*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 10 Ver. 10 (October. 2018), PP 18-22*
*www.iosrjournals.org*

# Analysis of Radiological Parameters and Pirani Scoring In Management of Idiopathic Clubfeet by Ponseti Method

Dr. Umesh Kumar[1], Dr. Devi Sahai Meena[2], ,Dr. Reena Meena[3], Dr. Anita Meena[4]

**,** (*Senior Resident in AIIMS, Delhi)[1],*
*(Sr.Professor and Unit Head in SMS Hospital, Jaipur, Rajasthan)[2]*
*(Sr. in S.M.S. Hospital, Jaipur, Rajasthan)[3]*
*, (JR in AIIMS,Delhi)[4]*
*Corresponding Author: Dr. Umesh Kumar*

***Abstract***
***BACKGROUND :*** *To final out agreement of association between radiological parameters and pirani scoring in management of idiopathic clubfeet corrected by ponseti method.*
***METHOD :*** *50 patients of CTEV fulfilling criteria, attending at sms hospital OPD, department of orthopaedics, from May 2017 to April 2018 will be included. All patients included in this study were thoroughly assessed clinically and radiologically.*
***RESULT :*** *The ponseti method of clubfoot correction has considerably decreased the need for surgery and its attending complication. The pirani score is useful to grade the initial extent of the deformity and to assess the progress of foot correction.*
***CONCLUSION :*** *Our study does not support routine use of radiograph during ponseti cast correction and during follow up. Better result on clinical examination, palpation, and use of radiograph only in unusual cases.*
***Keyword :*** *Ponseti , Pirani score, CTEV.*

---

Date of Submission: 05-10-2018 Date of acceptance: 20-10-2018

---

## I. Introduction

Idiopathic clubfoot is one of the oldest and commonest congenital deformities. The incidence in Indians is 1.51:1000 births.In developing countries, clubfoot remains a significant problem and yields an unpredictable outcome because of late presentation owing to ignorance of the parents. Management starts with assessment of severity clinically and radiologically. Clinically it is normally done with pirani score, which is a simplest and very effective method . The goal of clubfoot management is to reduce, if not to eliminate all elements of the clubfoot deformity. Hence achieving a functional, pain free, normal looking foot.Seven different radiological parameters in both AP and lateral views, consider in our study to evaluate the clinico-radiological outcomes of clubfoot managed by Ponseti method.

MATERIAL & METHODS : This observational study was conducted on eligible patient of 0-2 year of age since January 2016 to December 2016 in SMS medical college and hospital. All patients were managed on OPD basis. The study group consisted of 47 babies (67 feet).

**Statistical Analysis:** The data obtained were planned to be analyzed by using both descriptive and inferential statistics. The data on sample characteristics described in the form of tables whenever it was applicable. Inferential statistics such as chi square test to be used to find out the association between diseases and variables and for quantitative data paired T test was used and to find out the association, Pearson correlation coefficient and regression was performed. The "Microsoft Excel" SPSS 20 and "Primer" software was used for analysis of the Data.

All patients of CTEV fulfilling following criteria were included:-
Idiopathic clubfoot
Presenting first time for the management of clubfoot
Patient managed earlier conservatively but not fully corrected
All previously conservatively corrected clubfoot presented with relapse of deformity
Informed consent of patient's parents/ guardians
Age <2 year

We excluded-
Age >2 year
Previously operated patients
And if associated with secondary cause

All patients included in this study were thoroughly assessed clinically. Local examination of the foot documentation included following parameters (i) Shape of the foot (ii) Heel size (iii) Skin creases – mainly posterior and planter (iv) Tendoachillis – whether tight and its insertion (v) Callosities if any (vi) Measurement - Medial border and Lateral border Index" [Medial: lateral] (vii) Deformity (viii) Calf size (ix) Clawing of toes and Cavus.

For deformity correction, the classical Ponseti technique was adopted. Catteral Pirani scoring system was used in this study to assess the severity of deformity and to assess the correction achieved after final casting. While foot is maintained in maximum corrected position a thin layer of compressed cotton roll is applied follow by a thin layer of plaster cast wrapped. After every cast application, children were observed for any pressure complications for minimum of 4-6 hours.Regular follow up done weekly for manipulation and changing of cast. By fourth to fifth plaster casting most of the clubfeet are sufficiently corrected, but for equines, which was finally corrected by percutaneous tenotomy. Fully corrected non-walking feet were given Steenbeek Foot Abduction Orthosis (SFAB). The foot piece of this SFAB was set at 15-degree dorsiflexion and 70-degree external rotation. Catteral Pirani scoring system was used in this study to assess the severity of deformity and to assess the correction achieved during treatment and after final casting. All patients included in this study.

Catteral Pirani scoring system was used in this study to assess the severity of deformity and to assess the correction achieved during treatment and after final casting. All patients included in this study were thoroughly assessed radiologically.An anteroposterior, a lateral and ankle with the foot in maximum dorsiflexion radiographs were taken within one week after cast removal.In the antero-posterior and lateral view, lines were drawn longitudinally through the central axis of talus and calcaneum. The angle subtended was measured. These two angles then added together, and we have called their sum the talocalcaneal index (TCI). All parents were advised to come regularly every month for six months and then six monthly thereafter until the age of 4 years.

**Figure 1:** Pre management feet showing Extent of deformity

**Figure 2:** Pre management radiological evalution of feet

**Figure3:** CTEV Cast

***Figure 4**: Clinical correction Achieved at the end of final Manipulation*

**Figure 3:** Tenotomy

*Lateral View*
***Figure 4**: Post corrected Radiological evaluation of corrected* Feet showing all angles within normal Range

**STATICS :** The present study of analysis of pirani score and radiological parameters for idiopathic clubfoot was conducted on 67 feet in 47 patients during the period of January 2016 to December 2016 in SMS medical college and hospital. Detailed history, physical examination, pirani scoring and radiological examination were carried out.

There were 33 boys and 14 girls with a mean age at presentation of 3.56 ±3.50 months (15 days to 15 month).

## II. Result

**Table No. 1**

Distribution of the cases according to PIRANI SCORE

| Pirani score | Initial | | Final | |
|---|---|---|---|---|
| | No | % | No | % |
| Poor | 67 | 100 | 5 | 8 |
| Good | 0 | 0 | 23 | 34 |
| Very Good | 0 | 0 | 39 | 58 |

| | | | | |
|---|---|---|---|---|
| Total | 67 | 100 | 67 | 100.0 |

Chi-square = 115.389 with 2 degrees of freedom; P<0.001HS

According to change in Pirani score before and after the treatment was drastically changed 67 cases(100% )who had poor score achieved (34)%) good and (58%) in very good score and this was statistically significant.

**Table No. 2**

Tenotomy in relation to Pirani Scores

| Pirani Score | Pre | | Post | | Paired T Test |
|---|---|---|---|---|---|
| Tenotomy | Mean | SD | Mean | SD | P Value |
| No(8) | 5.31 | 0.46 | 0.31 | 0.26 | <0.001HS |
| yes(59) | 5.61 | 0.48 | 0.24 | 0.33 | <0.001HS |

There was significant lower mean was achieved in post corrective cases as compared to pre in irrespective of the Tenotomy status.

**Table No. 3** Correlation between Pirani Score and TCA (AP View)

Correlation between Pirani Score and TCA (AP View)

| R | R Square | Equation | P Value | Sig |
|---|---|---|---|---|
| .275[a] | .075 | y=38.351-8.2x | 0.02 | Sig. |

Correlation between Pirani Score and TMA (AP View)

| R | R Square | Equation | Sig |
|---|---|---|---|
| 0.05 | 0.003 | y=5.3+1.9x | 0.68NS |

Correlation between Pirani Score and CMA (AP View)

| R | R Square | Equation | P Value | Sig |
|---|---|---|---|---|
| 0.09 | 0.008 | y=2.14+2.7x | 0.46 | NS |

Correlation between Pirani Score and TCA (LATERAL View)

| R | R Square | Equation | P Value | Sig |
|---|---|---|---|---|
| -0.369 | 0.136 | Y=33.04-11.3X | 0.002 | S |

Correlation between Pirani Score and TibCA (LATERAL View)

| R | R Square | Equation | P Value | Sig |
|---|---|---|---|---|
| 0.554 | 0.306 | Y=75.36+27.22X | <0.001S | S |

Correlation between Pirani Score and TMA (LATERAL View)

| R | R Square | Equation | P Value | Sig |
|---|---|---|---|---|
| 0.182 | 0.033 | Y=10.4+5.4X | >0.05 | NS |

Correlation between Pirani Score and TCI (LATERAL View)

| R | R Square | Equation | P Value | Sig |
|---|---|---|---|---|
| -0.387 | 0.150 | y=71.45-19.15x | 0.816 | NS |

## III. Discussion

The goal of treatment is to achieve a functional plantigrade, supple painless callous free and shoe able foot that looks normal and to spare the parent and child from frequent hospitalization and years of treatment with any kind of surgery. Modalities include serial manipulation, casting, and splinting. The technique of manipulation and casting, described by ponseti and colleagues is the gold standard. We strictly follow this technique in our study. All feet underwent a total of 5 to 9 manipulations and casting at intervals of 7 days.

Ankle foot orthosis was prescribed for full time use until the age of 5 year.

Pirani scoring system was used in this study to assess the severity of deformity and to assess the correction achieved after final casting. We use this scoring system and document the results every time the feet were examined: before the treatment, during the correction phase, during the bracing phase and at later check up.

We observed that Ist metatarsal was more planter flexed than 5 th metatarsal. Improvement in Sinha Index (Medial/ Lateral border ratio) was observed in all subjects although we were not able to achieve complete reversal of medial to lateral border ratio, as probably the duration of observation was short. In unilateral cases, affected foot remains smaller in comparison to the normal foot but was cosmetically acceptable to all parents.

As per our observations, radiological parameters return to normal range. The possible explanation for this could be that the primary pathology in CTEV is soft tissue contractures around midfoot and hindfoot while the bony articulation changes are not initially present as skeleton is mainly cartilaginous. The purpose of casting is to immobilize the contracted ligaments at the maximum stretch obtained after each manipulation. All the joints are interconnected and proper bony alignment can be achieved if treatment is started early. The difference in pre and post correction Pirani scores in these patients was found statistically significant (p=0.01).

Our results were comparable to study of Ebehardt et al who treated 41 clubfeet by Ponseti technique of manipulation and presented 95% good results. He emphasized that with this technique, need of extensive surgery has decreased. Results were also comparable to Lourenco AF et al (2007), Segev et al, Goksan et al and Morcuende et al with approximately 92%, 94%, 84% and 98% good results respectively. we believe that the benefits of the additional information provided by radiographic assessment of clubfeet outweigh the risk of radiation exposure.

After analysis of the anteroposterior and lateral roentgenograms of the foot and pirani score, we find that it may assist the orthopedist in determining the extent of the deformities and in evaluating the treatment

We find that there is no role of radiography to demonstrate the relationship between bones. Radiography is accomplished by first drawing the axis of each bone, and hare is lies the limitation of this imaging modality. And there is also little ossification of the bone of normal newborn foot, and a delay in ossification in clubfoot.

There was also very poor reproducibility in positioning the clubfoot for radiography.

These factors make it unrealistic to consider radiographs of newborn and infant clubfoot as containing objective data.

We conclude that

The ponseti method of clubfoot correction has considerably decreased the need for surgery and its attending complication.

The pirani score is useful to grade the initial extent of the deformity and to assess the progress of foot correction.

Our study does not support routine use of radiograph during ponseti cast correction and during follow up. We believe on clinical examination, palpation, and use of radiograph only in unusual cases.

We also recommend use of easily available Steenbeek Foot Abduction Orthosis in the post correction phase which needs careful attention and close follow up to ensure a successful outcome.

## References:


[1]. Dobbs MB, Nunley R, Schoenecker PL. Long term follow-up of patients with clubfeet treated with extensive soft tissue release. JBJS 2006; 88 (A): 986-96.

[2]. Radler C, Manner HM, Suda R, Burghardt R, Herzenberg JE, Ganger R, Grill F. Radiographic evaluation of idiopathic clubfeet undergoning Ponseti 63. Chen RC, Gordon JE, Luhmann SJ, Schoenecker PL, Dobbs MB(2007) A new dynamic foot abduction orthosis for clubfoot treatment. J Pediatr Orthop 27:522–528 treatment. JBJS Am.2007 Jun: 89(6): 1177-83

[3]. Kessler JI (2008) A new flexible brace used in the Ponseti treatment of talipes equinovarus. J Pediatr Orthop B 17:247–250

[4]. Halanski MA, Huang JC, Walsh SJ, Crawford HA (2009) Resource utilization in clubfoot management. Clin Orthop Relat Res 467:1171–1179

[5]. Garg S, Porter K (2009) Improved bracing compliance in children with clubfeet using a dynamic orthosis. J Child Orthop 3:271–276

[6]. Zionts LE, Dietz FR (2010) Bracing following correction of idiopathic clubfoot using the Ponseti method. J Am Acad Orthop Surg 18:486–493


Dr. Umesh Kumar. "Analysis of Radiological Parameters and Pirani Scoring In Management of Idiopathic Clubfeet by Ponseti Method.." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 10, 2018, pp 18-22.