by Ponseti and his team<sup>5-7</sup>. Ponseti method of treatment has a success rate of more than 96% in short-term, mid-term and long-term results<sup>8-13</sup>. The technique include gradual manipulation of the foot into correct position through the aid of serial applications of casts generally followed by a percutaneous tenotomy of the Achilles tendon and a prolonged follow up programme with foot abduction braces<sup>14</sup>. Initially reserved for early correction of the uncomplicated idiopathic patients, today the Ponseti method is being adapted for complex non idiopathic patient and for patients presenting up to and beyond two years of age<sup>15</sup>. We conducted this study to sort out the outcome after short-term treatment with Ponseti method.

### Materials and Methods:

This is a retrospective cohort study on children presenting with CTEV in Mukti Hospital, Cumilla. The number of patient was based on those attending the hospital from 1<sup>st</sup> January 2013 to 31<sup>st</sup> December 2016 (Period of four years). Patients with underlying neuromuscular conditions, syndrome, and deformities related to trauma, tumour and infection were excluded from the study. Those with flexible clubfoot that did not require any manipulation or

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casting were also excluded. All the patients with CTEV were treated with weekly foot manipulation and change of plaster casts according to the principles and techniques described by Ponseti<sup>16</sup>.



**Figure-1: Clubfoot before treatment**

Figure-1 shows a patient with clubfoot deformity before any serial casting was attempted. Percutaneous Achilles tenotomy was performed on selected feet to correct equinus deformities. Achilles tenotomy was done when the foot was passively able to achieve at least 60 degrees of external rotation in a relation to long axis of tibia. This enabled the foot to be held in at least 15 degrees of dorsiflexion in the final cast. In our hospital, tenotomy procedures were most commonly performed under general anaesthesia. The final cast was applied for three consecutive weeks, after which the patients were required to use an abduction orthosis.



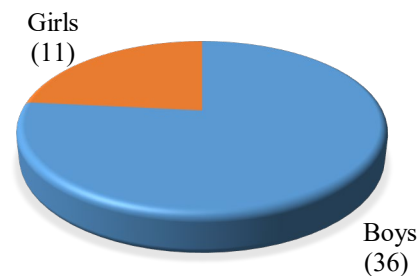
**Figure-2: Clubfoot after treatment**

Figure-2 shows a patient, six weeks after serial casting treatment was done. Parents were advised to use full time shoe abduction orthosis until the child started pulling up to stand. They were advised to use the abduction orthosis for 23 hours a day. One of the reasons for using the orthosis till this age was that many children presented to us several months after births, and by the time they completed casting it would be not too long before they started to stand

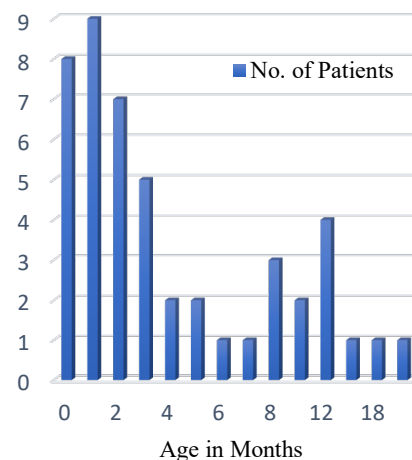
and eventually walk. After that, the child would only wear the abduction orthosis for about 6 hours at night. We recorded relevant information on each patient that included demographic data, age on presentation, casting procedure and clinical outcome on follow up. Deformities that were fully corrected but subsequently recurred were considered as relapsed clubfeet. A fully corrected deformity was defined as those feet that we were able to achieve a corrected midfoot position with the absence or minimal medial crease, minimal curved lateral border and non-palpable lateral head of the talus. The hindfoot was considered fully corrected if there was an absence of the posterior crease and the foot could reach at least a plantigrade position. Those that were not fully corrected after ten changes of casts, or required surgical intervention (excluding percutaneous tenotomy) were considered as resistant clubfoot. All the information was recorded in Microsoft Access database file. Selected data sets were subsequently transfer to Microsoft Excel programme for further analysis.

**Results:**

We treated 68 clubfeet in 47 children during the study period. In comparison to girls (11) boys (36) were more affected with a ratio of 3.27:1. (Figure-3)



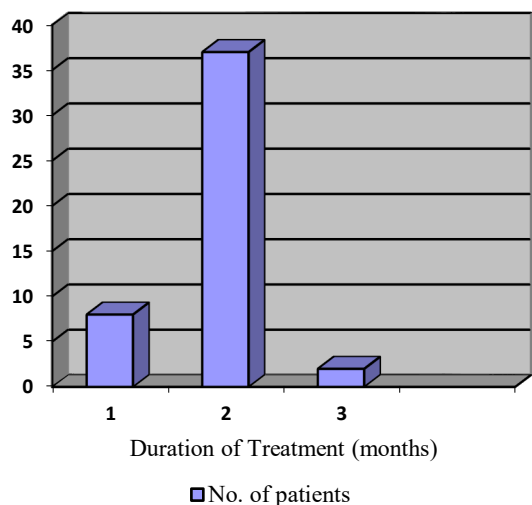
**Figure-3: Ratio of affected boys and girls**



**Figure 4: Age of presentation of the patients in our hospital**

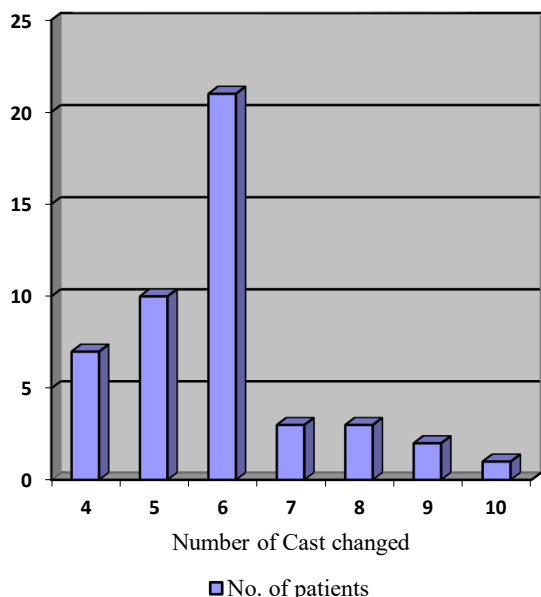
In our study, children with unilateral deformities (26, 55%) are more than bilateral deformity (21,

45%). In unilateral cases, right feet (19, 73%) were affected more than the left (7, 27%). The mean age of presentation was 4.97 months (Figure-4).



**Figure-5: Duration (in months) of treatment provided**

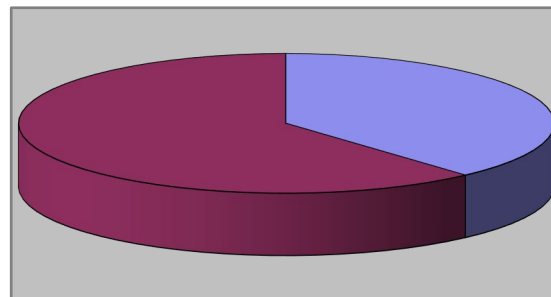
There were only 8 patients who presented within 4 weeks after birth, and one patient was attended at the age of 26 months for treatment. The mean duration of casting was 3.1 months ranging from 1-6 months (Figure-5).



**Figure-6: Number of cast change required during treatment.**

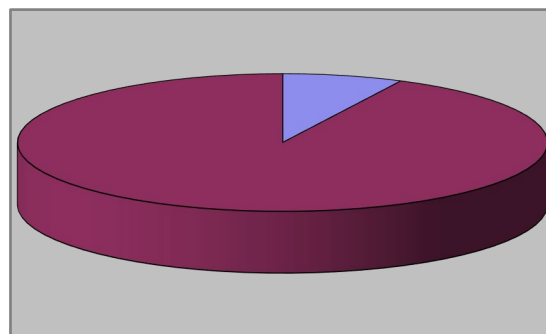
The mean number of cast change for all the feet was six ranging from four to ten changes (Figure-6).

Of the 47 patients, (29, 62%) required percutaneous Achilles tenotomy (Figure-7).



**Figure-7: Requirement of Achilles tenotomy**

Out of 47 patients with 68 clubfeet, we were not able to correct the deformities of 4 patients (8.5%) with 5 clubfeet (7.3%) and they were diagnosed to have resistant clubfoot. They subsequently required soft tissue surgery for the correction of their deformities. With 63 of the 68 feet responding to the treatment, our clinical success rate was 92.7%.



**Figure-8: Success rate of the surgery.**

The mean period of follow up was 16.2 months ranging from 4 to 30 months. Of the remaining 63 patients who were treated successfully 5 feet subsequently developed unilateral relapse giving rise to relapse rate of 7.9%. The initial presentations of these 5 cases did not vary significantly from others, in the term of the severity of their deformities or the resistance to passive correction. However, as the serial casting was applied, it was noted that the progress in these 5 patients was slower than the other patients in this report. There was no underlying pathological difference between the cases. However, the compliance of the abduction braces wear was poor among these 5 patients. All of them were successfully treated with repeated serial casting and a repeat percutaneous heel cord tenotomy. One patient required a medial soft tissue release in combination with a tendo-Achilles lengthening procedure.

**Discussion:**

The number of boys are near about three times the number of girls; and the ratio was 3.27:1. Unilateral clubfoot was slightly more than half of our patients (55%) and this is consistent with studies by Rasit<sup>17</sup> and Wallander<sup>18</sup> who reported 67% and 54% of unilateral cases respectively. We had more right sided (73%) unilateral clubfoot. In the literature, Wallander<sup>18</sup> and Byron<sup>19</sup> reported that right unilateral clubfoot was more common, while other studies by Rasit<sup>17</sup> reported that left side was more commonly affected.

We have treated 68 club feet. But we couldn't achieve full correction in 5 feet (7.3%) which given us success rate of 92.7%. This is relatively good result in comparison to study of Ponseti and smoley<sup>20</sup> who had success rate of 80% in 1963. We also observed relapse in 5 feet (7.3%) among 68 club feet. This is most compatible with the recent study of Morcuende<sup>21</sup> and Gunalan<sup>22</sup> whose relapse rate was 10% and 8% respectively. The main reason of relapse was negligence in the use of Dennis Brown Bar.

In our study, 13 out of 47 patient (34%) came after 6 mothers of age and the mean age of presentation was 4.97 months. As many patients of our country present lately, more effort should be organized to improve awareness on the need for early treatment. We conducted study in small number of patients with short follow up. Further studies with larger follow up and great care with the use of Dennis Brown Bar would be helpful to achieve a long term outcome of treatment in the region. Although 5 feet were diagnosed as resistant clubfoot and eventually required extensive soft tissue surgery, subsequently relapse in 5 feet were successfully treated with repeated serial manipulation and casting.

**Conclusion:**

In our study, we found that the Ponseti method of treatment was effective in the treatment of idiopathic clubfeet even for those who presented lately with overall success rate of 92.7%.

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