Correction of Resistant/Relapsed/Neglected Clubfeet by Differential Distraction with a Simple Unconstrained Ilizarov Construct

Dr.P.Deva,Dr.Giriraj Harshavardhan

Sri Ramachandra Institute of Higher Education and Research,Chennai

Introduction:

- Relapsed/resistant/neglected clubfeet is a common problem in developing countries.
- Differential distraction of soft tissues by means of an external fixator has been used with success in the correction of these difficult Clubfeet.But the correction is usually associated with stiff feet similar to that of open surgical releases even though the length of the foot can be improved.
- Most of the studies recommended that the fixator be maintained for a period of at least 4 to 6 weeks following the distraction dynamic phase to prevent recurrence. But prolonged period in a frame may increase the stiffness and incidence of reflex sympathetic dystrophy.
- The fixator does not allow much calcaneal rotation as it has a hold on the calcaneus; this is very important as envisaged by Ponseti. Hence to decrease the risk of stiffness and to apply the principle laid down by Ponseti for the correction of clubfoot, we removed the fixator early in a series of cases and applied Ponseti's technique.

Aim:

The purpose of the study was to follow up Resistant/ Relapse/Neglected clubfoot and to assess whether the correction of the deformity could be achieved and maintained by early removal of the fixator in the static phase and applying Ponseti's methods

Materials and Methods:

- Type of study: Prospective study
- Place of study: Sri Ramachandra Institute of Higher Education and Research
- Sample- 21 children with resistant/ relapsed/neglected clubfeet of age group - 2 to 13 years were treated by an unconstrained Ilizarov frame and differential distraction.
- **Once the deformity was clinically corrected, the distraction was stopped and the fixator was removed after 3 weeks**.
- During removal of the fixator, the feet were manipulated according to Ponseti's principles and if necessary a posterior TendoAchilles lengthening/tenotomy was done to obtain more dorsiflexion.Above knee plaster casts were applied for a period of 3 weeks.

Illustration-1 Relapse CTEV

Preop | Ilizarov insitu | 2-Year Followup

- Following removal of casts, measurements were taken for foot abduction orthosis and a below-knee cast was applied till the foot abduction orthosis was ready.
- The foot abduction orthosis was used at nighttime.
- Parents were taught to manipulate the feet after each meal.

RESULTS:

- Pes cavus and heel varus were well corrected in all feet and did not require any additional procedure at the time of ring removal.
- Good clinical correction was obtained in all the feet.
- 8 feet had inadequate dorsiflexion which required additional Tendoachilles lengthening/tenotomy
- All the children had restricted movements of subtalar and ankle joint in spite of early ring removal.
- 4 children had no dorsiflexion at all (all of them were post posteromedial release relapses).
- 13 children had only 10° of dorsiflexion (most of them were in older age group).
- 5 children had 20° of dorsiflexion-but no functional disability.
- 2 children had flexion contracture of toes
- 2 children had pin tract infection
- **In the 2 years followup study ,the correction was well maintained implying that there is no risk of recurrence if the fixator is removed early during the static phase**

Table 1: Functional assessment

Type	*Excellent*	*Good*	*Fair*	*Poor*
Relapsed/resistant (10)	5	4	1	0
Neglected (12)	4	7	0	0
Total (22)	9 (41%)	11 (50%)	1 (9%)	0

Table 2: Mean radiological parameters

Ankle/index	*Pre-operative*	*Post-operative*	*Mean change*
Anteroposterior talocalcaneal angle	16.77 ± 5.13	30.00 ± 4.47	13.33
Lateral talocalcaneal angle	11.38 ± 4.42	23.30 ± 7.47	11.92
Anteroposterior talo first metatarsal angle	31.46 ± 6.28	10.85 ± 4.9	20.61
Talocalcaneal index	28.15 ± 9.37	53.30 ± 6.84	25.15

Illustration 2-,Neglected CTEV

Preop Ilizarov insitu 4 -Year Followup

CONCLUSION:

- Ilizarov fixation is useful in the correction of neglected/relapsed clubfoot.
- The simple unconstrained frame is adequate even in severe deformities without open soft tissue releases/osteotomies.
- Most of the time, especially in younger individuals, adequate correction can be obtained without soft tissue release.
- In case of inadequate correction after Ilizarov fixation, second-stage soft tissue releases/osteotomy/ arthrodesis can be done.
- The amount of soft tissue release or bone resection required to completely correct the deformity is minimized by prior Ilizarov fixation and differential distraction.
- **In clubfeet corrected by differential distraction by external fixation, early removal of the fixator after completion of the distraction phase and following Ponseti's technique of manipulation leads to good correction of deformity and maintenance of correction.**

REFERENCES:

1. Bradish CF, Noor S. The Ilizarov method in the management of relapsed club feet. J Bone Joint Surg Br 2000 Apr;82-B:387-391.

2. Grill F, Franke J. The Ilizarov distractor for the correction of relapsed or neglected clubfoot. J Bone Joint Surg Br 1987 Aug;69-B:593-597.

3. Mehrafshan M, Rampal V, Seringe VR. Recurrent clubfoot deformity following previous soft-tissue release: midterm outcome after revision surgery. J Bone Joint Surg Br 2009 Jul;91-B:949-954.

4. Atar D, Lehman WB, Grant AD,. Revision surgery in clubfeet. Clin Orthop Relat Res 1992 Oct;(283):223-230.

5. Parade SA, Baird GO, Auffant RA, Tompkins BJ, Caskey PM. Safety of percutaneous TendoAchilles tenotomy performed under general anesthesia on infants with idiopathic clubfoot. J Pediatr Orthop 2009 Dec;29(8):916-919.

6. Oganesyan OV, Istomina IS, Kuzmin VI. Treatment of equinocavovarus deformity in adults with the use of a hinged distraction apparatus. J Bone Joint Surg Am 1996 Apr;78(4): 546-556.