



IS TENOTOMY NEEDED IN ALL CLUB FEET PATIENTS TREATED BY PONSETI METHOD

Orthopaedics

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ABSTRACT

Tendo achillis tenotomy in management of clubfoot using ponseti method is proven but is tenotomy is needed in all patients The aim of this study was to determine the factors which help in predicting the need for tenotomy in Ponseti method of clubfoot treatment. **Materials and Methods:** 183 cases with 266 clubfeet were assessed at presentation based on pirani score and Ponseti method was followed and Tenotomy was performed in 218 of the 266 clubfeet (81.95 %). **Result:** Need for tenotomy was significantly increased in atypical club feet (100% of atypical clubfeet) and 202 clubfeet which were having high pirani score at presentation (98.01% of cases with a Pirani score ≥ 5). Hind foot contracture also correlated with increased need for tenotomy (76.14% clubfeet with hind foot score > 2). Pirani scoring done following removal of last cast showed a score between 0 to 1, with a median score of 0.5 **Conclusion:** Clubfoot can be successfully treated with Ponseti technique by serial casting but Tenotomy is not must in all cases if 75 degrees of abduction and 15 degree of dorsiflexion were achieved then also not needed. Severity of the deformity at presentation, especially the hindfoot contracture along with the atypical clubfoot and late presentation of cases ie more than one month of age can predict the need for tenotomy and those with hind foot score more than 2 at presentation.

KEYWORDS

Casting, clubfoot, Ponseti, tendo Achilles

INTRODUCTION

Clubfoot is one of the most common congenital deformities and manipulation and casting were mentioned by kite¹, Ponseti and Smoley² but Ponseti corrected the Kite's technique in following ways First, the use of the calcaneocuboid joint as the fulcrum which blocks the abduction of the calcaneus and thereby prevents eversion of the calcaneus. Second, pronation of the forefoot to correct the cavus actually worsens the cavus. In Ponseti's technique, the first two casts are applied with the forefoot supinated so as to bring it into alignment with the hindfoot. The third cast is applied with the forefoot abducted and simultaneous counter pressure over the head of the talus. In the fourth cast, the forefoot is further abducted. Before the fifth cast, the degree of dorsiflexion is assessed, and if dorsiflexion is not possible beyond neutral, then a percutaneous Achilles tenotomy is required³. Following the removal of the last cast, is placed in a foot abduction brace, which is used for 23 h a day in the initial 3 months and then subsequently for night time for 3 years⁴. According to Ponseti, an Achilles tenotomy is required in 70% of the cases⁵.

The purpose of this study was to study the need for tenotomy in the Ponseti method of correction in all cases of clubfoot based on the severity of the deformities. We assessed the deformities of the clubfoot using the pirani scoring system⁶.

MATERIALS AND METHODS

183 patients presented to Thanjavur medical college and hospital during January 2017 to January 2020 with a total of 266 clubfeet were studied. All the feet were initially assessed according to Pirani scoring system [Figure 1] and treated with serial casting according to Ponseti technique at weekly intervals. Scoring was done at each subsequent visit, before application of the cast [Figure 2].

The Pirani system registers the deformity of six different components of the clubfoot. These are divided into midfoot components and the hind foot components and the scale is from 0 to 6 points, with 6 representing the most severe deformity.

Ponseti method of correction was performed in all cases^{7,8}. Feet were gently manipulated before cast application and then placed in toe-to-groin plaster casts with the knee flexed 90°. The first cast was applied with the forefoot in increased supination and the first ray elevated to correct the cavus deformity. Subsequent casts were then applied while gently abducting the forefoot, navicular, and cuboid around the talus, allowing correction of the adductus as well as the heel varus. Casts were applied at weekly intervals until the adductus and heel varus were corrected. The final cast was applied with the foot with minimum 15° of dorsiflexion. With foot in 75 degree of abduction. A percutaneous Achilles tenotomy was performed if the foot could not be

dorsiflexed to 15° and 75 degree of abduction was achieved before application of the final cast.

Figure 1 -2 (70 degree of abduction and 15 degree of dorsiflexion was achieved so tenotomy not performed for this baby)



Surgical technique

Tenotomy was done in the operation theater under local anesthesia as opd basis and in general anaesthesia in patients older than one year. While an assistant was holding the foot in a position of maximal dorsiflexion, the posterior ankle was then prepped with betadine solution. Using a 15 size blade, a subcutaneous tenotomy was performed, completely transecting the tendon about 1cm above its insertion and allowing at least 15° of dorsiflexion. (figure 3)

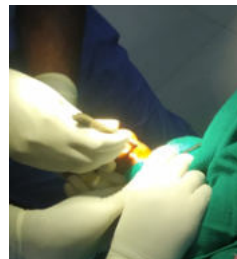


figure 3

A sterile gauze pad was then placed over the incision, and the final cast was applied with the foot in maximum dorsiflexion available and with 70 degrees of abduction.

RESULTS

A total of 183 cases with 266 clubfeet were studied. Of these 121 were male babies and 62 were female. In 2007, Haft, Walker and Crawford

also reported that 65% of their patients were male¹². Age at which treatment was begun ranged from the 2nd day of birth to 24 months. The 137 babies (74.86%) (185 clubfeet) presented before 1 month of age, of which 121 babies were within the first 2 weeks of birth, whereas the remaining babies (81 clubfeet) presented between 1 month to 24 months.

At initial presentation, 202 of the 266 clubfeet had a score of ≥ 5.0 , 35 clubfeet had a score between 3 and 4.5 and the remaining clubfeet had a score of ≤ 2.5 . The number of casts required for correction ranged from 4 to 13, 245 clubfeet required between 4 and 6 casts. 21 clubfeet required 7-13 casts. Tenotomy was performed in 218 of the 266 clubfeet (81.95%). Among the 202 clubfeet with an initial Pirani score of 5 or more, 198 required tenotomy (98.01%), while 14 of the 35 clubfeet (40%) requiring tenotomy had a score between 3 and 4.5. Clubfeet with a score below 2.5 at presentation required tenotomy in 6 of the 37 feet (16.21%) [Table 1].

In the Pirani scoring system, the relation between hindfoot score and the need for tenotomy was separately correlated. Among the 48 clubfeet with a hindfoot score of 1.5 or less (table 3) and in those patients 75 degree of abduction and 15 degrees of dorsiflexion were achieved so there was no need for tenotomy.

Clubfeet that required more than or equal to 6 casts required tenotomy in all cases, i.e. 21 of the 21 cases. Only 82.04% of clubfeet which required <7 casts needed tenotomy, i.e. 201 of the 245 clubfeet [Table 2]. Of the clubfeet presenting before 2 months, required tenotomy (82%). All clubfeet presenting after 2 months of age required tenotomy (100%).

Table 1: Requirement of tenotomy based on Pirani score at initial evaluation		
Pirani score	No tenotomy (%)	Require tenotomy (%)
0-2.5	31(83.7%)	6(16.21%)
3-4.5	21(60%)	14(40%)
5-6	4(1.98%)	198(98.01%)

Table 2: Requirement of tenotomy based on no. of casts required		
No. of casts	Tenotomy (%)	No tenotomy (%)
4-6	201 (82.04%)	44(17.95%)
7-13	21 (100%)	0(0%)
Initial Pirani score	Mid foot score	Hindfoot score
0-1.5	36	12
2-3	52	166

Table 3

At the end of casting correction achieved was similar in both requiring and not requiring tenotomy. Pirani scoring done following removal of the last cast showed a score between 0 and 0.5, with a median score of 0.5 in atypical cases.

DISCUSSION

The Ponseti technique for the treatment of idiopathic clubfoot has been shown to be very effective.[9] Achilles tendon tenotomy is an integral part of Ponseti's technique for the treatment of clubfeet. The indication for tenotomy has been clearly described and is reported to be necessary in approximately 70–80% of patients^{7,10,11}.

In this study, tenotomy was done in 81.95 % of cases. We found that a significant percentage of cases with severely deformed feet required tenotomy. Clubfeet, with pirani score scored 5.0 or more had a significantly increased need for tenotomy than lesser scores. In this system, the hindfoot scoring component, specifically, showed correlation with the need for tenotomy, where clubfeet with a score of 2–3 required tenotomy in a significantly greater percentage. This is probably because of the severity of the equinus being included in the hindfoot score. The components of the hindfoot score reflect the severity of hindfoot contracture.

The rigidity of the clubfeet was reflected in the number of casts required to correct the deformity. Those cases where more than 6 casts were required showed significantly greater need for tenotomy. We observed that atypical club feet and recurrent clubfeet and resistant club feet were more rigid, requiring more number of casts and tenotomy.

In this study, we found that The need for tenotomy is not must in all cases. Parents can be reassured that the need for tenotomy does not mean a worse outcome at the end of casting.

CONCLUSION

We conclude that clubfoot can be successfully treated with Ponseti technique by serial casting and Tenotomy is not must in all cases and if 75 degrees of abduction and 15 degree of dorsiflexion were achieved then also not needed. Severity of the deformity at presentation, especially the hindfoot contracture and atypical clubfoot with older age of presentation i.e. more than one month of age, can predict the need for tenotomy. Both cases requiring tenotomy and those not requiring are well corrected at the end of casting.

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Conflicts of interest

There are no conflicts of interest

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