

# Treatment of Neglected, Relapsed, Resistant Clubfoot by Ligamentotaxis using Jess and Evaluated Podographically

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## ABSTRACT

**Introduction:** Clubfoot is one of the oldest and commonest deformities of mankind, ever since man has adopted the erect posture. Study aimed to assess the role of Joshi's External Stabilisation System (JESS) in treatment of neglected, relapse and resistant cases of clubfoot and to evaluate the morbidity and complications of the method and to suggest ways to overcome them.

**Method and Materials:** This prospective study was done in a tertiary care center involving subjects with old, neglected, relapsed, resistant cases of clubfoot treated by Joshi's external stabilizing system. Total 10 subjects (14 feet) were included, which were corrected by JESS. All patients were evaluated clinically, Pirani Scoring, radiographically and by podograph, both before and after the correction.

**Results:** Severity of the deformities and clinical outcome was assessed by Pirani score. All patients achieved good results as per Pirani score. The pre- and post correction also assess by podographically.

**Conclusion:** Treatment of neglected, relapse and resistant cases of clubfoot by JESS is an effective and patient-friendly method of management.

**Keywords:** Treatment of Neglected, Relapsed, Resistant Clubfoot, Ligamentotaxis, Jess and Evaluated Podographical

## INTRODUCTION

Clubfoot occurs in variable severity and some of the mobile feet are corrected well with manipulation and stretching.<sup>1</sup> Nearly half the feet are rigid and do not show full correction with conservative management. In developing countries, clubfoot remains a significant problem and yields an unpredictable outcome because of late presentation and ignorance of the parents. The incidence is 5–6 per 1000 live births, varying with race and geography. The new concept is a simple versatile and light fixator system with tremendous potential was developed by Dr. B.B. Joshi of Bombay (Mumbai) INDIA in the year 1988.<sup>2-6</sup> A method of controlled, differential distraction which is semi invasive, more physiological in comparison to any other technique. Ilizarov fixator<sup>2</sup> has also used for correction of neglected cases of clubfoot but is more complicated and difficult. The component of clubfoot are internal tibial torsion and varus of hindfoot was assess podographically<sup>6</sup> measured by foot bimalleolar axis. This study was conducted to evaluate the clinical and podographic outcomes of neglected, relapse and resistant cases of clubfoot by using JESS.

## MATERIAL AND METHODS

The prospective study was done in a tertiary care centre

at IGIMS, Patna from June 2014 to June 2017 involving subjects with old, neglected, relapsed, resistant cases of clubfoot deformities treated by Joshi's external stabilizing system. This observational study was conducted on all the patients of pediatrics age. We exclude the patients who has primary typical clubfoot which was treated normal ponsatti method. Out of 30 patients 10 patients has neglected, relapsed, resistant clubfoot which was treated by by ligamentotaxis using JESS (Joshi's external stabilizing system) and evaluated podographically. All cases were assessed pre-operatively by thorough clinical pirani score (Table 1) and podographically. Each feature score one point when present or zero point when absent. Thus worst foot having all the features would score 6 points and a normal as well as corrected foot score 0 points. Out of 10 cases 4 bilateral cases, which were operated subsequently depend upon which had severe deformity. The time taken for correction by distraction ranged from 4 weeks to 10 weeks with an average of 6 weeks. After the complete correction, assembly removed and static phase maintain by a well moulded above knee plaster cast in maximum corrected position for double the time of JESS had been applied to allow soft tissue maturation in elongation and corrected position. The correction was asses by George Simons criteria (Table 2). They classified as Satisfactory (Excellent, Good) and Unsatisfactory (Poor).

## STATISTICAL ANALYSIS

Microsoft office 2007 was used for the analysis. Descriptive statistics like mean and percentages were used for the analysis.

## RESULTS

The average age of patients was 5 years to 15 years. Out of 30 patients with 10 patients was included which has neglected, resistant and relapse types of clubfoot while excluded 20 patients which has typical clubfoot and cured by ponseti meyhod. Out of 10 cases 4 were bilateral while in 6 unilateral cases 4 in right foot 2 in left foot. Thus total 14

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feet were treated by JESS. Out of 10 patients 6 were male and 2 female. Thus total 14 feet was treated by JESS. Post operative result of JESS shown as follows. At ankle joint dorsiflexion achieved was more than 10 and planterflexion more than 15 degree in all most all cases. All feet have good heel varus correction. Radiologically the talo-calcaneal angle (stress weight bearing view) in both preoperatively and post-operatively was assessed (Table 3). In our series 13 satisfactory and one unsatisfactory result was found as per Simon's criteria. The significant edema of foot during the distraction phase was observed. However, pin-tract infection was seen in only one case and there were no skin necrosis in any cases.

The result was asses by clinical pirani score (Table 1) and podographically (Figure 1).

**Podographic:** Foot bimalleolar angle (FBM), an objective assessment of deformity and correction, was correlated and compared with Pirani scores 0.5-2, 2.5-4, 4.5-6 as grouped I to III 30 children. The mean FBM angles of groups I, II and III were 80°, 65°, and 55°, respectively. The FBM angle gives an objective assessment of the severity of deformity and is used as objective evidence of improvement/deterioration of deformity. As per Simon's criteria there was nine satisfactory and had one unsatisfactory result. There was one case of pin-tract infection and there were no cases with skin necrosis.

## DISCUSSION

The treatment of club foot deformity are many with almost same results. There were no two studies can really be

compared. The advantage of distraction is histoneogenesis (that is increase tissue specific cells), absence of scar tissue formation and the no further shortening of the foot. There are many reports of the fixators distractor correction of clubfoot with good outcome. Suresh et al found JESS study involving 26 children with 44 clubfeet.<sup>7</sup>

Suresh et al done the difference between Ilizarov technique and JESS method and found that the wires in JESS fixators were pre-stressed and not-tensioned, thus preventing the chance of cutting through bone and soft tissue. And also, JESS is less costing and simple when compared to Ilizarov technique. Overall, result of JESS fixators are superior as compare to Ilizarov fixator, especially in neglected, relaps and resistant cases of clubfeet.<sup>7</sup> Anwar and Arun showed excellent and good results in 59.7% of cases.<sup>8</sup>

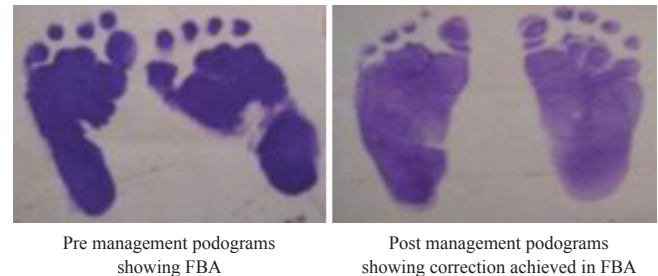
The cosmetic and functional outcome is satisfactory. Anwar and Arun found that is better in children who strictly follow the distraction-static phase protocol and the final outcome, stressing the fact that parent involvement is an essential component in treating neglected clubfeet.<sup>9-10</sup> Similar results found by Oganessian and Istomina.<sup>11</sup> The result from other studies and the present study shows that correction by JESS fixator is an useful and good method of treatment in neglected, relaps and resistance cases of clubfoot.

## CONCLUSION

JESS working on the principle of gradual differential distraction along with modification of the frame produces better results with less morbidity and low complications rate,

Parameters	Normal	Moderate	Severe
Midfoot			
Curved lateral border	0	0.5	1
Medial crease	0	0.5	1
Talar head coverage	0	0.5	1
Hindfoot			
Posterior crease	0	0.5	1
Rigid equines	0	0.5	1
Empety heel	0	0.5	1

**Table-1:** Carroll Pirani scoring criteria for clinical assessment of severity of Club-foot



**Figure-1:** Podographic assessment of the clubfoot

Symptoms	Satisfactory	Unsatisfactor
Apperance of hindfoot	Normal to mild deformity	Minimal to moderate pain with activity
Forefoot adduction	Mild	Moderate to significant residual deformity
Functional weakness of triceps surae	None to mild	severe
ROM Ankle	DF>10 and PF>15	DF<10 and PF<15
ROM Subtalar joint	Present	Nil
Additionsl treatment	Not any	Fequent treated with cast and major surgery
Complication	Minor	major

**Table-2:** Simons criteria for clinical assessment of outcome of Club-foot surgery

	Average preoperative	Average postoperative	Normal value
A.P.	12	18	30-35
Lateral	20	33	25-50
T.C. Index	32	51	>40

**Table-3:** Radiological findings of the outcome of JESS fixator surgery for resistant clubfoot

than conservative and operative management for the older neglected, relapsed, recurrent, and resistant cases. Thus correction by JESS is a useful method for the management of clubfoot in neglected, relapsed, resistant clubfoot case.

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