

## To Objectively Document the Deformity Before, and After Manipulation Using Pirani Scoring For Treatment of Idiopathic Clubfoot In Children Below Two Years of Age

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### Original Research Article

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**Abstract:** The purpose of this study was to evaluate the early results of the Ponseti Method in reducing extensive corrective surgery rates for congenital idiopathic clubfoot in patients treated in Children's Orthopaedic Clinic and Rehabilitation Department Medical University of Lublin between the years 2007–2011. Thirty-five patients with 47 idiopathic clubfeet were followed prospectively while being managed with the Ponseti method. Clubfoot severity was graded with use of the Dimeglio system. The initial correction was achieved, and early results were measured by using Pirani scoring method. A prospective comparative study of Accelerated Ponseti versus the Standard Ponseti method for treatment of idiopathic clubfoot was done at Department of Orthopaedics & Traumatology, Amaltas Institute of Medical Sciences, Dewas. The duration of study was from September 2013 to October 2015, and includes 26 patients (40 feet, 20feet each group). A total of 140 casts have been applied for 12 patients (20 feet) in the accelerated group. Pre-cast PIRANI SCORE (mean): 5.3, Post-cast PIRANI SCORE (mean): 0.5 A total of 135 casts have been applied for 14 patient (20 feet) in the standard group. Pre-cast PIRANI SCORE (mean): 4.6, Post-cast PIRANI SCORE (mean): 0.525. Accelerated Ponseti method is equally efficacious as the conventional method. Reduces the treatment period. More economical, Very useful in a developing country like India, Prevents recurrent visits to the hospital, Early detection of any complications as the patient is in the hospital.

**Keywords:** Deformity, Pirani Scoring, Idiopathic, Clubfoot &Ponseti.

### INTRODUCTION

Clubfoot is a congenital deformity that occurs in 1/10,000 birth. It is more common in boys. The deformity includes four components: metatarsus adductus, cavus, hindfootvarus and equinus. Congenital clubfoot is a three-dimensional malformation with its center in talocalcaneonavicular articulation. The axis of deformation is interosseoustalocalcanealligament[1].

The cause of clubfoot has long been debated by the medical community. According to the Journal of Children's Orthopaedics, this condition has been studied since the 1800s. Some scientific investigators concluded that the condition was caused by malformed bones, abnormalities of muscle, joint or vascular lesions and/or abnormal ligaments and tendons. Another opinion is that congenital clubfoot results when external forces put the foot or the feet in a faulty position while the fetus is developing. Nowadays, there are two main hypotheses that say that

congenital clubfoot is caused by neurogenic disorders in neuromuscle balance or gene variations [2, 3].

Long back in 1960s, Dr. Ignacio Ponseti (3 June 1914 – 18 October 2009), a Spanish physician, specializing in Orthopaedics, devised his method of conservative treatment of Congenital Talipes Equinovarus which starts from day one of age and is based on the fundamentals of kinematics and pathoanatomy of the deformity and successfully realigns clubfoot in infants without extensive and major surgeries. High Success rate of the Ponseti method has made it the most widely practiced treatment for CTEV in modern era. Classic Ponseti method involves weekly plaster change with gradual abduction of foot. In accelerated Ponseti method the manipulation method remains the same but foot plaster is changed three times a week [4].

### MATERIALS & METHODS

A prospective comparative study of Accelerated Ponseti versus the Standard Ponseti method

for treatment of idiopathic clubfoot was done at Department of Orthopaedics& Traumatology, Amaltas Institute of Medical Sciences, Dewas. The duration of study was from September 2013 to October 2015, and includes 26 patients (40 feet, 20feet each group).

Each patient registered was given a clubfoot clinic number and detailed personal history was recorded including the age, sex, name of parents, laterality, address, date of first reporting, age at reporting ,detailed history of any previous treatment etc. A Club Foot Clinic card containing all the required information was issued and pamphlets containing all the required informations in the local language were given to attendants. The patients were followed up regularly at the clinic and assessed.

#### **Inclusion criterion**

- Idiopathic clubfoot
- Age upto 2years
- Pirani score more than one.

#### **Exclusion criteria**

- Children with clubfeet above 2years
- Secondary Club feet
- Local non healing wound
- -Previously operated patients

#### **Our protocol**

- A thorough general examination of the child was done so as to detect any associated congenital anomalies.
- A complete clinical assessment of all feet made precast and post cast.
- Aim of treatment is to achieve a functional, pliable, painless, and cosmetically accepted looking foot.
- During the entire period of treatment, we try to educate and counsel the parents about clubfoot, importance of early treatment, bringing the child regularly for follow up.

#### **Pirani score**

Dr. ShafiquePirani, Clubfoot clinic of Royal Columbian Hospital Canada developed this valid, reliable method of clinically evaluating the severity of a virgin clubfoot. A child's total score is between 0 to 6.

#### **Clinical parameters**

##### **Hind foot contracture (HFC)**

- Posterior crease (PC)
- Empty heel(EH)
- Rigid Equinus (RE)

##### **Possible HFCS (0 TO 3)**

##### **Mid foot contracture**

- Medial crease(MC)
- Curvature of Lateral border of foot (CLB)

- Lateral part of Head of Talus (LHT)

##### **Possible MFCS (0 TO 3)**

##### **Method**

The foot is evaluated every visit during serial cast treatment .the infant is kept supine at the end of examination table and is examined while feeding and relaxed.

##### **Look**

- CLB(curved lateral border)
- MC (medial crease)
- PC(posterior crease)

##### **Feel**

- LHT(lateral head of talus)
- EH(emptiness of heel)

##### **Move**

- RE(Rigidity of equinus)

##### **Curved lateral border (CLB)**

Look at the plantar surface of the foot at rest and gauge the curvature of the lateral border of the foot by placing a straight edge along lateral border.

##### **Medial crease (MC)**

Assessed with the foot in maximum correction and looking at the longitudinal arch of the midfoot.

##### **Posterior crease (PC)**

Assessed with the foot in maximum correction and looking at back of the heel.

##### **Lateral part of head of talus (LHT)**

Assessed with the foot in deformed position, lateral head of talus is palpated and foot is everted.

##### **Emptiness of heel (EH)**

Assessed with the foot in maximum correction, with the examining finger placed on corner of the heel and applying gentle pressure

##### **Rigid equinus (RE)**

Assessed with the baby supine, knee extended and foot in maximum correction from lateral side.

#### **INFORMED CONSENT**

- Informed consent was obtained from the parents of the patient after counseling them regarding the benefits of the treatment and their active role in the treatment protocol.

#### **Proper counseling on all visits by**

- Consultants
- Residents
- Counselor from club foot clinic
- Pirani score was done on all visits
- Used to assess the correction achieved

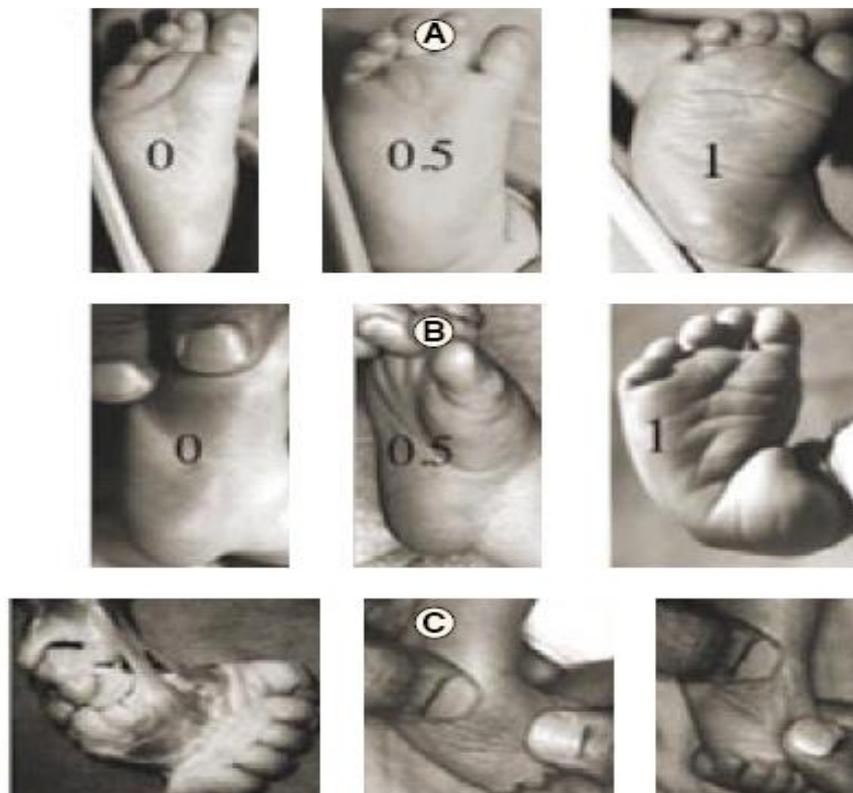
**PIRANI SCORE**

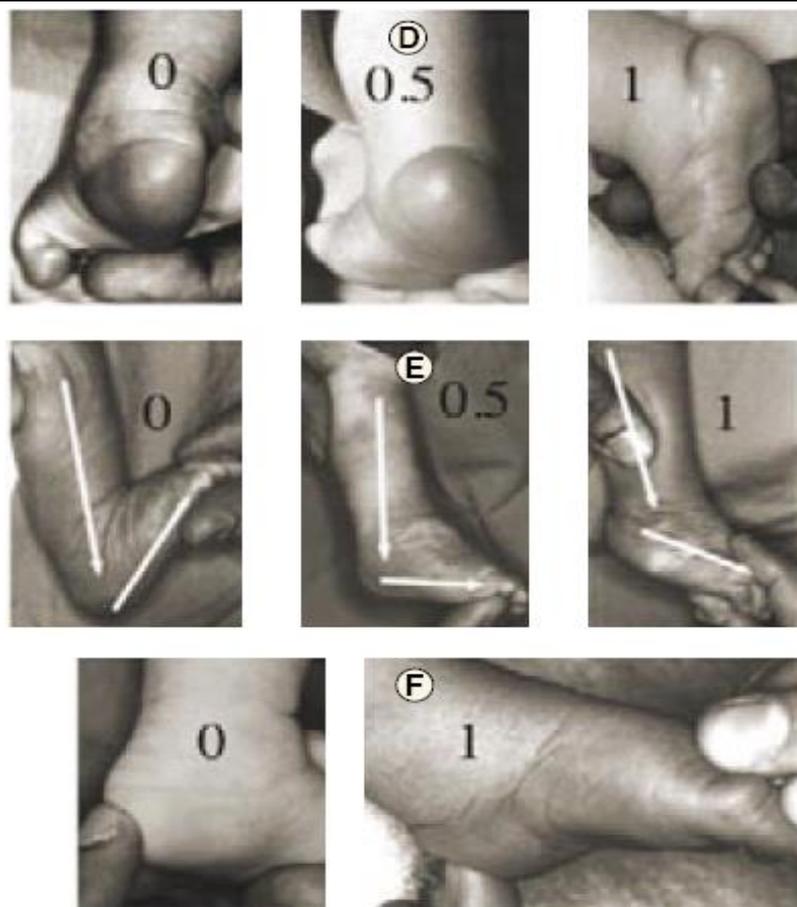
Physical examination finding	Score 0	Score 0.5	Score 1
Curvature of lat. Border of foot (CLB)	Straight	Mild distal curve	Curve at calcaneo cuboidal joint
Severity of med. Crease (MC)	Multiple fine creases	One or two deep crease	Single Deep crease
Severity of post. Creases (PC)	Multiple fine creases	Few deep creases	Single Deep crease
Rigidity of Equinus (RE)	Ankle dorsiflexes fully(<90 degree)	Ankle dorsiflexes upto neutral (90 degree)	Ankle dorsiflexes less than neutral(>90degree)
Palpation of lat. Head of talus(LHT)	Navicular fully reduced, talar head cannot be felt	Navicular partially reduced	Navicular not reduced
Emptiness of heel (EH)	Tuberocity of calcaneum easily palpable	Tuberocity of calcaneum more difficult to palpate	Tuberocity of calcaneum not palpable

**Mid foot score**

- Curved lateral border [A]

- Medial crease [B]
- Talar head coverage [C]





#### Hind foot score

- Posterior crease [D]
- Rigid equinus [E]
- Empty heel [F]

#### Ponseti Technique

- The corrective process utilizing the Ponseti technique can be divided into two phases:
- The Treatment Phase - during which time the deformity is corrected completely.
- The Maintenance Phase - during which time a brace is utilized to prevent recurrence

#### DISCUSSION

Dr. Shafiq Pirani, Clubfoot clinic of Royal Columbian Hospital Canada developed this valid, reliable method of clinically evaluating the severity of a virgin clubfoot. A child's total score is between 0 to 6.

#### Salient features of this system of Pirani score

- Uses six simple well described signs.
- The criteria for assigning a particular score to each deformity have been precisely laid down.
- When score was obtained before and after each manipulation (thrice a week in accelerated and once a week in standard Ponseti method), it showed the response of the deformity to manipulation and cast treatment.

- The plot of score against time also indicates areas of persisting contracture that may need to be addressed surgically.

In the study of P. Harnett, R. Freeman, and W.J. Harrison, total number of patients were 40 (61 feet) were entered into trial. The initial median Pirani score was 5.5 in the accelerated group and 5.0 in the standard control group. The median number of treatment days in plaster was 16 in accelerated group, and 42 days in control group. Of the 19 patients in accelerated group, three required plaster treatment for more than 21 days and were assigned to the standard group. Of the 40 patients, 36 were followed for a minimum of six months. In study of Syed Furqan Gilani, Salman Ahmed Randomized controlled trial. A total of 80 patients, 40 in each group were randomly allocated to either Group A (Standard Ponseti) or Group B (Accelerated Ponseti). Group A underwent serial manipulations and castings weekly and Group B received manipulations and castings twice weekly. 61.3% babies were male. The mean number of casts required was 5.2 in group A and 5.12 in group B [5, 6].

In our comparative study we include total number of patients are 26 (40 feet, each group 20 feet). In our study total number of male patients 15 (57.69%) and 11 female patients (42.30%). Initial Pirani score was 5.35 in accelerated group, and 4.6 in control group

(standard group), higher Pirani score in accelerated group needed greater tenotomy. Post cast Pirani score was 0.5 in accelerated group and 0.525 in standard control group. Mean duration of treatment of clubfoot in accelerated group was 26 days, and 47.25 days in standard group. A total of 123 casts (average 6.15/feet) have been applied for 12 patients (20 feet) in the accelerated group, and 135 casts (average 6.75/feet) have been applied for 14 patients (20 feet). Average age

of presentation in our study was 2.70 months in accelerated group and 4.71 months in control group. Average months of follow up were 7.84 months in standard group and 6.66 months in accelerated group. In standard group one patient didn't come for follow up after tenotomy[7].

**RESULTS**

**Table-1: Mean pre and post cast pirani score**

Sn	Method	Pre cast mean pirani score	Post cast mean pirani score
1	Accelerated ponseti	5.35	0.5
2	Standard ponseti	4.6	0.525

A total of 140 casts have been applied for 12 patients (20 feet) in the accelerated group  
 Pre-cast PIRANI SCORE (mean): 5.35  
 Post-cast PIRANI SCORE (mean): 0.5

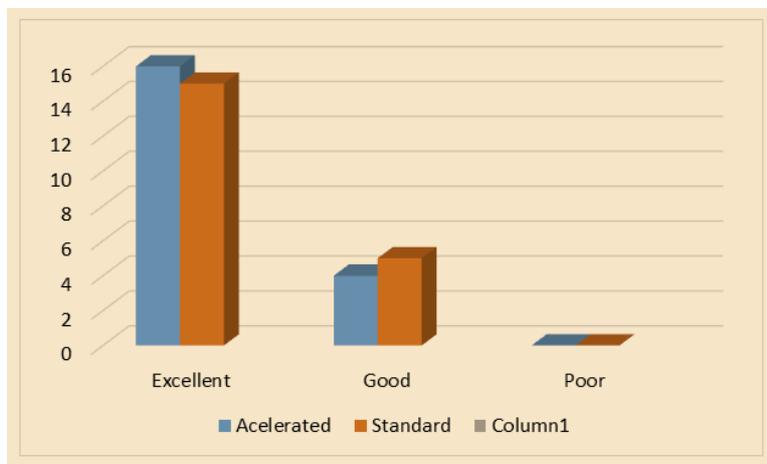
A total of 135 casts have been applied for 14 patient (20 feet) in the standard group  
 Pre-cast PIRANI SCORE (mean): 4.6  
 Post-cast PIRANI SCORE (mean): 0.525

**Table-2: Grading of result**

Grading	Accelerated group	Standard group
Excellent (Pirani Score <1)	16	15
Good (Pirani Score 1-2)	4	5
Poor (Pirani Score >2)	0	0

Of the 20 feet under the accelerated group, 16 have been graded as excellent and 4 as good.

Of the 20 feet under the standard group, 15 have been graded as excellent and 5 as good.



**Fig-1: Grading of result**

**CONCLUSION**

**Accelerated Ponseti method is equally efficacious as the conventional method**

Reduces the treatment period, More economical, Very useful in a developing country like India, Prevents recurrent visits to the hospital, Early detection of any complications as the patient is in the hospital.

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