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Role of Ponseti Technique in Late Presenting and Relapsed Idiopathic Congenital Talipes Equinocavo Varus Feets – Our Experience

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ABSTRACT

Objectives: Idiopathic Congenital Talipes Equino Varus (CTEV), commonly referred to as Clubfoot, is a complex musculoskeletal deformity affecting infants. The Ponseti technique, a gold standard approach, has emerged as an effective treatment. This study aims to evaluate the clinical outcomes of ponseti technique in children with idiopathic clubfoot who presents late after 03 months of birth and in relapsed infants up to one year of age.

Methods: A prospective study was conducted at the Department of Orthopaedics, involving 41 feet. Infants with idiopathic clubfoot were included. Infants started on ponseti treatment with serial castings followed by percutaneous tendo Achilles tenotomy corrections were monitored by scoring systems, Paired samples 'T' was applied for statistical analysis. The statistical difference was considered to be significant when $P < 0.05$ and highly significant when $P < 0.001$. Correlation between different parameters was analyzed by Spearman correlation coefficient.

Results: we treated 29 cases (41 feet) of idiopathic clubfoot in children more than three months. Age group classification was: group 1 (3 to 5 months), group 2(6 to 9 months) , group 3 (10 to 12 months) and group 4 (> 12 months). In group 1 mean pre Pirani and Dimeglio scores were higher than group 4, reduction of scores after corrective casting were more statistically significant in group 1 than group 2,3,4. This suggests that the Ponseti technique is effective in older age group but the effectiveness decreases as the age increases.

Conclusion : Thus Ponseti technique safe, effective and can be used as preferred initial treatment for congenital idiopathic clubfoot in patients presenting late, irrespective of age and initial severity , avoiding the need for extensive surgery later.

Keywords: *Clubfoot; Ponseti technique; Percutaneous Achilles tendon tenotomy; Serial casting; dimeglio scoring.*

1. INTRODUCTION

Congenital Idiopathic clubfoot is a variable three-dimensional deformity of a complex system of bones, joints, and their adjacent ligamentous and muscular stabilization systems. It occurs in approximately one in every 1000 births. Etiology and pathological anatomy of congenital idiopathic clubfoot are still controversial. Being one of the most common foot deformities, it may impede the child's development when not treated successfully causing much frustration to the family and physician. It is agreed by most of orthopedic community that initial treatment of congenital idiopathic clubfoot should be conservative, which involves gradual correction of the deformity through gentle manipulations followed by serial casting.[1]

Ponseti Technique in 1948, but it is only recently that he has been given due recognisation.. Ponseti technique is considered as the most successful, in treating congenital clubfoot[2,8]

The Ponseti method is cheap and simple, which makes it especially useful for developing countries like India. If the Ponseti method is done correctly, most clubfeet are corrected within 4-6 casting Sessions.[2]

It's thought that the Ponseti method of treatment should begin as early as possible, Dr. Ponseti and other doctors have treated some babies who were up to a year old successfully, and avoided major surgery on the foot. Most surgeons consider soft release for the treatment of congenital idiopathic clubfoot presenting late and where conservative method is not satisfactory within 3-6 month. However the results of surgical treatment are disappointing after long term follow up, resulting in pain disability, stiffness and weakness leading to premature arthritis of foot.

In developing countries like India large number of children's with Idiopathic clubfoot present late because of negligence by parents or lack of knowledge, and it is a challenge for the orthopedic surgeon to treat such cases. We conducted this study to find out the effect of Ponseti technique in these Untreated late presenting patients.

In present study we are evaluating the effect of Ponseti technique in children's presenting late, recurrent or relapsed clubfoot and those with failed conservative treatment elsewhere.

Objectives:

1. To study the effect of Ponseti technique in treatment of congenital idiopathic clubfoot in patients presenting late after 3 months of age, relapsed clubfoot and failed prier conservative treatment elsewhere.
2. To study the need for secondary surgery in these patients treated by Ponseti technique.
3. To study the presence of short term recurrences after achieving correction in these patients

This is a prospective study conducted in the department of Orthopedics, SDM College of medical sciences, DHARWAD,KARNATAKA India after Obtaining ethical clearance from IEC Ref no :- SDMIEC/0205/2019, from September 2019 to August 2022.

Patients

Patient presenting in clubfoot clinic with classical idiopathic clubfoot, who met the inclusion criteria, were included in the study. In our study we prospectively evaluated 29 children with 41 clubfeet.

Inclusion criteria

Child more than 3 months presenting with

a) Idiopathic clubfoot untreated

b) Patients with relapsed clubfoot

c) Patients with failed prior conservative

Exclusion criteria

1. Non-idiopathic clubfoot
2. Idiopathic clubfoot in infant less than 3 months of age
3. Patient undergone operative treatment prior

Parameters studied

CLINICAL EVALUATION:

- Appearance of ankle and foot
- Passive range of movement (measured by goniometer)
- Foot size and other complications

SCORING FOR SEVERITY

- Pirani scoring system
- Dimeglio scoring system

2. MATERIALS & METHODS

Informed consent was taken from all parents. After inclusion, patients were evaluated clinically and severity was assessed by Pirani and Dimeglio scoring system. Manipulation and casting was done by Ponseti technique. All patients were assessed and followed by single investigator.

The patients underwent weekly manipulation and casting, which was started on the day of first presentation and continued till they achieve correction of cavus, forefoot adduction and varus, no attempt was made to correct equinus, at the end patient was reassessed by clinical and severity scoring system and further treatment is planned by orthopedic surgeon either tenotomy or any other surgical procedure.

The protocol we followed was as described by Ponseti. The last cast (with or without tenotomy) held the foot in 50° to 60° of external rotation and 15°of dorsiflexion which is continued till 3 week. Following which Denis Browne splint was given. And for children in walking age group CTEV shoes were provided. It was advised to wear Denis Brown splint full time for

3 months, followed by application only at night for 2 to 4 years. Denis Brown splint is dynamic splint which holds affected feet in 70° & normal foot in 45° of external rotation and 15° of dorsiflexion

Foot was considered corrected when clinically there is 10 degree dorsiflexion & 45 degree abduction, a neutral or slightly valgus heel, and a straight lateral foot border. Later loss of dorsiflexion, varus of the heel, or dynamic supination was identified as a relapse.

The patients was followed up every month for the first 3 month and every 3 months subsequently to assess range of motion, function and appearance of the ankle and foot, radiological assessment, and for severity scoring.

3. RESULTS

The statistical analysis was done using SPSS software (version 19). Paired samples 'T' was applied for statistical analysis. The statistical difference was considered to be significant when P <0.05 and highly significant when P < 0.001. Correlation between different parameters was analyzed by Spearman correlation coefficient. **Patients and demographic characteristics:**

Table 1: **Patients and demographic characteristics**

Characteristics	value
Total number of patients	29
Total number of feet	41
Gender (n=29)	26 male/3female(ratio 8.3:1)
Feet per gender (n=41)	37 male/4 female
Age in months	Mean- 11.48 (range 3 to 60)
Laterality	12 bilateral /17 unilateral
Side in unilateral cases	7 right/ 10 left

Prior conservative treatment:

In present study 6 patients had prior conservative management in other hospital. Out of these 6 patients, 2 patients were having all components of deformity that is **C**avus, **A**dduction, **V**arus and **E**quinus (CAVE). Two patients were with relapse & four patients were with no prior correction.

Pre-intervention assessment:

We assessed feet clinically and with Pirani & Dimeglio severity scoring system at the time of presentation. Clinical evaluation of 25 patients showed all components of deformity that is cavus, forefoot adduction, heel varus and equinus. Remaining four patients were with 2 or 3 components of deformity, in these four patients there was history of prior conservative treatment. Small size of foot was observed in 2 cases. Two patients were walking on lateral border of foot in these cases callus was noticed on lateral aspect of foot.

Patients were divided in four groups depending upon the age at the time of presentation and evaluated with Pirani and Dimeglio scores in terms of mean, standerd deviation and statistical significance. Group1 - 3 to 5months, Group2- 6 to 9 months, Group3- 10 to 12 and Group4 –more than 12 months. In Group1 Mean Pre-Pirani and Dimeglio scores were high 7 & 13.5 respectively, and mean reduction in score (Pirani score-0.45 Dimeglio 2.95) which statistically more significant than Group4. Group4 patients had low mean Pirani and Dimeglio scores at the time of presentation, 5.8 & 10.2 respectively, which was reduced to 2.3 & 5.2 respectively (P value<0.001). (Table 7 &8)

Table 2: Age wise analysis:

Age in months & Group			Mean	Std. Deviation	Std. Error Mean
3 to 5	Group 1 N=22	Pre-Pirani	7.4773	.56647	.12077
		Post-Pirani	.4545	.37509	.07997
		Pre-Dimeglio	13.5909	1.22121	.26036

		Post-Dimeglio	2.9545	.78542	.16745
6 to 9	Group 2 N=7	Pre-Pirani	6.8571	.62678	.23690
		Post-Pirani	.7857	1.03510	.39123
		Pre-Dimeglio	12.5714	1.61835	.61168
		Post-Dimeglio	3.2857	1.11270	.42056
10 to12	Group 3 N= 7	Pre-Pirani	6.5000	.50000	.18898
		Post-Pirani	.6429	.55635	.21028
		Pre-Dimeglio	12.7143	.95119	.35952
		Post-Dimeglio	2.7143	.48795	.18443
>12	Group 4 N=5	Pre-Pirani	5.8000	.75829	.33912
		Post-Pirani	2.3000	.83666	.37417
		Pre-Dimeglio	10.8000	1.64317	.73485
		Post-Dimeglio	5.2000	1.48324	.66332

None of the patient in our study group required extensive posteromedial release or any major bony procedure. Overall relapse rate was 6.89% (2feet). The reason for the relapse was identified as poor compliance to the use of the brace.

Table 3: **Analysis of result**

	value
No. Of casts applied	Mean-6.90 (Range 5 to 11)
Duration of treatment	9.79 weeks (Range 8 to 14)
No of feet corrected	26 (89.66 %)
No of patients with tenotomy	10 patients (12 feet – 32.43%)
Follow up in months	12.03 (range 6 to 19)
Clinical evaluation(ankle dorsiflexion)	Mean 12.81 (Range 10 to 15 degrees)
No of feet developed Pressure sore	4
Relapse	2 feet (6.89%)
Soft tissue release procedure	TAL*- 2Patient (4 feet) / split TAT** -1

Table 4: Results of treatment depending on initial severity

Severity of clubfoot (Dimeglio)	No. of feet	Feet corrected	Uncorrected feet	No. of casts (mean)	Relapses
Benign(1-4)	-	-	-	-	-
Moderate(5-9)	2(4.88%)	1	1	18 (9)	-
Severe(10-14)	35(85.4%)	31	4	228 (6.51)	2(6.89%)
Very severe(15-20)	4(9.76%)	4	0	37 (12.3)	-

Effect of Prior conservative management on result:

In our study group 6 cases had prior conservative treatment and 23 were new cases without prier treatment. Correction achieved was 100% in patient without prier treatment compared to 44.44% in patient with prior treatment.

Clinical images

Fig 1.(Case No. 20) Serial photographs of the correction of a clubfoot deformity in a 1-year-old child
A & B, At initial visit. **C**, After first cast. **D**, After third cast. **E** , After sixth cast. **F**, at 6 month follow up

Fig 2.(Case No. 16) Serial photographs of the correction of bilateral clubfoot deformity in a 5-month-old infant. A, At initial visit. B, After first cast. C, After second cast. D, After fourth cast. E, After sixth cast. F, At 6 month follow up splint was changed due to increased foot size . F, Dorsiflexion at sixth month follow

Complications during treatment

Few minor complications were encountered during treatment. Four children had a plaster sore on the lateral aspect of the skin overlying the talar head which healed with local dressing within a week. Subsequent manipulation and casting was delayed during this period. However, we don't encounter serious bleeding following tenotomy, wound problems with percutaneus incision or any major complication like rocker bottom foot.

Follow up:

The mean follow up in our study was 12.03 months (range 6 to 19). At 6 month follow up and in last visit the Pirani score & Dimeglio severity score either remained same improved. The mean Pirani score at 6 month follow up was 0.03 (range 0 to 0.5) and mean Dimeglio score was 1.82 (range 1 to 3).

Relapse

Early relapse was noticed in 2 feet at 6 month follow up. In one patient it was forefoot adduction and cavus and in second case it was forefoot adduction only. Cause for relapse was identified as poor compliance to the use of brace. Both cases corrective casts were given. Correction was achieved with application of cast alone and then bracing was continued. Mean no of cast required to treat these relapse were 4.5.

The Ponseti technique for the treatment of congenital idiopathic clubfoot was proposed in 1948, however it has become popular recently over last decade. Several studies have reported the success of Ponseti technique. At present Ponseti method has become a well-established technique for the treatment of clubfoot presenting in the neonatal period. Ponseti has stated that manipulation and casting should be started as soon as possible but he has also shown that it is possible to treat children up to 9 years. Since soft tissue release procedures are often complicated by stiffness and residual or recurrent deformities at long-term follow up, there have been considerable interest in the minimally invasive Ponseti method especially in older children. Studies are being carried out to widen the indication of Ponseti technique e.g. neglected clubfoot, relapsed clubfoot, clubfoot associated with syndromes, relapse after surgery etc. Few studies reported the success of Ponseti technique in patients presenting late.

4. DISCUSSION

The purpose of present study is to evaluate the results of Ponseti method in the treatment of idiopathic congenital talipes equinovarus in older children presenting after 3 months of age and patients with failed prior conservative management.

In present study, we treated 29 cases (41 feet) of idiopathic clubfoot in children more than three months. The mean age at the time of presentation was 11.48 months (range 3 to 60 months), the minimum follow up was 6 months (mean-12.03 month, range 6 to 19 month). Correction was achieved in 87.80% of cases, 33.33% (12 feet in 10 patients) required percutaneous

tendoachilles tenotomy. In all the patients both the Pirani score and Dimeglio severity scores were reduced to statistically significant level P< 0.001. In five feet we got under-correction. Out of these 5 feet, four feet underwent limited posterior soft tissue release procedure in the form of lengthening of Achilles tendon, one foot required split transfer of tibialis anterior to middle cuneiform for dynamic supination. Overall relapse rate was 6.89% (2 feet).

Flynn JM et al[21] ., compared the ten point Pirani scoring system and Dimeglio classification system in the evaluation of clubfeet and found that both had very good interobserver reliability.

Chaudhry S et al[5] ., in his study showed that there was no difference between the Dimeglio and Pirani classification systems when measuring their correlation with the number of casts required for clubfoot correction. Although reliability for both systems has been shown, effectiveness has not. Longer follow-up and larger numbers of patients are necessary to determine if these classifications can identify early the feet that would require surgical treatment and perhaps identify factors that are predictive of recurrence. Both ten point Pirani scoring system and Dimeglio classification system has good interobserver reliability, so we used for assessment of severity in the present study.

In the present study mean Pirani score at the time of initial presentation was 7 with standard deviation of 0.82 (range 5 to 8.5). After corrective casting by Ponseti technique the mean Pirani score was reduced to 0.76 with standard deviation of 0.83 (Range 0 to 3), which was statistically significant (P < 0.001). The mean Pirani score at 6 months follow up was 0.03 (range 0 to 0.5). Most of other studies reported the use of 6 point Pirani scoring system for severity assessment. Mean ankle dorsiflexion after correction was 12.81 degrees (range 10 to 15).

In our study under-correction was achieved in five feet. All were more than 4 years, in these feet mean Pirani and Dimeglio were reduced to statistically significant level but less than the feet with correction. Out of these 5 feet, four feet had persistent equinus which required limited posterior release in the form of TA lengthening. ***Lourenço AF et[14] .,*** retrospectively reviewed 17 children (24 feet) with congenital idiopathic club foot who presented after walking age and had not undergone any previous treatment. A painless plantigrade foot was obtained in 16 feet without the need for extensive soft-tissue release and/or bony procedures. Four patients (7 feet) had recurrent equinus which required a second tenotomy. Failure was observed in five patients (8 feet) who required a posterior release for full correction of the equinus deformity.. ***In our study*** one foot had dynamic supination after corrective casting, which was treated with split transfer of tibialis anterior to middle cuneiform. Postoperatively CTEV shoe was given. At one year follow up after surgery correction was maintained. None of the patient in our study group required repeat tenotomy, extensive posteromedial release or any major bony procedure.

In present study, we treated 29 cases (41 feet) of idiopathic clubfoot in children more than three months. Age group classification was: group 1 (3 to 5 months), group 2(6 to 9 months) , group 3 (10 to 12 months) and group 4 (> 12 months). In group 1 mean pre Pirani and Dimeglio scores were higher than group 4, reduction of scores after corrective casting were more statistically significant in group 1 than group 2,3,4. This suggests that the Ponseti technique is effective in older age group but the effectiveness decreases as the age increases.

Complications that can occur during treatment by Ponseti technique are pressure sore on talar head, rocker bottom foot, bleeding complication due to tenotomy etc.

POP complication like plaster sore is likely to occur due to subcutaneous prominent talar head and which can be prevented by proper molding. ***In present study***, plaster sore was noticed on skin overlying the talar head in four children, all this cases had rigid clubfeet. Plaster sore healed with local dressing within a week. We avoided cast application during this period. However, major complications like serious bleeding following tenotomy or rocker bottom foot were not encountered.

Early recognition and appropriate treatment of recurrent deformity (relapse) is an important component of the Ponseti technique of clubfoot correction. After correction of a clubfoot deformity by the Ponseti technique, relapse usually involves equinus and varus of the hindfoot. Cavus and adductus rarely recur to a clinically significant degree. Clubfoot recurs most frequently and quickly while the foot is rapidly growing-during the first several years of life. Recurrence of deformity is likely, even after complete correction with the Ponseti technique, if appropriate bracing is not used. ***Verma A et al[17].,*** in his study reported relapse rate was 12.7%, out of which 4 required split transfer of tibialis anterior for dynamic supination, three patients required repeat tenotomy. ***Changulani M et al*** [16] in his study reported relapse rate of 32% (31 feet), 16 of which were successfully treated by repeat casting and/or tenotomy or tendon transfer of tibialis anterior, the remaining 15 patients required extensive soft-tissue release.

In present study relapse rate was 6.89% (2 feet) at 6 months follow up. The components of deformity relapsed were cavus and forefoot adduction instead of equinus which is common. The reason for the relapse in both cases was identified as poor compliance to the use of the brace. Both these feet underwent repeat corrective casting. Correction was achieved with corrective cast only without need of any surgery. Overall compliance to bracing protocol was good in our study group which may be the reason for low relapse rate. All other studies reported the higher relapse rate due to poor compliance to the use of brace at long term follow-up. The duration of follow up was less 12 months in our study which may also be the reason for low relapse rate. Long follow-up is needed to find out the relapse, as it is known to occur till 5 years of age.

Limitations

Small sample size

Retrospective nature of study

Uniformity of subjects

5. CONCLUSION

The present study has shown that Ponseti technique for idiopathic clubfoot is effective in treating children more than 3 months of age, relapsed cases and patients presenting after failed prior conservative management, avoiding need of extensive surgery. But the effectiveness of Ponseti technique reduces with increasing age

Thus Ponseti technique safe, effective and can be used as preferred initial treatment for congenital idiopathic clubfoot in patients presenting late, irrespective of age and initial severity , avoiding the need for extensive surgery later.

REFERENCES

[1] Morcuende JA, Dolan LA, Dietz FR, Ponseti IV. Radical reduction in the rate of extensive corrective surgery for clubfoot using the Ponseti method. Pediatrics. 2004 Feb; 113(2):376-80.

[2] Congenital Clubfoot: Fundamentals of Treatment by Ignacio V. Ponseti Publisher: Oxford University Press; 1st edition (January 15, 1996)

[3] Segav E, Keret D lokiec F. Early Experience with the Ponseti Method for the treatment of congenital idiopathic clubfoot. Isr Med Assoc J 2005; 7:307-310.

[4] Goksan S B, Bursali A, Bilgili. Ponseti technique for the correction of idiopathic clubfoot presenting up to 1 year of age. A preliminary study in children with untreated or complex deformities. Arch Orthop Trauma surg 2006; 126: 15-26.

[5] Chaudhry S, Chu A, Labar AS, Sala DA, van Bosse HJ, Lehman WB. Progression of idiopathic clubfoot correction using the Ponseti method. J Pediatr Orthop B. 2011 Apr 27.

[6] Gaston Terrazas-Lafargue, M.D., and Jose A. Morcuende. Effect of Cast Removal Timing in the Correction of Idiopathic Clubfoot by the Ponseti Method; Iowa Orthop J. 2007; 27: 24–27

[7] Shawne Faulks RN, MSN, CNS, B. Stephens Richards MD. Clubfoot Treatment Ponseti and French Functional Methods are Equally Effective. Clin Orthop Relat Res (2009) 467:1278–1282.

[8] Ashish Anand and Debra A Sala. Clubfoot: Etiology and treatment; Indian J Orthop. 2008 Jan-Mar; 42(1): 22–28.

[9] Porter RW. Congenital talipes equinovarus: Resolving and resistant deformities. J Bone Joint Surg Br. 1987;69:822–5.

[10] Feldbrin Z, Gilai AN. Muscle imbalance in the aetiology of idiopathic club foot. An electromyographic study. J Bone Joint Surg Br. 1995 Jul;77(4):596-601.

[11] Turco VJ. Clubfoot. New York: Churchill Livingstone; 1981.

[12] Lehman WB. The clubfoot. New York: JB Lippincott; 1996.

[13] Adams W. Clubfoot: Its causes, pathology and treatment. London: J and A Churchill; 1866.

[14] Adams W, Brockman EP. Congenital clubfoot. Bristol: John Wright and Sons; 1930.

[15] Johnston CE, Hobatho MC. Three-dimensional analysis of clubfoot deformity by computed tomography. J Pediatr Orthop B. 1995;4(1):39-48.

[16] Changulani M, Garg NK, Rajagopal TS, Bass A, Nayagam SN, Sampath J, Bruce CE. Treatment of idiopathic club foot using the Ponseti method. Initial experience. J Bone Joint Surg Br. 2006 Oct; 88(10):1385-7.

[17] Verma A, Mehtani A. Management of idiopathic clubfoot in toddlers by Ponseti's method. J Pediatr Orthop B. 2011 Jun 9.

[18] Ignacio V. Ponseti. Current Concepts Review Treatment of Congenital Club Foot. J. Bone and Joint Surg., 74-A, No. 3. March; 449-452.

[19] Chotel F, Parot R, Seringe R, Berard J, Wicart P. Comparative study: Ponseti method versus French physiotherapy for initial treatment of idiopathic clubfoot deformity. J Pediatr Orthop. 2011 Apr-May;31(3):320-5.

[20] Yagmurlu MF, Ermis MN, Akdeniz HE, Kesin E, Karakas ES. Ponseti management of clubfoot after walking age. Pediatr Int. 2011 Feb;53(1):85-9.

[21] Flynn JM, Donohoe M, Mackenzie WG. An independent assessment of two clubfoot-classification systems. J Pediatr Orthop. 1998 May-Jun;18(3):323-7.

[22] Rijal R, Shrestha BP, Singh GK, Singh M, Nepal P, Khanal GP, Rai P. Comparison of Ponseti and Kite's method of treatment for idiopathic clubfoot. Indian J Orthop. 2010 ;44(2):202-7.

[23] Parada 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 ;29(8):916-9.

[24] Park SS, Kim SW, Jung BS, Lee HS, Kim JS. Selective soft-tissue release for recurrent or residual deformity after conservative treatment of idiopathic clubfoot. J Bone Joint Surg Br. 2009;91(11):1526-30.

[25] Chomiak J, Frydrychová M, Ostádal M, Matejícek M.. The Ponseti method of treatment of congenital clubfoot--first experiences. Acta Chir Orthop Traumatol Cech. 2009 ;76(3):194-201.

[26] Wijayasinghe SR, Abeysekera WY, Dharmaratne TS. Descriptive epidemiology of congenital clubfoot deformity in Sri Lanka. *J Coll Physicians Surg Pak*. 2018;28:166-8.

[27] Bozkurt C, Sipahioglu S. Effects of younger siblings on the brace compliance and recurrence in children with clubfoot during Ponseti treatment. *Acta Orthop Traumatol Turc*. 2021;55:102-6.

[28] Ishizuka T, Hung YY, Weintraub MR, Kaiser SP, Williams ML. Ponseti idiopathic and nonidiopathic clubfoot correction with secondary surgeries. *J Foot Ankle Surg*. 2021;60:742-6.

[29] Janatová K, Nováková T, Lopot F. The incidence of clubfoot in the Czech republic: A nationwide epidemiological study from 2000 to 2014. *Children (Basel)*. 2023;10:714.

[30] garwal A, Rastogi A, Rastogi P. Relapses in clubfoot treated with Ponseti technique and standard bracing protocol-a systematic analysis. *J Clin Orthop Trauma*. 2021;18:199-204.