



Study of the Ponseti's Technique of Casting for Treatment of Congenital Talipes Equino Varus

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ABSTRACT

Objective - To study the Ponseti's technique of casting for the treatment of congenital talipes equinovarus in less than two years.

MATERIALS AND METHODS - Total no of patients(47 feet) with idiopathic congenital talipes equinovarus were treated using Ponseti technique of manipulation and casting over a period of two years (May 2013 to May 2015). Recurrent clubfoot, secondary clubfoot and age of more than 2 years were excluded.

RESULTS - Total number of patients in study 29 (20 male and 9 female). Total no. of feet treated 47 (11 unilateral and 18 bilateral). Follow up-Maximum follow up :12 months, Minimum follow up : 3 months. Average follow up : 6 months. After achieving correction patients were given maintenance device and followed every month to look for any recurrence.

CONCLUSION - Ponseti method is an excellent method for treatment of CTEV. Treatment must be start at the earliest possible age. The patients who have lower Pirani score at initial visit respond better and faster to the treatment as compared to those who have higher Pirani score.

KEYWORDS

congenital talipes equinovarus, Ponseti, Pirani score.

INTRODUCTION

Clubfoot has been existent and known since long time and and similar is the duration of controversies it carries within itself. The subject has been studied by innumerable workers .Hippocrates was the first to advocate orthopaedic treatment of clubfoot by gentle manipulation and bandaging. Nicholas Andry (1743) in his Orthopedia called the deformity as pedes equines resembling the hoof of a horse. The first advance in non operative occurred treatment in 1836 when Guerin introduced the POP. In 1932, Dr. Hiram Kite , recognizing that forceful manipulation and extensive surgical releases were harmful, recommended a return to gentle manipulation and cast immobilization for treatment of congenital clubfoot. The 20th century was marked by the classification of two concepts in management of clubfoot. The first is the general acceptance of the manipulation , strapping and serial correction plaster casts and other favors numerous surgical procedures for the correction of clubfoot. Long back in 1960s Dr Ignacio Ponseti devised a method of conservative treatment of CTEV which starts from day one of age and is based on the fundamentals of kinematics and pathoanatomy of the deformity and successful realigns clubfoot in infants without any extensive and major surgeries. We conducted a study and evaluate the Ponseti method of treatment of idiopathic CTEV in children less than 2 yrs in our institute. Ponseti and smoley¹ reported results of treatment of congenital talipes equinovarus. Their classification was based on dorsiflexion, heel varus, forefoot supination and tibial torsion. Feet were classified on the basis of these three components as either good, acceptable or poor.

Dorsiflexion	Heel Varus	Adduction of forefoot	Tibial torsion	Result
>10	0	0 to 10	0	Good
0 to 10	0 to 10	10 to 20	Moderate	Acceptable
0	>10	>20	Severe	Poor

CLASSIFICATION

Hersh² classification

Extrinsic or flexible- Foot lies in equino varus but is flexible by manual pressure. Although there are abnormal bony abnormalities , they are not gross and severe shortening of soft tissue is not present at first. The heel is prominent and there are skin creases on the outer side of the ankle. Intrinsic or rigid- Foot is can only be partially corrected by manual pressure. Abnormal bony relationships are present. Heel is small because the posterior end of the calcaneum has been displaced upwards and lies deeply against the posterior aspect of lower end of tibia.

Harold and Walker³

Grade	Definition
I	Foot correctable beyond neutral
II	Pushed to neutral, but with fixed equinus or heel varus < 20°
III	Fixed equinus or heel varus > 20°

Cummings and Lovels classification⁴

- Supple clubfoot
- Relapsed clubfoot
- Recurrent clubfoot
- Neglected clubfoot
- Rigid clubfoot
- Catterall⁵ classification.

Foot	Resolving pattern	Tendon contracture	Joint contracture	False correction
Hindfoot				
Lateral malleolus	Mobile	Posterior	Posterior	Posterior
Equinus	No	Yes	Yes	Yes
Creases medial	No	No	Yes	No
Posterior	No	Yes	Yes	Yes
Anterior	Yes	No	No	Yes

Forefoot	Straight	Straight	Straight	Straight
Lateral border	Yes	Yes	No	Yes
Mobile	Yes	Yes	No	Yes
Cavus	+/-	+/-	+/-	No
Supination	no	No	Yes	No

N C Carroll⁶ took a broad view and recommended examination in five parts. Birds eye view of the whole child. Detailed neurological examination with Ultrasonographic examination of whole spine. Doppler examination of the foot. Radiographic assessment of the foot. Clinical assessment of the foot with child in supine and prone position.

Lorenz⁷ was first to perform subcutaneous tenotomy of Achilles Tendon. Hiram Kite^{8,9,10} popularized non operative treatment with serial manipulation and plaster cast immobilization. Vincent J turco^{11,12}- Fibrosis of the medial structures forms a mass of indistinguishable scar tissue on the medial side that obscures the midtarsal and subtalar joints. In resistant clubfoot, the mass of scar tissue prevents the forward and anterior migration of the navicular and the eversion and lateral movement of anterior end of calcaneum. BB Joshi¹³ devised his own indigenous apparatus called JESS which works on the principle of controlled differential distraction for correction of clubfoot. Pirani¹⁴ identified method for evaluation of clubfoot. He classified 6 clinical signs that indicate primarily hindfoot contracture and 3 signs that indicate midfoot contractures.

MATERIALS AND METHODS

Total no. of patients 29 (47 feet) with untreated idiopathic CTEV were treated using Ponseti's method of manipulation and casting over a period of two years (May 2007 to June 2009). Recurrent clubfoot, secondary clubfoot and age more than two years were excluded. All the parents were questioned regarding presence of defect since birth, presence of either neuromuscular or skeletal defects, Maternal history of pregnancy, Both the parents were questioned about positive family history.

PONSETTI TECHNIQUE-

Manipulation of feet should be started soon after birth if possible. First the cavus followed by varus and the adductus and lastly equinus.the foot is manipulated foe 3-4 minutes and after that casting is done to maintain the correction achieved. This is done every 7th day. Cavus - the forefoot is supinated to the extent that visual inspection of the plantar surface of the foot reveals a normal appearing arch. The first portion of the plaster cast should extend to the knee and maintain the whole foot in equinus, in supination and as much abduction as possible while mild counter pressure is applied over the lateral aspect of the talus in front of the lateral malleolus. Varus and Adduction- varus adduction and equinus are the most severe deformities primatly occurring in the hindfoot. The talocalcaneal, talonavicular and calcaneocuboid joints operate in a mechanical interdependence. It is necessary to simultaneously correct the tarsal displacements in the clubfoot. The lateral shift of the navicular ,cuboid and calcaneus in relation to the talus will be possible when the tight joint capsule, ligaments and tendons of the inner aspect of the foot gradually yield to manipulation. Correction of clubfoot deformity necessitates a prolonged stretching of the medial tarsal ligaments and tendons. This can be achieved only by adducting the whole foot under the talus to a much greater degree. One must obtain 70 degrees of abduction of the foot by last cast after correction of the equinus. Equinus- correcting the foot by dorsiflexing it with the heel in neutral position after the varus and abduction of the foot have been corrected. The manipulation entails stretching the tight posterior capsules and ligaments of the ankle and subtalar joints and the tendo achiliesto the trochlea of the talus to slide backwards in the mortise. Two or three casts applied after manipulations, carefully molding the heel are usually needed to correct the equinus deformity. Care should be taken not to cause rocker bottom deformity. Plaster Cast is applied to maintain the correction achieved by manipulation. The mother should remain close to the baby during all manipulative procedures. Knees should be maintained at 90 degree flexion. Cast should be applied below knee at

first. Percutaneous tenotomy was required to correct the equinus deformity in more than 80 percent of the patients. It is done under local anesthesia. Tenotomy is done 1 cm above the calcaneus. An additional 10-15 degree of dorsiflexion is achieved.

RESULTS

Total number of patients in study 29(20 male and 9 female). Total no. of feet treated 47(11 unilateral and 18 bilateral). Follow up-Maximum follow up :12 months, Minimum follow up : 3 months. Average follow up : 6 months. After achieving correction patients were given maintenance device and followed every month to look for any recurrence. Out of 29 patients treated, 2 patients(0-14 days) and 1(15-28 days) had excoriation. 1 patient(1-3 months) had tight cast and plantar sores. 1 patient(2-12 months) had plantar sore and 1 patient(1-2 yr) had tight cast.



Initial Pirani score vs age at presentation

Score	0-14 days	15-28 days	1-3 months	3-12 months	1-2 years
3.0	3	1			
3.5	2	4			
4.0	3	1	1		
4.5	2	3	1	1	1
5.0	2	3	2	1	2
5.5	1	1		2	2
6.0	1	2	3	2	5
Total feet	14	15	7	6	5

No of casts required vs age at presentation

Age of presentation	No. of casts required to achieve full correction i.e Pirani score 0
0-14 days	4.5
14-28 days	5.3
1-3 months	5.8
3-12 months	6.5
1-2 years	6.8

Percutaneous tendoachillies tenotomy

Age	Feet	Tenotomy
0-14 days	14	10
15-28 days	15	13
1-3 months	7	6
3-12 months	6	6
1-2 years	5	5
Total	47	40

DISCUSSION

Treatment of idiopathic clubfoot is both surgical and manipulative. Despite long term experience in many centres, there still are outcome controversies surrounding both alternatives. John E Herzenberg¹⁵ showed 88% good to excellent results and 3% recurrence in his series of clubfoot treated by Ponseti method. Noam Bor¹⁶ in his series of 20 cases treating clubfoot in older children more than three months by Ponseti method found that only 5% required open surgical release. 85% required percutaneous Tendo achillies release at average of 6 months. M Changulani Garg, Dr N.K Garg¹⁷ in their series of 100 feet ogt more than 80% good results with 10% recurrence. In our study , we got more than 80% good to excellent results and 4% recurrence.

SUMMARY AND CONCLUSION

Ponseti method is an excellent method for treatment of CTEV. Treatment must be start at the earliest possible age. The patients who have lower Pirani score at initial visit respond better and faster to the treatment as compared to those who have higher Pirani score.

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