



## Orthopaedics

## MANAGEMENT OF IDIOPATHIC CONGENITAL CLUBFOOT USING PONSSETI METHOD

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**ABSTRACT** **Introduction:** Idiopathic congenital talipes equinovarus is a complex deformity that is difficult to correct. The treatment of clubfoot is controversial and continues to be one of the biggest challenges in pediatric orthopaedics. Most orthopedists agree that the initial treatment should be non-surgical and should be started soon after birth. We aimed to study a short-term follow up of 30 patients treated by the Ponseti method at our institute to assess the efficacy of the treatment modality.

**Methodology:** 30 patients underwent Ponseti method for a period of 2 years, patients were followed up regularly at weekly intervals. The severity of foot deformities was graded as per Pirani's scoring system.

**Results:** The Ponseti method is a safe and cost-effective treatment for congenital idiopathic clubfoot and radically decreases the need for extensive corrective surgery. Non-compliance with orthotics has been widely reported to be the main factor causing failure of the technique. At the end of study good results were obtained in 28 patients. 2 patients developed recurrence of the deformity due to non-compliance of the use of Orthotics.

**KEYWORDS :** Idiopathic clubfoot; CTEV; Ponseti.

## INTRODUCTION

Idiopathic clubfoot or CTEV is the commonest orthopaedic congenital condition which has been treated since the times of Hippocrates with unsatisfactory results. The results have improved over the decades owing to the increasing knowledge about the aetiology and pathoanatomy of club foot.

Clubfoot occurs in 1 in 1000 live births and is one of the most common birth defects involving the musculoskeletal system.<sup>1</sup> It results in equinus deformity characterized by ankle plantar flexion, subtalar inversion and adduction of the hind and forefoot. The incidence among different races ranges from 0.39 per 1000 among the Chinese population to 1.2 per 1000 among Caucasian to 6.8 per 1000 among Polynesians.<sup>2</sup> Lochmiller in 1998 reported a male to female ratio of 2.5:1 and 24.4% of the affected individuals have a family history of idiopathic talipes equinovarus.<sup>3</sup> Over the years many different forms of treatment ranging from gentle manipulation and strapping, serial plaster corrections, forcible manipulations including the use of mechanical devices to surgical correction have been tried. Ignacio Ponseti, developed an inexpensive and effective method of treating clubfoot by serial manipulation, a technique of cast application, and a possible percutaneous Achilles Tenotomy. The clinical correction achieved by using this method produced a functional, plantigrade foot without requiring posteromedial release in 85% to 90% of cases.<sup>4,5</sup>

## MATERIALS AND METHODS

This study includes 30 patients from outpatient section of Department of Orthopaedics, M.R Medical College, Gulbarga for a period of two years. Children between 7 days to 2 year of age with idiopathic clubfoot were included in our study. The excluded cases were patients aged more than 2 years of age, clubfoot secondary to syndromic involvement, polio, CP, patients that have undergone prior surgical intervention for clubfoot. Demographic data were obtained from the parents during their visits. Each patient was subjected through general, physical and systemic examination. Children were evaluated and graded for severity of clubfoot by Pirani severity scoring system<sup>6</sup>

The feet were classified into three categories with respect to the severity of the deformity on the basis of initial Pirani score. Group -1: Pirani score of 1.5-2.5 points. Group-2: Pirani score of 3-4.5 points. Group-3: Pirani score of >5 points with >5 being severe deformity.

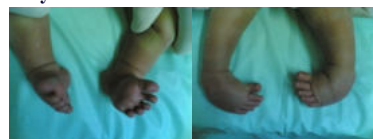
The Ponseti technique<sup>7</sup> was used at our institution according to the following regimen. Treatment consisted of gentle manipulation of the foot and the serial application of long leg plaster. We initiated this same treatment method even in the older children (up to 14 months of age)

who were referred to us for the first time. In all patients, the cavus was corrected first by supinating the forefoot and dorsiflexing the first metatarsal. To correct the varus and adduction, the foot in supination was abducted while counter pressure was applied with the thumb against the head of the talus by abduction of foot. The patient returned in 5 to 7 days and the casts were removed. The equinus was not addressed until all other deformities were corrected, and the foot was able to be abducted 50° to 60° on the talus. Then equinus was corrected by casting or percutaneous Achilles Tenotomy. In the last cast, the foot was markedly abducted 70° without pronation and 15° dorsiflexion and left in place for 3 weeks to allow for healing of the tendon. After that, the cast were removed.

After achieving full correction with casts, a custom made Steenbeek Foot Abduction Brace with 70-degree external rotation of the affected foot and 15-degree bend of the connecting bar is given for constant use (at least 23 hrs per day) for the next 3 months or till the child is cruising. The normal foot in a unilateral deformity was placed in 45 degrees of external rotation and the brace was worn for 23 hrs a day for first three months and then at night for 12 hrs for next 4 yrs. After this the splint was used only for nightwear and CTEV shoes were given for daytime use to facilitate walking.

Final grading of the patient's results was done into good, poor results. Good Results: Patients were labeled as having a good result if Pirani Score is 1.5 points or better or if all deformities get corrected by Ponseti technique alone at final follow up. Poor Results: Patients were labelled as having a poor result if Ponseti technique failed to give complete correction of foot even once.

## Case-1: An 8 Day Old Child with Bilateral Clubfoot



At presentation

At 4<sup>th</sup> cast



## RESULTS

The present study includes treatment and follows up of 30 children which were managed by Ponseti method after recording the deformity with Pirani scoring and if required percutaneous tendoachilles tenotomy.

Most of the children were below 6 months of age. The youngest in the series was of 8 days, while oldest was of 1 year 10 months.

Male predominated the series consisting about 67% of the population. The male to female ratio in the series was 2:1.

Of the 30 cases, twenty (66%) had unilateral and ten (34%) had bilateral involvement.

Three out of thirty cases were having positive family history for similar deformity of foot.

In present study, majority of the feet (60%) were having pre-treatment Pirani Score between >5.

Patients presenting early after birth required lesser number of casts compared to those who presented late. The mean number of casts applied to obtain correction was 6.6 (range-4 to 14 casts). The more severe the initial deformity, the more casts were required to obtain correction.

## DISCUSSION

The mean age at initial presentation of 10.2 weeks is in agreement with age incidence observed by Dobbs et al<sup>8</sup> who reported clubfeet in 51 patients at mean age of 12 weeks, at initial presentation.

In our study there were 67% male and 33% females. Turco in his series of 468 patients reported 71.36% males and 28.64% females.<sup>9</sup>

As regards laterality, 10 of our cases were bilateral (33%) and 20 were unilateral (67%) which is in concordance with Raju Rijal et al who reported 57.89% bilateral and 68.75% unilateral cases.<sup>10</sup>

In the present study positive family history was ascertained in 10% of patients. Similar incidence of 17.9% of positive family history has been observed by Turco<sup>9</sup>.

We found that those feet belonging to Group II were more amenable to correction and responded relatively early when compared to those belonging to Group III.

Raju Rijal et al. showed in their series, faster rates of decrease in Pirani score treated by Ponseti technique, regardless of side, mean Pirani scores improved much faster similar to our study.<sup>10</sup>

In our study, number of casts required for full correction ranged from 4 to 6 and most patients requiring mean number of 5.8 casts. PJ Dyer and N Davis in their series showed at least 4 cast required for full correction of initial Pirani score similar to our study.

In our study, 28(90%) patients required Percutaneous Tenotomy of Achilles Tendon. In Morcuende et al study (n=256) tendoachilles tenotomy was done in 86% of the cases.<sup>12</sup>

In present study minimum duration of plaster cast application was 5 weeks, maximum being 14 weeks. Average duration was 7.3 weeks. It is quite similar with Herzenberg et al<sup>13</sup>, who reported casting for average of 8 weeks, range being 4-12 weeks.

In the present series 6% of the patients (2 children) reported relapses after initial successful treatment. Similar observations were reported by Morcuende et al<sup>12</sup>, who reported that there were 17 (10%) relapses. These relapses were significantly associated with non-compliance with the Steenbeek Foot Abduction Brace (FAB).

Compliance with the FAB has also been an issue. Those patients compliant with brace wear had 100% success at final last follow-up. However, patients not compliant with FAB wear, with initial good results after casting, had maintained correction in only 40% of the patients. Thacker et al reiterated the fact that compliance with the foot FAB is essential for the success of the Ponseti technique.<sup>14</sup>

In our study, overall, 93.3% of the patients showed good results. Wallace B Lehman, MD, in his series of 50 patients with idiopathic clubfoot deformity were treated by Ponseti protocol and reported that over 90% of cases will require no other treatment except for percutaneous tenotomy of Achilles tendon.<sup>15</sup>

In the present study follow-up was of short duration, however we anticipate equal results in long term. Clearly, the true functional outcome of these patients cannot be determined until the child has completed growth, and perhaps not until later in life. Still, the results of treatment using Ponseti technique and validated scoring systems, allow an accurate assessment of the ability to correct the clubfoot to a supple, plantigrade position.

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