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Newer modified technique for treatment of idiopathic clubfoot deformity with combination of modified ponseti casting and posterior, posteromedial soft tissue release in 6 month to 5 year age group children

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Abstract
Specific Objectives: Congenital talipes Equinovarus (clubfoot) is one of the most common foot Anomalies which can be treated by serial casting technique with high rate of success. Surgery is indicated for deformities that do not respond to conservative treatment or the patients that seek medical intervention too late or neglected by family without medical treatment.
In our study, we reviewed the result of our newer modified technique for treatment of idiopathic clubfoot deformity with combination of modified ponseti casting and posteromedial soft tissue release in 6 month to 5year age group children.
Material and methods: Between May 2015 to May 2016, we treated twenty (20) feet with idiopathic CTEV in sixteen (16) children who were between 6 month to 5year age-group who were evaluated by Pirani scoring system before and after our newer modified technique for treatment of idiopathic clubfoot deformity. All the feet were given a trial of serial manipulation and cast application with 15 days interval with 4 to 5 number of CTEV cast then postero-medial soft tissue release was done with single incision and full correction achieved. Sutures were removed after 15 days followed by manipulation and cast application. postoperative cast immobilisation continue for 2 months in over corrected position or age more than 9 month old children given walking modified fibre CTEV cast and mobilisation with 'Babagadi' for 2 month in over corrected position. Our modified walking fibre CTEV cast change in 15 day interval with corrected position and mobilisation done atleast for 2 -3 month then we were made CTEV over corrected specialized shoes in which we were adviced. Patient to walk with CTEV shoes in day time and rest of night sleeping time. At the end of 6 and 12 months all feet were evaluated according to pirani Scoring system.
Results: All 20 feets were treated between 6 month to 60 months age-group children with mean age of 28months. Postoperatively the patients were followed up for a minimum of 6 month to maximum 18 months with mean of 12months. Post operative evaluation was done according to total score obtained by pirani scoring system. According to this 14 feet evaluated as pirani score 5.5, 4 feet b/w 5.5 to 4.5, 2 feet b/w 4 – 4.5. NO any patients had residual deformity, no any patients had relapse.
Conclusion: The timing of surgery did not change the final outcome considerably below 5 years of age in clubfeet. With our new modified technique for treatment of idiopathic clubfoot deformity with combination of modified ponseti casting and postero-medial soft-tissue release in 6 month to 5year age-group children. 95 percent of cases had excellent to good results. In our modified technique had chances of relepse and retained residual deformity are less. Relepses did not occur in one and half year follow up period. Our new technique had better functional outcome with faster recovery to other mode of treatment.

Keywords: Congenital talipes equinovarus, newer modified technique with combination of modified ponseti casting and posterior, postero medial soft tissue release

Introduction
Idiopathic congenital talipes equinovarus (clubfoot) is a common complex deformity that occurs in approximately one or two per 1000 newborns [1]. The long-term goal of treatment is a functional, pain-free, plantigrade foot with good mobility, without calluses and walking with comfortably with nomal shoes [2, 3]. Treatment of congenital talipes equinorvarus (clubfoot) begins as soon as possible with serial casting techniques [4] with 20-95% of success rate [5]. However in case of failure of serial casting or reoccurence, or in whom parents seek medical

intervention too late, surgical treatment can be performed. There are different types of surgical procedures according to the remaining deformities ranging from simple posterior release and tendon transfer to extensive procedures like postero-medial release and complete subtalar release [7]. Theoretically, as the child becomes older, soft tissues become more contracted and difficult to be a corrected because of long-standing deformity and secondary contractures. Turco[8] reported that the best results from the surgical treatment of congenital clubfoot were obtained in children operated on between ages of one and two year and the thereafter the number of the excellent result diminished as the age at operation increased. Hence this our study reviewed the result of clubfoot treated by modified technique with combination of modified ponseti casting and posterior, postero-medical soft tissue release in 6 month to 5year age-group children.

Materials and Methods

This study was conducted in the department of orthopaedic surgery, Baroda Medical College, Vadodara with twenty (20) feet with idiopathic congenital talipes Equinovarus (CTEV) in sixteen (16) children who were evaluated and operated below the age of 5 years between May 2015 to May 2016.

Exclusion criteria: The exclusion criteria were clubfoot secondary to some other disorders such as cerebral palsy, arthrogryposis multiplex congenital, myelodysplasia or congenital dislocation of the hip.

Incursion criteria: Idiopathic, Age group: Birth upto 5 year.

All the feet were given a trial of serial manipulation and cast application till the deformities were no more correctable. At the end of all feet was clinically re-examined and following criteria.

Grade –I: (Supple feet) – where the deformity of the feet could be passively corrected to near normal.

Grade –II: (rigid feet) – where the deformity could only be corrected partially and passive correction offered resistance.

Grade –III: (rigid feet) where the deformity could not be corrected at all and offered marked resistance.

Now pt were plan for operative technique for posterior and postero-medical soft tissue release by one single incision and single sitting.

Operative Technique

The skin was incised horizontally from the base of the first metatarsal to the lateral side of tendo achilles which was lengthened, as were the tendons of tibialis posteior, flexor hallucis longus & flexor digitorum longus using a z-technique. The posterior tibial neurovascular bundle identified & isolated along the entire length of incision. The posterior talofibular & calcaneofibular ligaments, the posterior third of deep deltoid ligament, the superficial deltoid & the talocalcaneal interosseous ligament, the spring ligament & the Y ligament ware all divided. Complete release by capsulotomies of ankle, subtalar, talonavicular & first tarsometatarsal joints until mobilization of the ankle, hind foot & mid foot was obtained. In all cases, irrespective of the presence of cavus deformity, a planter fascia release was performed near its origin flexor digitorum brevis & hallux abducter muscle were also release from their proximal insertion to allow forefoot correction. The ankle joint & subtalar joint, posterior capsule release was necessary to correct hindfoot equinus. Z-plasty done over tendo achillis according to the severity of equines deformity Suture were removed after 15 days followed by manipulation & cast application. Patients were followed post operatively at 15 days regular interval. Post operatively above knee fibre cast immobilization continued for 2 months in an over corrected position with "babagadi" or patient himself.

Mobilisation with modified above knee fibre cast allows tarsal bone to be realigned, After that corrective CTEV shoes were given at the age of 11-12 months in corrective position. At the age of 6 & 12 months all the feet were re-examined & evaluated according to pirani scoring system.

Clinical Assessment

Pirani Scoring

The Pirani score is a simple, easy to use tool for assessing the severity of each of the components of a clubfoot. It is extremely useful for assessing the severity of the clubfoot at presentation and for monitoring patients' progress. The Pirani score should be recorded at each visit the patient makes. If the Pirani score increases from one visit to the next it may indicate that a relapse of deformity is occurring. Information on how to manage relapse can be found here.

The components are scored as follows:

Pirani Scoring

Each component may score 0, 0.5 or 1

*Hind foot contracture score (HCFS)

1. Posterior crease
2. Empty heel
3. Rigid equinus

*Mid foot contracture score (MFCS):

1. Medial crease
2. Curvature of lateral border
3. Position of head of talus

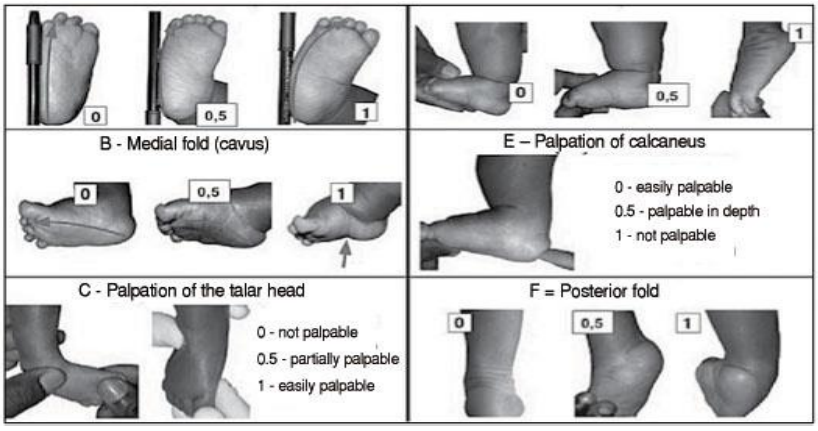

Fig: Pirani's Classification for CC. Source: Pirani and Naddumba[110].

Clinical Image

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">before Treatment Images</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>After Operation</td><td>1 month After Operation modified ctev fibre ctev above knee cast</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Walking modified ctev fibre ctev above knee cast</td><td>Walking with babagadi</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>After Treatment Image</td><td>After Treatment Image</td></tr>
</table>

Result

Functional results in 20 feet using Pirani scoring system

Result pirani score	with treated by our modified technique	result
5.5 to 6	14	excellent
5.5 to 4.5	4	good
4.5 to 4	2	average

- No residual deformity was appreciated clinically in (18) feet. two feet have residual deformity in single child. Among the residual deformities, fore foot adduction was there.
- All feet were considered to have the normal range of ankle movement and subtalar movement.
- A normal event or power was observed is every feet
- NO one child had gait abnormality and limping.
- All feet except two feet showed excellent results following this procedure.

Discussion

Clubfoot or congenital talipes equinovarus is a complex deformity of foot whose etiopathogenesis remains poorly understood. The effect of the deformity on the social & physical life of the patients & their parents cannot be overemphasized. The management of this deformity had been puzzle for treating doctors for centuries. The ponseti method

of correction of clubfoot deformity has recently acquired the status of first line management. Our modified techniqueis combination of ponseti & Turco posterior & postero-medical soft tissue release. This study demonstrate effective uses of manpower &guided motivation to indentify the case & correction of the deformity in all the cases with use of our modified technique.

Our study obtained good results after post- operative modified above knee fibre cast for minimum period of 2 months with walking by patient himself or with "babagadi". This mobilisation allows the tarsal bone to realign. Poor results were seen in those children who repeatedly broke or soiled the cast during this mobilisation period. so in our study we were use fibre cast. All had rigid deformity. Postero-medical release was done at the age of 9 month. All tight structures were released & foot correction was obtained. Difficulty has been faced in maintaining the correction following surgery. These patients broked, soiled & loosened plaster castrepeatedly. Ctev corrective shoes were given earlier at age of 12 months to maintain the correction. After 6 month & 12 months follow up. No deformity was found.

Incidence of residual forefoot adduction deformity was seen in only 2 patients.

No complications like.

- Soft tissue infection
- Subtalar Arthrodesis
- Recurrence of residually deformity
- Reoperation etc.

Seen in our study. 95% good & excellent result in patient treated by our modified technique has been seen.

Conclusion

The combination of ponseti & turco posterior & posteromedial soft fissue release method of clubfoot treatment is an excellent method as per our study.

Our modified technique gives a painless, mobile, normal looking, functional foot which requires special corrective shoes & allows good mobility. Results of the clubfoot treatment by our modified technique in our study had been good & rewarding & now all the clubfoot are treated in our institution by this technique only. In a developing country like india, where poverty & ignorance still have a day. A death of proper operative facilities in remote area. this modified technique is a very safe, easy, result-oriented, economical method for clubfoot management.

Proper motivation & persuading the parents to accept long term corrective shoes treatment helps to maintain the correction over a longer period of time & prevent relapse.

Our study also observed that delay in presentation doesn' t lead to increase in the duration of treatment and discomfort. Earlier the child presents, easier & sooner it is to correct the deformity. Only 3 out of 5 children presented us early. This signifies the level of ignorance in our country & the deficiency of good referral centers. We feel that by proper education & motivation along with integration into a government program like pulse polio, may improve the outcome not only in terms of degree of deformity, correction but also duration of the treatment.

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