



Original Article

## Evaluation of Results of CTEV Correction Byserial Casting of Ponseti Technique

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### ABSTRACT

**Background:** Idiopathic clubfoot or congenital talipes equinovarus is the most common orthopedic congenital deformity. Club foot affects roughly one in every 1000 live births, and it is bilateral in about half of the cases. The four components of a congenital club foot are cavus, adduction, varus, and equinus. The treatment's purpose is to address four abnormalities and keep them corrected so that the patient can have a functional, pain-free plantigrade foot. The Ponseti Method is a conservative and manipulative method that is utilized worldwide to correct CTEV. **Aims:** To Analyze the functional outcome of serial cast correction of congenital talipes equinovarus by ponseti method.

**Materials and methods:** Prospective Observational Clinical Study conducted in the Department of Orthopedics for 18 months in total of 30 cases. Up to 1 year of age, either gender, Idiopathic type are considered for study.

**Results:** The severity of deformity was assessed using a standardized scoring system in which a score of 0 indicated no abnormality, 0.5 indicated moderate abnormality, and 1 indicated severe abnormality. Each foot was assigned a total score, with a maximum possible score of 10 points; higher scores represented more severe deformity. Statistical analysis showed that the p-value was less than 0.0005 when comparing the two groups (before treatment and after treatment), indicating that the intervention was highly significant.

**Conclusion:** The outcome was determined using a paired T-test. Based on the findings of this study, we may infer that the Ponseti approach for correcting clubfoot deformity is a highly effective treatment. It successfully provides patients with a painless, mobile, and cosmetically acceptable foot, resulting in improved functional outcomes.

**Keywords:** Ponseti, Equinovarus, Congenital Talipes Equinovarus (CTEV).

### INTRODUCTION

It is predicted that more than one hundred thousand infants are born with congenital clubfoot every year everywhere in the world. Eighty percent of the cases are seen in countries that are still developing. The majority get inadequate or no treatment at all. As a result of the neglectful treatment of clubfoot, patients, their families, and society as a whole are subjected to crushing physical, social, and financial costs. When it comes to congenital musculoskeletal disorders, neglected clubfoot is the most serious source of physical impairment on a global scale. Club Foot, also known as Congenital Talipes Equino Varus (CTEV), affects around two to three out of every one thousand children who are born in India. If the problem is not addressed early on, it will grow more severe when the joints become stiff and arthritis begins to manifest.[1,2]

It has been documented in the orthopedic literature that the prevalence of clubfoot is two per one thousand births, and the ultimate therapy for clubfoot is primarily surgical. Although early serial casting is performed, the majority of the clubfeet that are recorded eventually results in surgical release. This occurs predominantly in individuals who are between the ages of three months and one year.[3]

In recent years, non-surgical therapy of idiopathic clubfoot has gained widespread acceptance as the primary standard of care in several countries throughout the world. When it comes to correcting clubfoot deformity, the Ponseti procedure has been demonstrated to be extremely effective. A success rate of 95% has been recorded for manipulation procedures performed at the North American clinic run by Ponseti. Because of the intrinsic simplicity of the system and the conservative approach that it takes, it has been proposed that it is particularly well-suited to the developing world.[4]

The Ponseti procedure was first reported in the early 1960s; however, it is only in the most recent decade that its advantages in the early treatment of clubfoot deformity have been brought to light. It has been stated that the Ponseti casting technique has a high success rate when it comes to the treatment of idiopathic clubfoot. When compared to surgical treatment, non-operative treatment for clubfoot results in a lower rate of complications, less pain, and improved function by the time the patient reaches their senior years. Patients who complained about the Ponseti procedure and were treated before the age of seven months had a success rate of 92% at an early follow-up after casting was finished. There are only a few minor complications caused by the cast procedure and the equipment that was employed.[5]

A youngster who is otherwise healthy can have their clubfoot fixed in as little as two months using the Ponseti method of manipulations and plaster cast applications. This method requires very little or no surgical intervention. India is an example of a developing nation that might benefit greatly from utilizing this strategy. In order to prevent relapses, it is necessary to have a health system that is well-organized in order to guarantee that parents will follow the directions for the foot abduction brace. The treatment is not only cost-effective but also gentle on the infants. If it is carried out effectively, it will significantly reduce the number of people who are crippled by clubfoot.

It is impossible to find another foot in the animal kingdom that is comparable to the human foot. It is one of the most notable components of the human body as a whole in terms of its anatomical composition. These kinds of structural adjustments have turned into a requirement for him in order to achieve a bipedal posture. The deformity of such a foot causes it to become inefficient, which results in an ungainly walk. There are many different types of foot deformities, but clubfoot is one of the most frequent congenital diseases that orthopedic practitioners encounter. The issue has not been resolved to this day. Despite the fact that congenital talipes equinovarus (CTEV) has been there since the beginning of time, our understanding of its etiology is limited, its pathophysiology is complicated, and its management is fraught with debate.[6]

This dissertation is an investigation into the outcomes of the Ponseti procedure for the treatment of idiopathic congenital talipes equinovarus. The findings indicate that early conservative therapy with the Ponseti approach yields favorable outcomes, and that parents are becoming more aware of the fact that the deformity can be completely cured, which ultimately leads to early consultation and consistent follow-up. A growing number of people are turning to the Ponseti treatment for clubfoot as a result of the positive outcomes that have been proven by Ponseti and other institutions. The surgical intervention rates are rather modest, with the exception of the Achilles tenotomy, which is considered to be an essential component of the treatment in this case. The purpose of this study, on the other hand, was to determine whether or not the Ponseti approach was both safe and successful in the early phases of clubfoot repair.

## **MATERIALS AND METHODS**

**Study Design:** Prospective Observational Clinical Study.

**Place of Study:** The study was conducted in the Department of Orthopedics , Tertiary care center.

**Study Period:** January 2023 to June 2024

**Study Population:** The patient's/guardians were explained about the study, the procedure, and the complications, and the informed consent form was collected from all of them before the commencement of the study in the department of Orthopedics .

**Study Sample Size:** A total of 30 cases were studied.

### **Methodology:**

A total of 30 patients who were satisfying the inclusion criteria were enrolled into study.

**Inclusion Criteria:** Up to 1 year of age, either gender, Idiopathic type and Having obtained his/her informed consent from parents/guardians.

**Exclusion Criteria:** Postural, syndromic, neglected, relapse club foot, Patients who are unfit and noncompliant with the described technique

Ethical clearance was obtained from the Institutional Ethical Committee at Chalmeda Anand Rao Institute of Medical Sciences.

### Statistical Analysis

The demographic data and clinical parameters obtained were subjected to descriptive statistical analysis and by using SPSS (version 20), the data is stated as Mean±SD, Frequencies (n), and Percentages (%) in tabulated and graphs form. Student t-test was performed to test the significance of the difference between the means of study groups. In all the cases p value ≤0.05\* is considered as statistically significant.

Complete history including consanguinity, birth history, family history, and milestones were taken. The severity of the deformity was graded according to the Pirani Severity Score; clinical scoring the initial total Pirani score and the final total Pirani score of each foot was calculated. 28 patients entered the study with 38 idiopathic clubfeet, after explaining the treatment and counselling the parents. Parents were explained about 6 to 10 casts at weekly intervals; tenotomy and wearing of foot abduction brace till 3 to 4 years of age, and parents were also explained about other methods of treatment. Patients were followed up clinically for a minimum of six months after completion of treatment.

Radiographs were not taken except for a few initial patients. The reason for not taking a radiograph was that every time the foot cannot be put in the same position, bones are not well ossified, and the Pirani scoring system, which is followed here, doesn't need radiographic evaluation. Routine Blood investigations were done before the tenotomy. Scoring of the foot was done before first casting and then on every visit before applying the cast, and changes were scrutinized.

### Pirani Classification of Clubfoot Deformity

#### Physical Examination Findings and Scoring

##### 1. Curvature of the lateral border of the foot

- **Score 0:** Straight
- **Score 0.5:** Mild distal curve
- **Score 1:** Curve at the calcaneocuboid joint

##### 2. Severity of medial crease (foot held in maximal correction)

- **Score 0:** Multiple fine creases
- **Score 0.5:** One or two deep creases
- **Score 1:** Deep creases change the contour of the arch

##### 3. Severity of posterior crease

- **Score 0:** Multiple fine creases
- **Score 0.5:** One or two deep creases
- **Score 1:** Deep creases change the contour of the arch

##### 4. Medial malleolar–navicular interval (foot held in maximal correction)

- **Score 0:** Definite depression felt
- **Score 0.5:** Interval reduced
- **Score 1:** Interval not palpable

##### 5. Palpation of the lateral part of head of the talus (forefoot fully abducted)

- **Score 0:** Navicular completely reduces, lateral talar head cannot be felt
- **Score 0.5:** Navicular partially reduces, lateral head palpable
- **Score 1:** Navicular does not reduce, lateral talar head easily felt

##### 6. Emptiness of heel (foot and ankle in maximal correction)

- **Score 0:** Tuberosity of calcaneus easily palpable
- **Score 0.5:** Tuberosity of calcaneus more difficult to palpate
- **Score 1:** Tuberosity of calcaneus not palpable

##### 7. Fibula–Achilles interval (hindfoot knee extended, foot and ankle maximally corrected)

- **Score 0:** Definite depression felt
- **Score 0.5:** Interval reduced
- **Score 1:** Interval not palpable

##### 8. Rigidity of equinus (knee extended, ankle maximally corrected)

- **Score 0:** Normal ankle dorsiflexion

- **Score 0.5:** Ankle dorsiflexes beyond neutral, but not fully
- **Score 1:** Cannot dorsiflex ankle to neutral

#### 9. Rigidity of adductus (forefoot is fully abducted)

- **Score 0:** Forefoot can be overcorrected into abduction
- **Score 0.5:** Forefoot can be corrected beyond neutral, but not fully
- **Score 1:** Forefoot cannot be corrected to neutral

#### 10. Long flexor contracture (foot and ankle held in maximal correction)

- **Score 0:** MTP joints can be dorsiflexed to 90 degrees
- **Score 0.5:** MTP joints can be dorsiflexed beyond neutral but not fully
- **Score 1:** MTP joints cannot be dorsiflexed to neutral

#### Final Score Interpretation (Total = 20)

Grade Type	Frequency (%)	Score	Reducibility
<b>Benign</b>	20%	1–4	>90% soft, resolving
<b>Moderate</b>	12%	—	—
<b>Severe</b>	33%	5–9	>50% soft-tissue, reducible, partially resistant
<b>Very Severe</b>	35%	10–14	<50% stiff, resistant, partially reducible

#### Pirani Scoring – Rationale

There is no science without a reliable and valid measurement. Both Pirani scoring and dimeglio scoring systems have shown to be equally efficacious in assessment of clubfoot. 40 Pirani has developed a reliable and valid method of clinically assessing the amount of deformity, to serially monitor the progress of correction and to guide the need and timing of percutaneous tenotomy of the tendo-achillis. Documenting the amount of deformity allows the treating doctor to where he or she is with respect to the road map of the treatment, to assure the parents regarding progress and also allows meaningful comparison of results.

The Pirani scheme scores six clinical signs either 0 (normal), 0.5 (moderately abnormal), or 1 (severely abnormal).

#### Midfoot score

Three signs comprise the Midfoot Score (MS), grading the amount of midfoot deformity between 0 and 3.

Curved lateral border

- Medial crease
- Talar head coverage
- Hindfoot score
- Three signs comprise the Hindfoot Score (HS), grading the amount of hindfoot deformity between 0 and 3.
- Posterior crease
- Rigid Equinus
- Empty heel

#### Treatment Regimen – The Ponseti Technique

The treatment was in 2 stages: Correction of the deformity by weekly serial casting and Maintenance of that correction by bracing. Casting was begun as soon as possible after birth. Some babies had to be called a week later in view of fragile neonatal skin. In all babies, pirani scoring was done to assess the initial severity.

#### Manipulation And Application Of Cast:

##### First Cast:

##### Correction of Cavus:

The baby was allowed to sleep or bottlefed or breastfed on the mother's lap. The head of the talus palpated in front of the lateral malleolus, lifting the head of the first metatarsal by holding it with the thumb and index finger of one hand and pressing gently over the head of the talus (as a fulcrum) with the thumb of another hand, cavus was corrected. This corrects the pronated forefoot, aligning it with the already supinated hind foot.

##### Cast Application:

After 1 to 2 minutes of gentle manipulation, cotton soft rolls of 3-inch width were wrapped from the toe towards the thigh, while the assistant held the head of the first metatarsal gently. Cotton soft rolls were applied covering half of its width in every rotation. It was applied snugly over the foot and the ankle, and loosely over the calf and thigh. The thigh was covered with extra cotton. A plaster bandage (3-inch width) was applied from the toe, while the assistant held the toe, towards the knee. Initially, 3 to 4 rotations are given over the toe covering the assistant's finger then gradually proximate towards the knee. Plaster was applied snugly over the foot and ankle and loosely over the calf.

**Molding of casts:**

It was done according to the manipulation. The assistant leaves the foot and the surgeon starts molding by lifting the head of the first metatarsal using the head of the talus as a fulcrum, making the medial longitudinal arch normal. Molding was done over the malleoli, talar head, medial arch, and heel.

**Extending The Cast:**

The cast was extended up to the thigh keeping the knee at 90° of flexion, with more plaster over the anterior aspect of the knee and less over the popliteal fossa. First cast correcting the cavus and forefoot pronation.

After applying the cast, the toes were checked for capillary filling and overcrowding or any excessive cry or leg banging of the baby to rule out any abnormal pressure due to cast application. Patients were asked to revisit after 7 days.

**Cast Removal:**

The first cast and all the cast were removed by soaking the whole cast with water and unrolling the so- formed soft plaster bandage, by holding the end of the plaster bandage which was left for identification.

**Second to last cast to correct adduction and varus:**

After the entire preliminary requirement for the baby's comfort, manipulation was started within hour of the previous cast removal. The casting protocol is the same.

**Manipulation for correction of Adductus:**

1 to 2 minutes of manipulation is done before cast application. It is done by holding the head of the first metatarsal by index finger on the plantar aspect the thumb on the medial aspect of one hand, and the thumb of the other hand over the lateral aspect of the head of the talus. Making the talus as fulcrum foot was abducted by the hand that is holding the metatarsal head. Lifting of the metatarsal head is done at the same time to keep the cavus corrected and keep the foot in supination. Eversion of the heel was never tried as it comes gradually along with the correction of adduction.

**Cast Application:** The cast is applied the same way from toe to knee and then extended to the thigh. Cast was molded in the same way as manipulation is done, with the same pressure points with fingers. The cavus deformity was corrected first by supinating the forefoot to bring it in alignment with the hindfoot. A long leg cast was applied to maintain this correction for 1 week.

Next week the cast was removed in the outpatient and scoring was done. Over the next 2 or 3 weeks the foot was serially abducted to bring about over-correction. Additional casting would sometimes be needed. When the calcaneum was sufficiently abducted beneath the talus, scoring was assessed.



**Figure -1: Cast Application**

**CORRECTION OF EQUINUS:**

When the midfoot score had fallen below 1 but the hindfoot score remained over 1, it was indicative of residual equinus deformity requiring release of the contracture. This was when the decision to perform Percutaneous Tendo-Achilles Tenotomy would be taken. Tenotomy was done under sedation achieved by syrup pedicloryl and local anaesthesia.

**PERCUTANEOUS TENOTOMY:** Ponseti recommends it under local anaesthesia but it was not possible in our setup due to the non-compliance of the baby. So, we use short-acting general anaesthesia for tenotomy. Parents were explained about the procedure, being a minor one, and basic investigations were done. The limb of the patient is prepared by scrubbing with an antiseptic solution in the operation theatre. Short-acting general anaesthesia was given by an anaesthetist.

### Steps for Percutaneous Tenotomy

- Painting was done from mid-leg to mid-foot.
- Draping was done keeping the ankle exposed.
- Assistant holds the foot in maximum dorsiflexion while the patient is in the supine position, the foot rotated externally with the knee flexed and thigh externally rotated.
- Tendoachilles was palpated and identified (bluish in light skin).
- Scalpel blade #11 or #15 was put from medial side of tendon. The point of insertion of the blade is 1.5 cm proximal to the attachment of tendo achilles on the calcaneum.<sup>64</sup>
- Blade is kept parallel to the tendon. It is inserted just anterior and touching to the tendon, to avoid injury to the neurovascular bundle which is present anteromedial to it.
- Now the sharp edge of the blade is rotated posteriorly to cut the tendon using its tip.
- A “POP or SNAP” is felt after successful tenotomy, which gives an additional 15° to 20° of dorsiflexion.
- Wound is dressed. No need of putting stitches most of the time.
- Single dose of injectable antibiotic given before procedure and started with oral NSAID and antibiotic for 3 days.



**Figure -2: Percutaneous Tenotomy**

**LAST CAST APPLICATION:** It was applied after gaining 15-20 degrees of dorsiflexion 50- 70 degrees of abduction and satisfactory varus correction. This cast was applied to keep the foot in 70 degrees of abduction and 15-20 degrees of dorsiflexion for 3 weeks. After removal of the cast, the outcome is, a painless, plantigrade with good mobility and cosmetically acceptable foot.

**BRACING:** After the removal of the last cast, the brace was applied. Here we used Denis Brown splint keeping the heel at shoulder width apart with foot in abduction of 70 degrees and dorsiflexion of 15-20 degrees Knees are kept free.

Babies were then shifted to the Maintenance phase by bracing them in a Dennis Brown splint; 23 hours a day for the first 3 months and then 14 hours a day for 3 years. Weekly follow-up was done during initial periods of bracing to ensure compliance and to periodically assure and educate the parents. Later monthly follow-up was advised. A long leg cast was applied for the next 3 weeks. All tenotomy wounds were inspected within 1 week.

### EVALUATION

Each foot was evaluated cosmetically, and functionally and rated according to the following criteria: -

#### A. Excellent

1. Complete correction of all components of the deformity
2. Plantigrade cosmetically acceptable foot
3. Pliable subtalar motion
4. Dorsiflexion equal to the normal side or above the right angle in bilateral deformities

#### B. Good

1. Complete correction of all components of deformity
2. Fully plantigrade and mobile foot with a minor degree of persistent metatarsus adductus

#### C. Fair

1. Plantigrade and functionally acceptable foot
2. Cosmetically less acceptable

3. Some loss of initial correction, which is correctable by re-manipulation and casting

#### D. Poor

1. Loss of correction and recurrence of the deformity which requires soft tissue release.

### RESULTS

**Table-1: Demographic Distribution in present study**

Age	Frequency (n)	Percentage (%)
0 to 4 months	20	66.7%
4 to 8 months	07	23.3%
8 to 12 years	03	10%
TOTAL	30	100%
<b>Gender (M/F)</b>		
Male	19	63.3%
Female	11	36.7%
<b>Side</b>		
Right	13	43.3%
Left	7	23.3%
Bilateral	10	33.3%

In the present study, it was observed that the majority of the study participants were from the age group 0 to 4 months (66.7%), followed by 4 to 8 months (23.3%), and the least were from the age group of 8 to 12 months (10%), respectively. Male population is in the majority (63.3%) when compared to the female population (36.7%), respectively. Laterality-Right is 43.3%, Laterality – Left is 23.3%, and Laterality- Bilateral is 33.3%, respectively.

**Table-2: Correlation Between Age Group And Pirani Score (Initial And Final)**

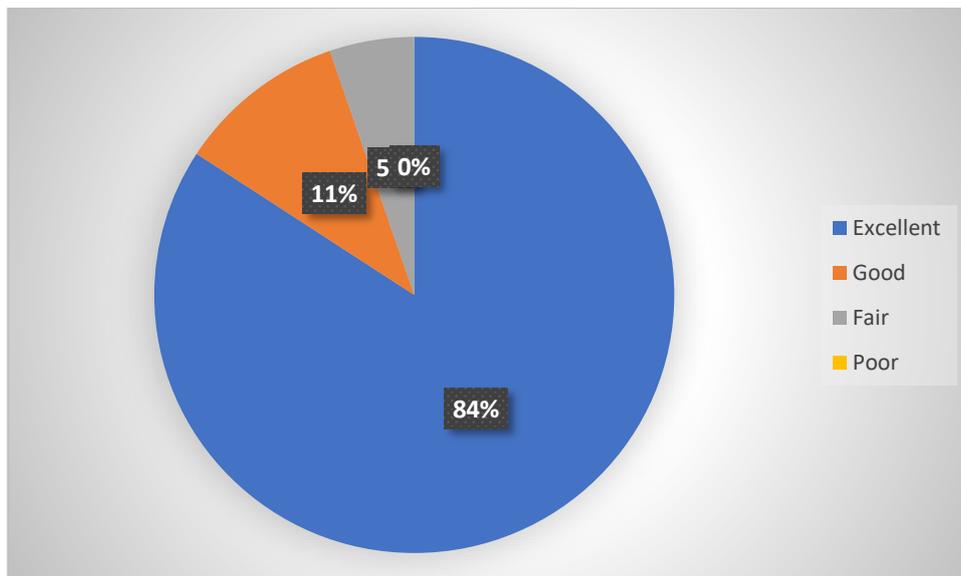
Age	Mean Initial Pirani score	Mean Final Pirani score
0 to 4 months	5.33	0.18
4 to 8 months	5.6	0.29
8 to 12months	5.77	0.77

In the present study, it was found that at 0 to 4 months the mean initial score was 5.33 and the Mean final score was reduced to 0.18. At 4 to 8 months the mean initial score was 5.6 which was reduced to 0.29. At 8 to 12 months the mean initial score was 5.77 which was reduced to 0.77, respectively.

**Table-3: Number of casts in relation to age**

Age	Number of Casts
0 to 4 months	5.5
4 to 8 months	5.85
8 to 12months	7

In the present study, it was observed that the number of casts at 0 to 4 months is 5.5, at 4 to 8 months is 5.85, and 8 to 12 months is 5.85, respectively.



**Figure-3: Scoring in present study**

In the present study, the observed scores were excellent high percentage (84.2%), followed by good (10.5%) and fair (5.3%), respectively. No patient had poor score it was zero.

**Table-4: Pirani Score (Initial And Final)**

Pirani Score	Mean Initial Pirani Score	p values
Initial	5.25±0.68	0.001*
Final	0.22±0.28	

In the present study the Pirani score mean values were calculated, it was observed that the initial mean is 5.25 and the final mean is 0.22 with a statistical significance. (p=0.001\*).

**CASE: 1**



Initial Presentation



First Cast



Third cast

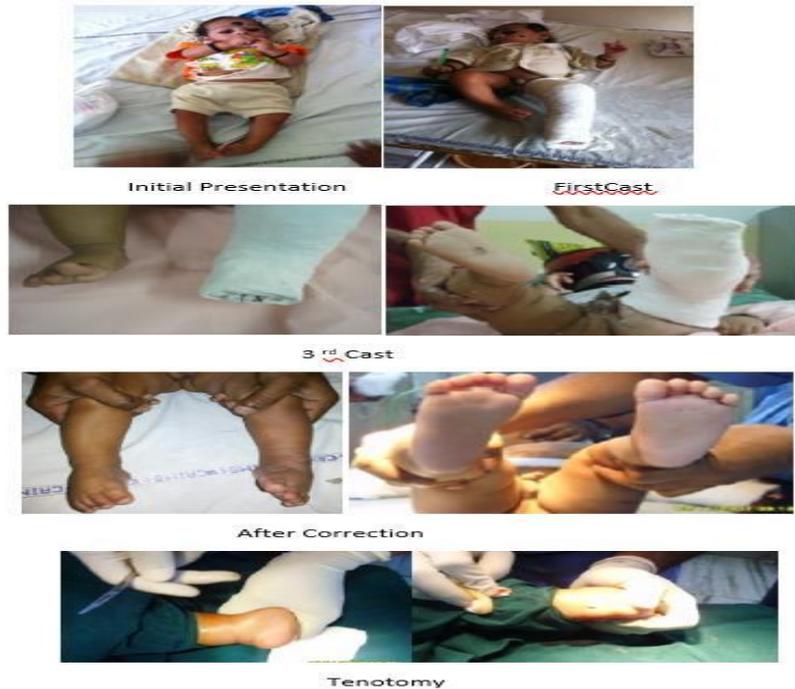


Fifth Cast



After correction

### CASE: 2



### CASE: 3



Figure-4: Cases in present study

### DISCUSSION

Clubfoot, also known as congenital talipes equinovarus, is a complicated foot malformation with an unclear understanding of its causes and development. Idiopathic is the most prevalent form. Congenital talipes equinovarus is the most prevalent deformity, accounting for around 80% of all cases. The frequency of this condition is approximately 1 in every 1000 live births, and it is more prevalent in developing nations such as India compared to Western countries. The disorder is prevalent in males and affects both sides in around 66% of instances. The impact of the deformity on the social and physical well-being of the patients and their parents is significant and should not be underestimated. Ponseti created a method of serial

manipulation and casting for congenital club foot with the goal of achieving a functional foot that is flat on the ground, without the need for extensive surgery. In 1948, Ponseti suggested using a series of casts to gradually correct the malformation. While the use of casts for treatment has a long history, Ponseti's method is distinguished by its adherence to precise principles derived from anatomical evidence.

The objective is not to rectify the apparent distortion, but rather to enforce a simultaneous supination and abduction of the foot. After the calcaneopedal block has been realigned, a percutaneous tenotomy of the Achilles tendon is carried out. The Ponseti approach is used to avoid the long-term stiffness and weakness sometimes associated with extensive open surgery, such as posteromedial release. Ponseti and Smoley[7] found that the technique of manipulation, casting, and limited surgery resulted in the avoidance of open surgery in 89% of patients. 81% of cases did not undergo posteromedial soft-tissue release, whereas 85% required percutaneous tenotomy. Ponseti observed that the transfer of the Tibialis anterior tendon occurred in 35% of his patients who were above 2.5 years old. Ponseti's group recently reported a relapse rate of 10%. The decrease in the relapse rate was ascribed to a heightened focus on the necessity of meticulous follow-up treatment with the foot abduction orthosis. Tenotomy of the Achilles tendon is a crucial component of Ponseti's method for managing club feet.[11]

There is a scarcity of comprehensive descriptions of casting procedures in the literature. Kite suggested dorsiflexion of the forefoot while applying pressure at the calcaneocuboid joint. Ponseti coined the term "Kite's error" to refer to this maneuver, as it impedes the correction of hind-foot varus and internal rotation. The current study yielded outstanding outcomes in 32 children (84.2%) and satisfactory outcomes in 4 children (10.5%) when employing the Ponseti approach. A total of 30 patients with idiopathic congenital Talipes Equino Varus were treated conservatively using the ponseti procedure in our study group. 30 patients with clubfoot were treated, resulting in a total of 38 feet being treated. . The male-to-female ratio is 1.8:1, which aligns with findings from earlier studies (Chesney D et al).[7] Several investigations indicated a considerably higher prevalence of males compared to females.

The number of casts per foot varied between 5 and 7. The mean total number of casts applied for the age groups of 0-4 months, 4-8 months, and 8-12 months are 5.4, 5.82, and 7, respectively. The number of casts correlated positively with the age at which the presentation occurred (late presentation). There is a link between the original Pirani score and the number of casts needed for correction, with an increase in the number of casts as the score increases. Over time, as individuals gain more skill, they have begun to change plaster casts more frequently and use fewer castings each foot, resulting in quicker outcomes.[8,9]

Tenotomy was necessary in 78.9% (30 out of 38) of the foot. There was no discernible disparity in the proportion of tenotomy and cast application between males and females for the purpose of correcting equinus. Pirani performed tenotomy on more than 90% of his patients with clubfoot. The current study and Laaveg et al. have a smaller proportion of instances involving tenotomy compared to prior studies, which had a higher percentage of patients with tenotomy.[10,11]

The results were excellent in 32 (84.2%) and good in 4 (10.5%) children in the present study. By using the 10-point Pirani scoring system we calculated the average Pirani score for the age group 0- 4 months is 5.34, 4-8 months is 5.5 and 8-12 months is 5.75 and the final Pirani score after correction is 0.17, 0.28 and 0.75 for 0-4 months, 4-8 months and 8-12 months respectively. The Pirani score for the residual deformity was mainly the adductus deformity with a maximum of 1 in the Pirani severity score. This score of 0.5 in 7 feet is statistically significant.[11]

## CONCLUSION

The Ponseti method is a safe, effective, and cost-efficient treatment for congenital talipes equinovarus (CTEV), demonstrating highly significant improvement ( $p < 0.0005$ ) between pre- and post-treatment outcomes. Early initiation of treatment, particularly within the first few weeks of life, leads to better correction and fewer casts, while delayed presentation increases treatment resistance.

A clear correlation exists between the initial Pirani score and the number of casts required. The majority of patients achieved excellent to good outcomes, with minimal relapse, primarily due to non-compliance with bracing. Overall, the Ponseti technique provides a functional, painless, and cosmetically acceptable foot, significantly reducing the need for extensive surgical intervention.

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