

## Treatment Success with the Ponseti Technique in Congenital Talipes Equino Varus up to two Years of Age.

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### ABSTRACT

**Background:** Congenital talipes equinovarus (CTEV) is a severe foot birth disorder that may make walking difficult and painful and limit mobility. Seventy-five per cent of clubfoot infants are born in low- and middle-income countries. Clubfoot has long been treated. As orthopaedists gravitated toward surgery to treat clubfoot in neonates, non-operative treatment became less popular.

**Objective:** The study examined how the Ponseti technique works, how bad the deformity is (as measured by the Pirani score), and how much it costs to treat congenital talipes equino Varus in babies under the age of two. The Ponseti Clinic treated 490 individuals with 456 CTEV-infected foot cases.

**Study design:** A prospective study

**Place of duration of study:** department of orthopedic Saidu Teaching Hospital swat between 05 Jan 2017 and 05 Jan 2021

**Material And Methods:** this prospective clinical study was conducted in Swat's Saidu Teaching Hospital between 2017 and 2021. 456 patients were selected using the inclusion and exclusion criteria department of orthopaedic saidu teaching hospital swat concluded this study. The youngsters were 3.20 months old on average, and they needed 6.80 casts to improve. At the final follow-up, 90.20 per cent of patients (score > 24) had positive functional outcomes. The Ponseti method for clubfoot treatment may prove most beneficial regarding both functionality and aesthetics. This approach still remains a safe, simple and cost-effective way to deal with clubfoot in places such as Pakistan.

**Results:** our finding ninety percent of patients had a positive prognosis after starting treatment at 3 months of age, which took about seven casts altogether correct their feet. The research has suggested that the Ponseti method is both cheap and effective treatment for congenital talipes equinovarus in babies under 2 years .

**Conclusion:** this study shows is that the Ponseti technique is not only fine but economical way to deal with clubfoot in infants under two years of age. The method kept plain and safe while also demonstrating a very high success rate. Now the findings of this particular study suggest that the Ponseti technique provides an excellent option for managing clubfoot in underdeveloped countries, such as Pakistan

**Keywords:** Congenital Talipes Equinovarus, Ponseti Method, Pirani Score, Orthopedics, Treatment, Clubfoot.

### Authors Contribution

AK. Concept & Design of Study ,IUH.Drafting, DK.Data Analysis,BK.Revisiting Critically, AK,SA,Final Approval of version

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## INTRODUCTION

Congenital talipes equinovarus or clubfoot (CTEV), this is an intractable congenital deformity that severely interferes with the development of the feet. If a clubfoot goes untreated, the toes become gnarled, the arch of the foot collapses, and much severe troubles are caused for example inability to wear ordinary shoes or do any walking. That impedes work opportunities and unless surgery restores a good form, it can also lead anywhere from mild discomfort up to excruciating bones pains with every step of a lifetime to come.<sup>1</sup> Congenital clubfoot is present at birth in one out of every 1200 surviving infants. It has a 48–3 per cent symmetrical incidence and a proportion of men to women<sup>2</sup>. The Global Clubfoot Initiative's research shows that 28,000 infants in Pakistan are born with clubfoot yearly<sup>3</sup>. Infants with club feet comprise 75% of births in low- and middle-income nations. (LMICs)<sup>4</sup>. Many of these result in a lifetime of impairment because they are not properly diagnosed or managed. Left untreated, clubfoot has terrible effects on the sufferer, their family, and society<sup>5</sup>. Neglected instances of clubfoot are those that go untreated or are managed incorrectly. These kids experience a lot. In surgery, difficulties and failures frequently occur. The quantity of review processes is increasing as a consequence. The foot is still agonizing, feeble, and rigid after the operation. It becomes intolerable after puberty<sup>6</sup>. The optimal course of action for clubfoot therapy is almost universally acknowledged to be non-operative. (Dr. Ignacio) Ponseti developed a clubfoot correction method based on casting and massage that successfully realigns clubfoot in newborns without needing major surgery.<sup>8</sup> With operation rates declining by rigid, feeble, and excruciating; the Ponseti technique has an overall success rate of 90–95 per cent. It becomes intolerable after puberty<sup>7</sup>. Most people concur that the best course of action for clubfoot therapy is non- operative. (Dr. Ignacio) Ponseti developed a clubfoot repair method based on casting and massage that successfully realigns clubfoot in newborns without needing major surgery<sup>8</sup>. The Ponseti

operation has a 90-95 per cent success rate globally, and treatment rates have decreased by 7% each year after reaching a high in 2020<sup>9</sup>. Several clubfoot scoring systems have been described throughout the years. The Ponseti-Laaveg and Dimeglio categories are two examples. These are difficult to use and are

disliked. Shafique Pirani, MD, developed the Pirani Score<sup>10</sup>. to analyze each clubfoot component correctly. In wealthier countries, the program is often used. The Ponseti technique is becoming more popular in low- and middle-income nations<sup>11</sup>. The Ponseti technique was utilized to evaluate the functional outcomes of CTEV treatment, the degree of the deformity using the Pirani score and the Ponseti method in a developing country like Pakistan.

### Materials and Methods:

This prospective study was conducted in Swat's Saidu Teaching Hospital between 5 Jan 2017 to 05 Jan 2021. 456 patients were selected using inclusion and exclusion criteria. The parents of 23 patients withdrew after learning about the whole research method, citing discomfort to the patients and study length as reasons. Only educated or uninformed people could comprehend the procedure's significance and use it for their children. All 23 patients were offered surgery, with four accepting and nine declining. Despite our best efforts, Ponseti remains a mystery. Despite numerous inquiries, these 23 patients refused to participate in the research. Our study included the remaining 433 people. During the follow-up period, we lost ten patients due to patient relocation, Ponseti cast pain, and parent transportation costs. As a result, the final study included 456 patients with 490 CTEV.

### Data collection:

Data compilation was conducted from January 2017 until January 2021 at Saidu Teaching Hospital located in Swat. A cohort comprising 456 patients meeting the inclusion standards was evaluated for congenital talipes

equinovarus (CTEV) using the Ponseti technique. Demographic information, Pirani scores measuring deformity seriousness, treatment consequences, and linked costs were carefully documented. This complete database formed the basis for assessing the effectiveness and cost-benefit of the Ponseti approach. Furthermore, the research team

### Statistical Analysis

The data were analyzed using SPSS 24.0 The minority population and other data were mathematically calculated. And %. The Wilcoxon test was used to compare the Pirani score and functional rating before and after therapy, and the chi-square test was used to compare sex and laterality. A correlation and correlation test assessed the association between the Pirani score and the total number of casts. 0.05 was chosen as the threshold of statistical significance. Results from Our research included 280 men and 176 girls. The median age was 4.03 months, ranging from 0.5 to 24 months. Two hundred seventy- three cases (60%) were under four months old; 101 patients (21%) were between 8 and 12 months; 64 patients (21%) were between 12 and 24 months (14 per cent). The research included children aged 12 months to 24 months

**Ethical Behavior Considerations:** It was accepted by the ethics committee (saidu teaching hospital swat) on March 12, 2022. A permission form was sent to each participant's parents before the trial. The Ponseti technique was applied to all research participants. It was vital to educate parents about the Ponseti method's course.

### Criteria of Inclusion and Exclusion

Children aged 24 months with normal hips and spines with clubfoot consented to be studied. Patients over 24 months old with neurological abnormalities, spine and hip issues, or prior treatment were eliminated. 16 The Ponseti classification considers untreated clubfoot in children under two. A comprehensive literature search discovered several published studies on babies under two but few on toddlers under one year, 17-18. So we started to investigate 24-month-olds. The stage categories were as follows:

meticulously tracked patients over time, noting recurrence rates and re-treatment necessities. Despite limited funding and resources, the program demonstrated promising results for families in the region.

### Assessment and Functional outcomes

The deformity severity and functional result were scored using the Pirani rating method before and after therapy. It determines the correction level. It scores three mid-foot signals and three hind-foot indications. The mid-foot (M.S.) and hind-foot (H.S.) scores are three indications that rate deformities from 0 to 3. A Pirani score of 0 denotes a normal foot, a three a mildly aberrant foot, and a six a severely abnormal foot. Excellent, good, or terrible outcomes were graded 0– 4, good, 4–1, and poor (>1). Excellent and good outcomes indicated success. Poor outcomes were labelled failures and given surgical therapy. On emphasized the necessity of braces, their compliance with the parents, and the Ponseti method's objective. Figures 1–7 show the treatment. (a) weekly serial casting; (b) bracing To maintain the correction. Casting began as soon as the kids arrived. All the babies The initial severity was determined using Pirani scoring. Initially, weekly follow-ups were performed to check compliance and comfort and educate the parents. A three- month, four-year follow-up was advised after the Dennis Brown (D.B.) splint was applied.

### Results

In 280 instances (77.2%), good and bad outcomes were equally distributed, with 101 (11.2%) and 64 (11.1%), similar to Sakale H et al. 92.456 out of 280 patients in the 4-month age group had excellent outcomes, while others had bad results. These two patients did not brace. 38 out of 58 patients in the >8–12 month age group failed. This reaffirmed that therapy should begin as soon as feasible to maximize outcomes. Turco's operation was offered to 38 patients; 16 parents declined, citing the procedure's high cost.

Figure 1 to 9 shows different treatment of ponseti technique in congenital talipes equino varusup

Figure 1 shows the first demonstration.



Figure 2 Operation



Figures 4-5 (a-d) Following operation and forming steps, and

Figure 4(A)



Figure 5(B)



Figure 7. (a) Fifth cast for equines; (b) after amputation of fifth cast and



Table 01: Mean Wise And Percentage-Wise Demographic

| Age of patients and months | Number of patients | Percentage (%) |
|----------------------------|--------------------|----------------|
| <4,                        | 280                | 61%            |
| >8-12                      | 101                | 21.33%         |
| >12-24                     | 64                 | 14%            |
| Total                      | 456                | 100%           |

Table no 02: Pirani score distribution before and after treatment

| Mean | SD   | Mean | SD   | 5.61 | <0.0001 |
|------|------|------|------|------|---------|
| 5.04 | 0.85 | 0.06 | 0.21 | 2.99 | <0.0005 |
| 5.27 | 0.65 | 0.36 | 0.39 | 2.21 | <0.05   |
| 5.29 | 0.68 | 1.50 | 1.41 | 2.28 | <0.05   |

Table no. 03 displays the cast's age distribution.

| Age months | Mean | SD   |
|------------|------|------|
| <4,        | 6.52 | 0.72 |
| >8-12      | 6    | 1    |
| >12-24     | 8.11 | 1.80 |

Table 4 displays the final findings of the study's distribution.

| Months of age | Outcomes   | Functional outcome | Outcomes | Percentage |
|---------------|------------|--------------------|----------|------------|
|               | N/Patients | Excellent          | Good     |            |
| <4,           | 280        | 96%                | 1.2%     | 0.8%       |
| >8-12         | 101        | 61%                | 22%      | 12%        |
| >12-24        | 64         | 22%                | 4.5%     | 52%        |
| Total         | 456        | 100%               |          |            |

### Laterality

152 (51.2%) had bilateral clubfoot, 208 (52.41%) had unilateral clubfoot, 100 (51% right) and 56 (54% left). Consanguinity And Internal History A total of 153 cases (43.33%) were discovered to be the result of a consanguineous marriage, and 23 individuals had a history of clubfoot (56.33 Pirani is rated 3.4 out of 5 stars. Pirani scores ranged from 3.5 to 6 at the time of case presentation in our study, with a mean of 5.19 (range 3.5 to 6). (range 0 to 3.5). [2] Both initial and final Pirani scores in the 4-month age group had a mean + standard deviation (S.D.) of 5.04 + 0.85 and 0.06 + 0.21. This age group had a mean + S.D. of 5.27+0.65 and a mean + S.D. of 0.36+0.39, respectively, for initial and final Pirani scores. Both initial and final Pirani score mean + S.D. were 5.75 + 0.61 in >12- 24 months and 1.50 + 1.41.

## Complications

During the casting process, a few minor complications occurred in our series: issue cuts, the cast saw injuries, the model coming loose, and cast fractures are all possible complications.

## Overall View

Founded arranged the Pirani score, the ultimate functional results were evaluated as excellent, good, or poor and comprised 280, 101, and 64 individuals, respectively (Table 4 and figure 1 to 9).

## Discussion

They have a stable nature and Wide application scenarios to simplify things<sup>12</sup>. The Ponseti method, with gentle manipulation and successive plasterings, has changed the traditional way of managing CTEV (club foot); a technique that is both non-invasive yet very effective. A series of studies has shown conclusively that the Ponseti technique is superior to surgery in terms of performance and economical accessibility<sup>13</sup>. 4. Pirani et al. (2001) report that The successes of the Ponseti method may reach 90%-95%. In addition, it noticeably cures foot alignment and function<sup>14</sup>. Without their it was not possible to predict the effects of the Ponseti technique. However, observations made by Smith and Thompson (2000) showed that in 85% of cases treated with this method, clinical results were favorable after correction but Balgo was essential before those numbers could be used as statistical proof that such changes had occurred. What's Moore, (Mosca et al 2007)<sup>15</sup>. Kaufman (2004) highlighted the benefits of Ponseti treatment over surgical correction: it can produce satisfactory results without operable complications or extensive surgical interventionworrysome<sup>16</sup>. Shafique Pirani (2011) developed the Pirani score to systematically measure the severity of clubfoot and assess progress made in treatment. The Pirani scoring system has been shown by studies such as Kallio et al (2003) Shaikh and Rode (2012), not only to provide a reliable tool for judging results following Ponseti treatment, but also insights into treatment responsewhich can help require how treatment should go from now onward<sup>17,18,19</sup>. In addition to obtaining superior

outcomes, and also important is the fact that the Ponseti method is cost-effective. A review by Bensahel et al. (2011)<sup>20</sup> dealt with the relative costs of Ponseti treatment versus surgical correction, pinpointing significant economies made possible by this way of treating clubfeet. This comprehensive body of evidence shows that the Ponseti technique is very effective and can also be implemented in practice<sup>21</sup>. The Safety of gentle manipulation, sequential dressing and careful monitoring has put Ponseti method on the road to success Rigidbody and airlycomfortable, is expressly designed for little children from birth to their second birthday<sup>22</sup>.

## Conclusion

The Pirani score may properly grade clubfoot or CTEV. This grading method considers all aspects of assessing a clubfoot deformity and helps decide between conservative and surgical treatment options. The Pirani scoring system also helps track and evaluate therapy progress. In addition to serialcasting, bracing maintenance, and parental education, the Ponseti approach for controlling CTEV gives excellent functional and aesthetic results when treated strictly according to Ponseti's standards. Swat groups are too poor to afford operations and this is why the technique is so important in Impoverishment Among the poorEven if it is understood that Polio cripples are caused by environmental factors, most families in Southwest China will doubtless ask when they find that one of their flock has club foot: How could a healthy baby be born with such a deformity? Because extreme poverty is the rule in these areas even for government employees who earn no salaries, they too are often unable to afford corrective surgery.

## Limitations

Some cases exceed the scope of Ponseti method application. For example, not all cases of clubfoot are of the similar simple type. Criteria for follow-up care may also be hard to carry out in practice-as in this system only families who received the most help regularly from Homeward Bound will go through with it regularly, while others living on their own are not likely to bring their children back even for

free food! Plus, there is inadequate rural health care service which can guarantee success for these long-term objectives as yet unresolved problems (See the next Question ). Additional steps may be required if there are accompanying conditions. We must also explore more ways to help all children.

### Future Finding:

The Ponseti technique could be improved through future studies. The use of advanced cast materials or additional therapeutics should move the technique forward. As adults who were treated in infancy live and work for decades, research on how well they function and feel offers precious first-hand experience. Furthermore, any challenges along the way that effectively result in widespread adoption and provision of services, especially through projects as to underserved regions, is a worthwhile quest for universal clubfoot care.

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