

## Outcome Of Postero-Medial Soft Tissue Release In Congenital Talipes Equino Varus

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### Abstract

**Background:** Clubfoot is one of the most common congenital orthopaedic anomalies, first described by Hippocrates in the year 400 BC. However, its treatment still continues to challenge the skills of the paediatric orthopedic surgeon as it has a notorious tendency to relapse, irrespective of whether the foot is treated by conservative or operative means.

**Material & Methods:** This prospective study was conducted at our center from June 2014 to May 2016 in 39 (31 cases) congenital talipes equinovarus deformities treated by single stage posteromedial soft tissue release and the outcome assessment was done by Pirani score and Green, Lloyd- Roberts criteria.

**Results:** The mean age was 1.7 years. 21 were male and 10 were female. The mean pre-operative Pirani score improved from  $4.8 \pm 0.82$  to  $1.4 \pm 0.86$  postoperatively, which was statistically significant ( $p < 0.05$ ). As per the Green Lloyd-Roberts criteria 13 (37%) feet had excellent results, 13 (37%) feet had good results and 9 (25%) feet had poor results. 6 feet had superficial infection or wound gaping and plaster sore and skin blisters were seen in 4 feet.

**Conclusion:** Single stage Postero-Medial Soft Tissue Release produces satisfactory results when done at appropriate age as soft tissues are more resilient to correction and the remodeling capacities of the cartilaginous bone are good.

**Keywords:** Clubfoot, CTEV, Posteromedial soft tissue release, PMSTR

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### How to cite this article:

Singh V, Yadav A, Vyas GS, Sharma SK, Patidar A, Mehta R, Bhide S, Jain P. Outcome Of Postero-Medial Soft Tissue Release In Congenital Talipes Equino Varus. Orthop J MPC. 2020;26(2): 65-69

Available from:  
<https://ojmpc.com/index.php/ojmpc/article/view/120>



### Introduction

Clubfoot (CTEV) is one of the most common congenital orthopedic anomalies, first described by Hippocrates in the year 400 BC [1,2]. The aim of treatment in CTEV is to achieve cosmetic, anatomical and functional foot which is acceptable to the child and to the parents [3,4]. Despite this long experience in treating clubfoot deformities, there still exist controversies regarding both the treatment methods i.e. conservative or surgical. Comparison between the groups is further

complicated by lack of standards for evaluating the functional outcomes.

Conservative method, as developed by Ponseti, which begins immediately after birth and is based on the fundamentals of kinematic coupling and patho-anatomy of the deformity, and is quiet successful and well accepted initial step in realignment of clubfoot deformity in infants without the need of extensive and major surgeries [3-8]. But, still there are few deformities that do not respond at all to the conservative line of treatment even after serial

manipulation and casting (rigid clubfoot), or some deformities recur after initial correction by conservative management (relapsed clubfoot) or recur after the completion of the treatment (recurrent clubfoot) [2,9]. All of these feet along with the feet which had never received any treatment (neglected clubfoot), require surgical correction. During the early years of infancy, the deformity can be surgically corrected by single stage posteromedial soft tissue release. Hence we evaluated the outcomes of single stage posteromedial soft tissue release in rigid, relapsed, resistant or neglected clubfoot deformity children in early infancy.

### Material and Methods

This prospective study was conducted at our center between 2014 to 2016 in 31 CTEV children. Primary idiopathic rigid, relapsed, recurrent or neglected CTEV aged between 6 months to 5 years were included in the study. Initially in all these cases Ponseti's method [5,6] of cast correction was attempted, and when it failed due to late presentation of child, lack of compliance, walking of child on the cast, illiterate parents, irregular weekly follow-up and inconsistent use of brace after correction, these cases were included for the study. In some of the bilateral cases, one side foot deformity was corrected by serial casting and hence only the other side, which was not corrected or relapsed was only included. Secondary clubfoot, previously operated feet, atypical clubfoot, clubfoot with non-healing ulcers over callosities, and children more than 5-year age and less than 6 months were excluded from the study.

All the cases were operated via standard posteromedial soft tissue release procedure done under general anaesthesia in supine position under tourniquet control [2]. Postoperatively, all the cases were given an above knee cast with full correction of deformity. All cases were regularly followed biweekly and after 2 weeks the cast was removed and suture were cut and the cast was reapplied for further three weeks. After three weeks the cast was removed and patient was allowed to walk with normal shoes, whereas child was given foot abduction night brace for

further 6 months to prevent relapse. The outcome assessment of the deformity was done by Piraniscore and using Green, Lloyd-Roberts criteria [10,11].

### Results

Total number of 39 feet (31 cases) of congenital talipes equinovarus deformity (CTEV) treated with single stage posteromedial soft tissue release were included in the study. Bilateral deformity was seen in 16 cases (24 feet) and unilateral deformity was seen in 15 cases (15 feet). The mean age of children in the study was 1.7 years. 21 were male and 10 were female. 4 cases were lost to follow-up and hence cohort comprised of 35 feet, which were included in the study.

In all the cases, full correction of the deformity was achieved. The overall mean pre-operative Pirani score improved from  $4.8 \pm 0.82$  to  $1.4 \pm 0.86$  at the end of 6 months postoperative follow up, which was statistically significant ( $p < 0.05$ ).

11 (28.2%) feet were neglected cases in which no cast application was done, while 28 (71.8%) feet were either rigid, relapse or resistant cases i.e. in which previous cast application was attempted. The preoperative mean Pirani score for the feet who had no prior cast application was  $5.09 \pm 0.94$  and for the patients who had prior cast application was  $4.11 \pm 0.92$ . The difference was found to be statistically significant ( $P < 0.05$ ). The postoperative mean Pirani score for feet who had not received any prior cast application was  $1.73 \pm 0.91$  and for the feet who had received prior cast application was  $1.18 \pm 0.91$ . The difference was not found to be statistically significant ( $P > 0.05$ ), showing that there was no difference in the postoperative Pirani score between prior cast application and no prior cast application. As per the Green Lloyd-Roberts criteria 13 (37%) feet had excellent results, 13 (37%) feet had good results and 9 (25%) feet had poor results.

6 feet had superficial infection or wound gaping at the incision site, all of which healed

with oral antibiotics and regular dressings. Plaster sore and skin blisters were seen in 4 feet, which were due to improper padding or due to tight cast or sweating inside the cast, all of which healed spontaneously with cast holiday, antiseptics and antibacterial/antifungal dusting powder and none of the sores deepened.

## Discussion

Neglected, rigid, resistant or relapse CTEV cases, have always been a difficult challenge to treat, because of many reasons, like late presentation, walking child, already longer treatment duration, soft tissue contractures and remodelling and alteration of the deformed tarsal bones [9]. Hence, these clubfeet require surgical treatment, by soft tissue release in early years of infancy or bony procedure in an older child [2].

We evaluated the outcome of rigid, relapse, resistant or neglected 39 clubfeet deformities in children between 6 months to 5 years' age, treated by single stage posteromedial soft tissue release. Our study was comparative to other studies in terms of mean age, number of cases, laterality and male to female ratio [12-15].

These studies differ in assessment criteria and scoring systems making the comparison, difficult [12-15]. Hussain et al [16] used modified McKay rating system; Ajmera[9] used Ferreira score whereas Menezes et al [12] in his study used Wayne-davis scoring system for assessment. We used both Pirani and Green, Lloyd-Roberts clinical criteria for assessment [10,11]. Since Pirani score is most commonly and widely used system [17], but its use in older child can be debatable and Green, Lloyd-Roberts clinical criteria based on appearance, function and pain during activity, is reliable in older child, hence we used both Pirani and Green, Lloyd-Roberts's criteria for assessment.

In our study, overall mean pre-operative Pirani score improved from 4.8 to 1.4 at final follow up, which was statistically significant. Since these feet were rigid, relapsed, neglected or resistant in an older child, even

the postoperative score remained a little bit higher as compared to other studies [9, 12-16]. In our series, the mean preoperative Pirani score in neglected cases (prior no cast application) was significantly higher than rigid, relapsed or resistant cases (previous casting done). This higher Pirani score in neglected cases was maintained in the postoperative period as well, although it was not significant. Hence we concluded that preoperative cast application positively affects the final outcomes of surgery, since more number of feet had good to excellent outcome who had previous cast treatment (92.3%) in comparison to feet who had no prior cast application (67%). Similar results were observed in other studies also [12-16]. As per the Green Lloyd-Roberts criteria, in our series 13 (37%) feet had excellent results, 13 (37%) feet had good results and 9 (25%) feet had poor results. We further found that Pirani scoring system is good method for clinical assessment of deformity. The patients who have low Pirani score at initial visit (less severe deformity) respond better and faster to the procedure as compared those who have higher scores.

Soft tissue release done is unsatisfactory in cases presenting too late for treatment, i.e. when the bony changes occur and there is alteration in the tarsal bones [2,9]. Sharma on assessment of initial and final Pirani scoring revealed significant improvement in all age groups but with mean difference of correction higher among more than 6 months' age [14]. We also found the mean correction of preoperative Pirani score was highest in the age between 6 months to 2 years as compared to 2 to 3.5 years or 3.5 to 5 years. This is because soft tissues are less resistant and more resilient to correction at young age and as age advances soft tissue structures and cartilaginous bone develop, remodels and becomes stiffer.

The complications in our series were wound gaping or superficial infection (n=6) and cast sore (n=4), all of which are minor complications, which can be easily dealt with regular dressings as we did. Although, the incidence of these complications were higher in our series, because, ours is hot and humid climate causing increased changes in skin and

soft tissue. Although we corrected all the components of the deformity i.e. adduction, varus and equinus completely on the table by complete posterior medial soft tissue release but mild forefoot adduction (9%) was most common residual deformity followed by hind foot varus (3%) in our series, as also seen by other studies by Menezes et al [12], Hussain et al [16] and Singh et al [18].

Dobbs et al concluded that clubfoot treated with an extensive soft-tissue release have poor long-term foot function [19]. Van Gelder et al noted CTEV cases after surgery have limitation of foot function with a significant decrease in range of motion and increases grade of osteoarthritis than contra lateral

normal feet [20]. But our study is limited by short term follow up, and short sample size, hence a long term study with large cohort is suggested to evaluate this finding.

### Conclusion

We found that good to excellent short term results can be obtained with one stage posteromedial release, in rigid, relapse, resistant or neglected CTEV. The poor results are due to late presentation or without prior casting treatment. Improved surgical results can be obtained by prior cast treatment, surgery between 6 months to 2 years' age, complete single stage soft tissue release and regular checkups for earlier identification of complications if any.

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