



A COMPARATIVE STUDY BETWEEN ILIZAROV RING FIXATOR AND JESS IN NEGLECTED/ RELAPSED CTEV

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ABSTRACT

Background: Idiopathic clubfoot is one of the oldest and commonest congenital deformities of mankind, ever since man has adopted the erect posture. Franke (1987-90) used Ilizarov ring fixator to correct all components of clubfoot. On the basis of similar principles, Joshi et al devised a simple external fixator (Joshi's External Stabilization System- JESS). **Materials and Methods:** A total of 21 patients with 28 affected feet who met the inclusion criteria were included in the study and divided into 2 groups; one group of 15 feet treated by Ilizarov fixator and other group of 13 feet treated by JESS. All the cases were assessed pre operatively and post operatively clinically using Dimeglio classification scoring system and radiologically using angles and indices. **Results and Conclusion:** This study included patients of age 3 to 12 years with majority below 8 years. Clinical assessment using Dimeglio scoring system showed improvement in score post operatively in both the groups. In our study, 15 feet were treated by Ilizarov in which 4 feet (27%) had excellent results, 6 (40%) were good, 2 (13%) were fair and 3 (20%) were poor results and 13 feet were treated by JESS in which 2 (15%) had excellent results, 3 (23%) were good, 3 (23%) were fair and 5 (39%) were poor results. In our study, results are better in ilizarov as compared to JESS.

KEYWORDS : clubfoot, JESS, Ilizarov, distraction histoneogenesis, neglected, relapsed

INTRODUCTION

Idiopathic clubfoot is one of the oldest and commonest congenital deformities of mankind, ever since man has adopted the erect posture. It occurs in variable severity and some of the mobile feet are corrected well with manipulation and stretching. Nearly half the feet are rigid and do not show full correction with conservative management.

In India, clubfoot remains a significant problem and yields an unpredictable outcome because of late presentation of the patients. The incidence in Indians is 1.51:1000 births.

There are numerous surgical procedures described for correction of clubfoot. The comprehensive soft tissue release in current favors is Turco's posteromedial release, Mukhopadhyay procedure with its variants and circumferential release as described by McKay, Carrol and Simons, etc. The outcome of surgery in a relapsed clubfoot is usually poor because of the extensive fibrosis and scars of the earlier surgery. Neglected clubfoot usually presents the unyielding rigid deformities because of the extremely contracted skin, tendons, ligaments and capsules.

This unsatisfactory situation prompted to seek a method which did not involve soft tissue trauma, bony resection etc. Since the basic aim of the treatment is to balance the discrepancy in the length between the lateral and the medial side of the foot, it was achieved by lengthening the medial side by continuous distraction by an external fixator. The discovery of principle of distraction histoneogenesis by Ilizarov came like a silver lining.

Franke (1987-90) used Ilizarov ring fixator to correct all components of clubfoot simultaneously and reported very good results in terms of no post operative scar and also no decrease in foot length.

On the basis of similar principles, Joshi et al devised a simple external fixator (Joshi's External Stabilization System- JESS). JESS works on the principle of soft tissue distraction, maintenance of tarsal relations and correcting all the deformities simultaneously.

Ilizarov ring fixator and Joshi's external stabilization system

frames are ideally suited for children in whom clubfoot deformities remain uncorrected by plaster of Paris casts and manipulation, as well as for recurrent clubfoot. Casting after complete correction not only protects the osteopenic bones while the pin tracts heal but also maintained correction and allows gradual weight bearing.

MATERIALS AND METHODS

This is a prospective comparative study of fractional distraction using JESS and Ilizarov ring fixator for neglected/ relapsed clubfoot conducted on 28 feet of 21 patients in SMS Medical College & Hospital, Jaipur. A total of 21 patients with 28 affected feet who met the inclusion criteria were included in the study and divided into 2 groups; one group of 15 feet treated by Ilizarov fixator and other group of 13 feet treated by JESS.

Patients less than 3 years and more than 12 years age were excluded from the study. Clubfeet with associated anomalies were not included in the study.

All the cases were assessed pre operatively and post operatively clinically using Dimeglio classification scoring system and radiologically using angles and indices. Distraction was done at 3-6 weeks and 7-9 weeks followed by a static phase. The follow up was done at regular intervals and distractor removal was done after satisfactory results.

STATISTICAL ANALYSIS

The data collected was entered in Microsoft Excel and analysis was performed using spss software [Chi-Square test]. Univariate analysis of all the dichotomous variable was performed by means of Chi Square test with Yates correction if required. A 'p' value of less than 0.05 was accepted as significant.

OBSERVATION & RESULTS

This study included patients of age 3 to 12 years with majority below 8 years. Male cases (17) were 81% and female cases (4) were 19%. Neglected cases were 89% (25) out of total 28 feet and rest 11% (3) were relapsed cases. Right foot cases (9) were more than left foot cases (5) and 7 cases were bilateral.

Table 1: Demographic details and type of clubfoot

		No of feet	Percentage
Type	Relapsed	3	11 %
	Neglected	25	89 %
Side	Right	9	42 %
	Left	5	24 %
	Bilateral	7	34 %
Age in years	4-8	18	
	8-12	3	
Sex	Male	17	81 %
	Female	4	19 %

Clinical assessment using Dimeglio scoring system showed improvement in score post operatively in both the groups. Pre operatively 9 feet (39%) had score 11-12; 8 feet (29%) had score 13-15; 9 feet (32%) had score 17-18. Post operatively 19 feet (67%) had score 2-3; 5 feet (18%) had score 4-5 and 4 feet (15%) had score 6-7.

Pre operative			Post operative		
Dimeglio Score	No of feet	%	Dimeglio score	No of feet	%
11-12	11	39	2-3	19	67
13-15	8	29	4-5	5	18
17-18	9	32	6-7	4	15

Table 2: Pre operative and post operative clinical comparison using Dimeglio scoring system. Radiological assessment was done using talo- calcaneal angle in AP and Lateral views, talo- calcaneal index. Average pre operative TC angle in Ilizarov group in AP view was 14, in lateral view was 18 and TC index was 32. Post operative average TC angle in AP view was 27, 29 in lateral view and TC index was 47.

In JESS group, pre operative average TC angle in AP view was 16, in lateral view was 18 and TC index was 32. Post operative average TC angle 19 in AP view, 24 in lateral view and TC index was 41. Average talocalcaneal angle and index improved better in Ilizarov group.

In our study, 15 feet were treated by Ilizarov in which 4 feet (27%) had excellent results, 6 (40%) were good, 2 (13%) were fair and 3 (20%) were poor results and 13 feet were treated by JESS in which 2 (15%) had excellent results, 3 (23%) were good, 3 (23%) were fair and 5 (39%) were poor results. In our study, results are better in ilizarov as compared to JESS.



Fig 1.b Post operative clinical picture of foot

CASE ILLUSTRATIONS

CASE 1: A 4 yr old boy with relapsed bilateral clubfoot



Fig 1.a Pre operative clinical picture of foot



Fig 1.c 3 month follow up



Fig 1.d 12 months follow up



Fig 2.b Post operative clinical picture of foot

Case 2: A 5 yr old female with neglected clubfoot



Fig 2.a Pre operative clinical picture of foot



Fig 2.c 3 month follow up



Fig 2.d 10 month follow up**DISCUSSION**

External fixators offer a versatile method of correcting complex three dimensional deformities of the foot such as club foot, more so with rigid, deformed and previously operated scarred feet. Physiological tension and stress applied to the tissues stimulates histoneogenesis, while controlled differential distraction gradually corrects the deformities and realigns the bones.

In our study, the average fixator period was 12.86 weeks in Ilizarov cases and 11.76 weeks in JESS cases and average follow up was 15-16 months ranging from 1-2.5 years. A similar study conducted by Oganesian and Istomina 1991 with feet treated by hinged distraction device had average fixator period of 16 weeks and follow up range of 1-9 years.

Duration of distraction was 3-6 weeks in 7 feet (47%) in Ilizarov cases and 6 feet (46%) in JESS cases; and 7-9 weeks in 8 feet (53%) in Ilizarov cases and 7 feet (54%) in JESS cases. Duration was less in Ilizarov cases as compared to JESS cases.

COMPLICATIONS

In our study, temporary oedema developed in 2 feet (13%) in ilizarov group and 4 feet (30%) in JESS group due to insertion of K wire in metatarsal. Clawing of toes developed in 4 feet (26%) in ilizarov group and 6 feet (46%) in JESS group. Pin tract infections were noted in 5 feet (32.14%) in Ilizarov group and in 4 feet (30.7%). Loosening of fixator was noted in 3 (20%) feet in Ilizarov and 9 feet (69%) in JESS group. Linear skin necrosis developed in 2 (7.14%) feet in Ilizarov group; not noted in JESS group. The complications are similar to the findings of study conducted by S Suresh, A Ahmed et al. 1999 of 44 feet treated by JESS. Pin tract infections were 27.3%, skin necrosis 4.5% and pin loosening 13.6%.

RESULTS

In our study, 15 feet were treated by Ilizarov in which 4 feet (27%) had excellent results, 6 (40%) were good, 2 (13%) were fair and 3 (20%) were poor results. A study conducted by C.F. Bradish et al. 1999 treated feet by Ilizarov showed 47% excellent results, 29.4% good, 11.7% fair and 11.7% poor results. A similar study by Amin Abdel- Razel Youssef Ahmed 2010 showed 72.2% satisfactory results while 27.8% unsatisfactory results.

In our study, 13 feet were treated by JESS in which 2 (15%) had excellent results, 3 (23%) were good, 3 (23%) were fair and 5 (39%) were poor results. A similar study conducted by Anwar and Arun 1999 showed 59.7% excellent and good results. A similar study by S Suresh, A Ahmed et al. showed 77% excellent results, 13% good and 9% poor results.

CONCLUSION

We concluded for better comparison of functional outcome of Ilizarov ring fixator and JESS required long term study/ follow up and similar identical group (such as type and grade of deformity, age). In our short term study, we concluded that outcome of Ilizarov ring fixator was better than JESS in patients having moderate to severe deformity, more advanced age group and educated parents. JESS is better than Ilizarov in patients having small feet with early age group, less severe deformity and illiterate parents because Ilizarov is technically more demanding procedure and more bulky to use in small feet.

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