



## HYBRID RELEASE FOR THE NEGLECTED, RELAPSED AND RESISTANT CLUBFOOT.

### Orthopedics

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### ABSTRACT

**Background-** Neglected, relapsed and resistant clubfoot is always difficult to manage with the Ponseti technique alone. So we use a new hybrid technique to correct these clubfeet and at the same time keeping the complications of a surgery to a minimum.

**Materials and methods-** in 25 children with clubfoot (15 unilateral and 10 bilateral) are treated with this method. The 3 week post operative Pirani Scores are assessed.

**Result-** the results were excellent in 22.9% cases, good in 62.9% cases, and fair in 14.2% cases. Only 1 case had residual deformity at the age of 1 year. The hybrid release is an effective and safe procedure to be used for neglected, relapsed and resistant clubfeet with good to excellent outcomes.

### KEYWORDS

Neglected clubfoot, Hybrid release, Ponseti

**Introduction-** Idiopathic clubfoot in infants can be easily managed with a lot of methods. Among the non-operative ones the Ponseti<sup>1</sup> technique is the most prevalent and effective<sup>2</sup> but it too requires a long follow-up and compliance from the parents. In case of neglected, relapsed and resistant clubfoot Ponseti cast method is not very useful, and the conventional surgeries have a number of complications such as wound dehiscence, cast soiling and breakage due to dressing through the window leading to further infection and deformity recurrence<sup>(3,6)</sup> Specially in a subtropical country like India.

So we use a hybrid technique for the management of neglected, relapsed and resistant clubfoot. In our technique we use percutaneous release of flexor hallucis longus and the Tendo-Achilles. A limited single surgical incision is given on the medial side which is a modification of NC Carroll's technique<sup>3,4</sup> (no flap is raised) thus reducing the complications of an extensive incisions like the Cincinnati incision<sup>7</sup> and Carroll's technique<sup>3,4</sup>. This procedure is simple and easy to learn, quick and recommended for clubfoot surgery.

**Material and methods-** There are 25 children treated with the hybrid release technique, of age 1 month to 1 year (avg age 4months). A short history with clinical examination of spine and foot was done. Males-12 females-13 with bilateral involvement in 10. All these feet had moderate type of deformity as assessed by Pirani scoring<sup>8</sup> system. A foot with Pirani score as modified by Flynn<sup>9</sup> et al, less than 2.5 which gets corrected by weekly Ponseti casting was considered as mild. A foot was considered to be having moderate deformity when the child had a Pirani score between 2.5 and 5. These feet did not get corrected fully with weekly Ponseti casting or recurred in a few weeks' time due to poor parent compliance, ignorance, illiteracy. A foot was said to be having a severe deformity if the Pirani score was more than 5. Moderate and severe clubfoot can be treated with this procedure at the time of fresh presentation as well as in neglected, relapsed, resistant clubfoot.

**Procedure-** The surgery was done under short General anaesthesia with the patient in supine position. A thigh tourniquet is used. Knee is kept extended and foot in dorsiflexion as much as possible so that ligaments become taut.

First the percutaneous release is done. With the help of 11.no blade directly reach up to the plantar fascia origin and release it for the correction of cavus, as in Steindler technique<sup>10</sup>. Then percutaneous tendo-achilles release is done by multiple partial three level tenotomy with foot in complete dorsiflexion. Then the great toe was assessed in full dorsiflexion of foot and if found to be taut, then flexor hallucis longus is percutaneously released at the level of proximal crease of metatarsophalangeal joint on the plantar aspect, described by Mittal<sup>11</sup> et al. Next is the medial incision.

Medial incision- the incision is started 1cm behind and above the medial malleolus along its posterior border and is curved down to the middle of the first metatarsal. After identifying upper border of abductor hallucis muscle (AH), it is retracted down. The dissection is

done straight down to the deep fascia, so as to avoid superficial dissection and jeopardize the vascularity of flaps raised. Behind the medial malleolus and the sheath of tibialis posterior (TP), the adjoining flexor digitorum longus (FDL) tendon is identified. This is made easy by the fact that the TP tendon is 3 times thicker than the FDL tendon. The superficial part of the deltoid ligament and the spring ligament is cut and followed down to the navicular tuberosity and all its insertions are excised. The proximal cut end of TP is sutured to the tendon of FDL, and can be used in future as a motor unit for tendon transfer<sup>12,13</sup>. Capsulotomy of talonavicular, naviculocuneiform and cuneiform- first metatarsal joint is done. If necessary, Z plasty of FDL tendon is done to avoid clawed toe. The tendinous portion of abductor hallucis is cut and reduction of navicular is confirmed.

The correction was assessed on the table with regards to cavus and equinus, if necessary 2 smooth 2mm K-wires were inserted to maintain the equinus and forefoot adduction, as in Turco's<sup>14</sup> method. Above knee Ponseti cast for 3 weeks is applied in over corrected position. After 3 weeks the cast is removed and CTEV splint was applied. In case where K wires were inserted, they are removed at 3 weeks and cast is again applied for 3 more weeks. Followed by regular stretching exercises.



Fig.1 pre operative status



fig.2 the tendo-achilles release points



fig.3 the plantar fascia and FHL release poin



Fig.4 the medial surgical incision



Fig.5 post closure of the medial incision



Fig.6 bilateral clubfoot treated with hybrid release after 3 weeks in an 8 moth old infant.

**Results-** There were 25 children (avg age-4 months), with deformities in total 35 feet, who were operated upon with this hybrid release technique. On comparing the pre and post-operative pirani<sup>8</sup> scores of these patients we observed a significant reduction in the deformity. On

follow-up we had excellent results in 8 feet (22.9%) (postoperative Pirani score <0.5), good results in 22 feet (62.9%) (post-operative Pirani score <1.5), and fair results in 5 feet (14.2%) (postoperative Pirani score <2). Only 1 feet had residual forefoot adduction at the end of 1 year.

Pirani Score	Pre-OP	Post-OP
0-0.5	0	8
0.5-1.5	0	22
1.5-2	0	5
2-3.5	2	0
3.5-5	15	0
5-6	18	0
Total	35	35

**Table.1 assessment of foot correction by pre and post-operative Pirani scores.**

**Discussion-** Ponseti<sup>1</sup> technique is a worldwide followed technique for clubfoot correction but it comes with its share of drawbacks like improper compliance, ineffective in resistant and relapsed clubfoot. On the other hand, the Turco's<sup>12</sup> and Cincinnati's<sup>7</sup> incisions have their complications like wound dehiscence, multiple casting and infections. Our method here gets the same result without the above problems. There is no vascular compromise hence no wound dehiscence or extensive fibrosis what so ever, due to presence of only one incision.

We recommend this hybrid technique for the correction of relapsed, recurrent, neglected clubfoot because there are no wound complications nor any residual deformity.

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