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# Functional Outcome Of Posteromedial Soft Tissue Release Following Failed Ponseti Technique In Children With Congenital Talipes Equinovarus

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## ABSTRACT

**Background:** The complicated deformity known as idiopathic congenital talipes equinovarus is challenging to treat. Although the majority of orthopaedicians agree that non-surgical treatment (Ponseti method) should be used as a first line of treatment, if non-surgical treatment is unsuccessful, surgical soft tissue release should be recommended for improved outcomes. The purpose of the study was to evaluate the effectiveness of the treatment method by conducting follow-up on 15 patients who undergoes posteromedial soft tissue release.

**Methods:** Posteromedial soft tissue release (PMSTR) was performed on 15 patients at KLE Jagadguru Gangadhar Mahaswamigalu Moorsavirmath Medical College and Hospital, Department of Orthopaedics between June 2023 and May 2024. Up to a year and a half, patients received routine follow-up care. The Denis-Brown classification was used to grade the severity of foot abnormalities.

**Results:** The study included 15 patients, 93% patients aged less than 4 years, with male predominance 60%. 40% were bilateral cases. The average duration of casting done was 8.2 ± 1.4 weeks. Pre operative Pirani scoring showed significant deformity with mean of 5.2 ± 0.4, and postoperatively it was improved to 1.1 ± 0.6. Functional outcome measured by modified Laaveg and Ponseti score revealed 60% of patient had excellent results.

**Conclusion:** The PMSTR technique significantly reduces the need for extensive corrective surgery and is a safe and economical treatment for congenital idiopathic clubfoot after failed Ponseti method. Technique failure can be attributed to late-life surgery and noncompliance with orthotics following surgery.

***Keywords:*** *Idiopathic congenital talipes equinovarus, Posteromedial soft tissue release (PMSTR), Pirani scoring, Ponseti method, Modified Laaveg and Ponseti score*

## 1. INTRODUCTION

Congenital Talipes Equinovarus, another name for clubfoot, is a fibroproliferative disorder affecting the musculoskeletal system of foot. Its cause is yet unknown. The likelihood of having a child with this birth defect is one in a thousand [1]. Although numerous explanations have been proposed to explain the pathological alterations observed in clubfoot, the precise reason remains unknown. This three-dimensional malformation includes anomalies of the equinus, varus, adductus, and cavus. Regardless of the type of treatment, the ultimate goal is a plantigrade foot that is pain-free and functional [2]. Because surgery has been proven to be successful in the short term, surgeons used to favor it. Conservative techniques like massage, stretching, manipulation, and immobilization (Ponseti Technique) is the initial mode of management [3]. If manipulation techniques are unable to adequately treat the deformities, surgical procedures such posteromedial release (PMR) may be necessary. This study aimed to evaluate the radiological and functional results of surgically corrected clubfeet in children following Ponseti method failure [4].

## 2. MATERIALS AND METHODS

Study design: Prospective Study.

Study period: June 2023 to May 2024

Place of study: KLE Jagadguru Gangadhar Mahaswamigalu Moorsavirmath Medical College and Hospital, Hubli

Sample size: 15 cases.

**Inclusion Criteria**

1. Children aged between 1 to 5 years with Idiopathic clubfoot
2. Patient with failed Ponseti technique defined as no correction after at least 6-8 casts
3. Both unilateral and bilateral cases
4. Patient undergoing posteromedial soft tissue release

**Exclusion Criteria**

1. Children with Syndromic and Neurogenic clubfoot
2. Previous surgical intervention for clubfoot
3. Children with associated limb anomalies

**Statistical analysis:**

The variables were tested for normal distribution using the Kolmogorov-Smirnov test following the analysis of exploratory data. Non-parametric tests were employed since not all variables satisfied the requirements for a normal distribution. The Mann-Whitney-U test was used to compare continuous variables between groups, while the chi-square test was used to compare dichotomous variables. P-values were considered statistically significant if they were less than 0.05 IBM SPSS software was utilised for data recording and analysis.

## 3. RESULTS

| **Variable** | **Number of Patients (%)** |
|---|---|
| **Age Groups in years** | |
| 1-2 | 10(66.66%) |
| 3-4 | 4(26.66%) |
| 5 | 1(6.66%) |
| **Sex** | |
| Male | 9(60%) |
| Female | 6(40%) |
| **Laterality** | |
| Left | 5(33.3%) |
| Right | 4 (26%) |

| | |
|---|---|
| Bilateral | 6(40%) |
| **Mean duration of Ponseti casting in weeks** | 8.2 ± 1.4 |

**Table.1: Demographic details**

| Parameter | Mean Pre op Score | Mean Post op Score |
|---|---|---|
| Mid foot contracture | 2.5 | 0.5 |
| Hind foot Contracture | 2.7 | 0.6 |
| Pirani Scoring | 5.2 ± 0.4 | 1.1 ± 0.6 |

**Table 2: Pre and Post Operative Pirani Score**

| **Outcome** | **Number of Patient** |
|---|---|
| Excellent (90-100) | 9 (60%) |
| Good (80-89) | 5 (33.3%) |
| Fair (70 – 79) | 1 (6.7%) |
| Poor (<70) | 0 |

**Table 3: Functional Outcome by Modified Laaveg and Ponseti Score**

**Image 1: Pre operative Clinical Picture**

**Image 2: Pre operative Xrays**

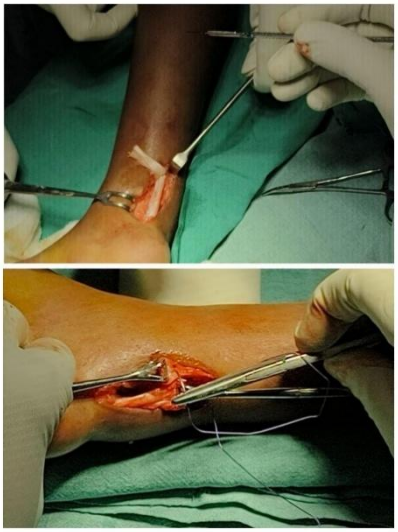

**Image 2: Intra operative pictures of posteromedial soft tissue release**


**Image 3: Post operative Clinical Picture of Right foot**

## 4. DISCUSSION

Congenital Talipes Equinovarus, another name for clubfoot, is a fibroproliferative disorder affecting the foot. The deformity includes Deformities Cavus, Adductus of midfoot, Varus heel, Equinus of hindfoot. The cause is yet unknown, the various theories proposed are [5]:

1. Arrest in embryonic development
2. Myofibroblastic retractile response [6]
3. Primary germ plasm defect
4. Localized neuromyogenic imbalance
5. Congenital fiber type disproportion

Systemic conditions associated with clubfoot are [7]:

1. Arthrogryposis
2. Diastrophic dysplasia
3. Streeter dysplasia (Constriction band syndrome)
4. Freeman-Sheldon syndrome
5. Mobius syndrome
6. Chromosomal deletions
7. Down syndrome/Larsen syndrome

The Pirani Scoring [8] includes: Mild (0), Moderate (0.5), Severe (1)

Hind Foot Contracture (HFC)

1. Posterior Crease (PC)
2. Empty Heel (EH)
3. Rigid Equinus (RE)

Mid Foot Contracture (MFC)

1. Medial Crease (MC)
2. Lateral part of Head of the Talus (LHT)
3. Curvature of Lateral Border of foot (CLB)

The various soft tissue release surgery are [9]:

- TA lengthening + Posterior release → equinus
- Tib. Anterior tendon transfer for dynamic supination
- Posteromedial soft tissue release (PMSTR) [Turco]
- Complete soft tissue release (CSTR)

Structures to be addressed in the surgical correction of club foot during posteromedial soft tissue release [10]

1.Posterior release

- Achilles tendon Z-lengthening
- Calcaneofibular ligament release
- Posterior talofibular ligament release
- Posterior ankle and subtalar joint release

2.Medial release

- FDL/FHL/Tib. Post. Z-lengthening
- Superficial deltoid release
- Talonavicular and subtalar joint release

## 5. CONCLUSION

After the Ponseti approach fails, it may be possible to fix the clubfoot with a single salvage procedure: posterior medial release. To protect children from the consequences of untreated clubfoot, it should be done before the age of 3 years. These complications include osteomyelitis and ulceration, which can result in amputation [11]. Clinical examination and radiological investigation are the primary determinants of case follow-up and evaluation. Limitations, such as the brief follow-up period and the comparatively small number of patients. Therefore, to confirm the current findings and rule out the long-term emergence of any complications, further study with a large number of cases and long-term follow-up is advised.

**Conflict of Interest:**

The author declares no conflict of interest.

**Ethical Approval:**

Approved

**Consent Form:**

Written informed consent was taken from the patient.

**Financial Support:**

Not available

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