

Treatment of Resistant Clubfoot Cases Treated with Minimal Soft Tissue Release and Application of Ilizarov Ring Fixator with Cuboid Osteotomy**Agarwal Ankur¹, Gupta Amit Kumar²**¹Professor, Post Graduate Institute of Child Health, Sector 30, Noida²Senior Resident, Lady Hardinge Medical College, New Delhi

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Conflict of interest: Nil

Abstract

Introduction: Some resistant clubfoot respond to repeat casting by Ponseti method. However most cases will not respond to manipulation and casting. In these cases there have been bony changes and contracture in soft tissues where casting alone doesn't help.

Methods: Limited postero-medial soft tissue release with cuboid osteotomy with application of Ilizarov are expected to yield good results. A retrospective study was carried out at a tertiary level centre of India collecting data of cases treated between Sept 2021 and Aug 2025.

Results: There were 11 cases. There were 8 males and 3 females. Age range was 6 years to 11 years. Mean follow-up period was 35 months. There was no relapse till last follow up.

Conclusion: This method of minimal soft tissue release combined with cuboid osteotomy and ilizarov fixator is good alternative to other methods of treating resistant Clubfoot.

Keywords: Resistant, Clubfoot, Ilizarov, Osteotomy, Cuboid, Soft Tissue Release.

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Introduction

Clubfoot is also known as congenital talipes equinovarus (CTEV). It is one of the most common musculoskeletal defect. The incidence of clubfoot is 1 to 1.2 per 1000 live births in India, which amounts to approximately 60,000 cases per year. There is geographical variation. The boys are affected more than the girls, in the ratio 2:1. [1]

Although health care delivery system has improved over the past several years, it is still out of reach of many because of illiteracy, poverty and lack of awareness in this part of the world. Hence, in India we often see patients who are late presenters or patients who leave treatment in between and have multiple short stints of incomplete treatment by casting. There are also patients who have relapses and then seek re-treatment after a considerable time delay. While there are still other cases who have never sought treatment and have started walking on deformed foot leading to a stiff deformity and a callosity. Such cases often present as resistant to simple casting methods, as the soft tissue contractures develop and bones may get deformed. [2]

The aims and objectives of this study was to evaluate a series of such cases operated by minimal soft tissue release coupled with cuboid osteotomy and application of ilizarov ring fixator.

Material and Methods

A retrospective study was carried out at a tertiary level centre of India collecting data of cases of resistant clubfoot treated between Sept 2021 and Aug 2025. Inclusion criteria was Age between 6 years and 12 years AND little or no improvement in Pirani score with atleast two consecutive castings. Exclusion criteria was secondary clubfoot or clubfoot associated with neurological conditions, AMC and various syndromes.

All cases were operated by minimal postero-medial soft tissue release in the form of TA Tenotomy and plantar fascia release along with a closing wedge osteotomy of the cuboid. The aim was to achieve some degree of correction which was not possible due to contracture and bony deformities. Residual deformity was planned to be corrected by ilizarov ring fixator which permits gradual stretching of tight fibrous structures. Sutures were usually removed at 2 weeks duration. Care of pin-site was taught to the parents along with gradual distraction. The patients were called weekly or every 10 days. After aimed correction was achieved, ilizarov fixator was removed and a below knee walking cast was given for 4 weeks. Foot abduction brace was given for night time / nap time and an AFO with ankle hinge for daytime for

next 3 years. Gait training was done by a physiotherapist and visual gait analysis was done.

After plaster removal, follow up was planned at monthly intervals for first 6 months, then once in two months for next 3 years. The modified Pirani score was noted at each follow up.

Results

There were 11 cases. There were 8 males and 3 females. Age range was 6 years to 11 years. The mean age was 9.5 years. The follow-up range was from 23 months to 45 months. Mean follow-up

period was 35 months. There was no relapse till last follow up. All 11 patients maintained the correction till last follow-up. The mean Pirani score at start of treatment was 5.1 (± 0.4). Complications included pain requiring frequent oral analgesia during distraction phase of ilizarov, atleast 1 pin infection, requiring pin change / removal.

However, there was no serious infection and the pin sites healed well in all the cases after ilizarov removal. Figures 1, 2 and 3 show the representative case at presentation, during treatment and at follow-up.



Figure 1: At presentation, 11 year male was walking on deformed foot



Figure 2: At 3 months post-op, with ilizarov frame in situ



Figure 3: At 12 months follow up, after frame removal and plaster removal

Discussion

Resistant clubfoot in developing countries like India is not an unknown entity for various reasons. Various methods have been advocated with each having its own outcomes, advantages and disadvantages. [3]

Many researchers have advocated the successful use of Ponseti casting with weekly change of casts. [4,5,6] The disadvantages include prolonged casting phase, higher number of casts and related complications along with high relapse rate is also there. Also, patient compliance to treatment, motivated parents and repeated counselling is important.

The scope and result of conservative management diminish if the bones of the foot get deformed, child continues to walk on deformed foot and if the age nears skeletal maturity. Thus, theoretically bony procedure is must in such cases. Still others have devised modification of Ponseti casting with minimal soft tissue releases without a bony procedure. Such procedures have limited role when bones of the foot become deformed. [7]

Still other researchers have used external fixators in the form of JESS (Joshi's External Stabilization System) or ilizarov fixator without any soft tissue or bony procedure for resistant clubfoot. [8,9] While others have successfully treated resistant clubfoot by use of external fixators coupled with soft tissue releases without a bony procedure. [10]

The other methods advocated are surgical procedures that involve extensive soft tissue releases coupled with osteotomy of the cuboid (closing wedge osteotomy), osteotomy of the medial cuneiform (opening wedge osteotomy) or a combination of both. The osteotomy in different researches has been stabilized in plaster or by use of a pin or wire fixation. [11]

More radical procedures like excision of carpal bones have been tried but in subjects with age usually more than 11 years. [12]

The advantages of our method is faster correction of deformity, selective surgical insult, lesser number of visits to healthcare centre and effective method in children of older age group where deformity is more stiff.

Although the short term outcomes may be enterprising, our study had various limitations. The number of cases in our study was only 11.

Studies with larger sample size might reveal some aspects which could not be seen in our cohort of patients. The mean follow-up was 35 months. A longer follow-up till is must in any pediatric condition. Further the long term results of any bony procedure like osteotomy might be evident after 1-

2 decades, which cannot be revealed in a shorter study like this.

Conclusion

This method of minimal soft tissue release combined with cuboid osteotomy and ilizarov fixator is good alternative to other methods of treating resistant Clubfoot not responding well to the Ponseti method.

A plantigrade foot is achieved even in severely deformed foot. This is supported by the facts that with the advancement of the age and weight bearing, there are bony changes in the foot along with the soft tissue changes, which are not pliable enough for conservative management.

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