OUTCOME OF CLUB FEET IN AGE MORE THAN TWO YEAR OPERATED BY TIBIALIS POSTERIOR TRANSFER

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INTRODUCTION:

The clubfoot is the most common congenital orthopaedic condition requiring intensive treatment. As the clubfoot most likely represents a congenital dysplasia, treatment of idiopathic true clubfoot can never produce a normal extremity.

The basic objectives of treatment of clubfoot are:

i) To correct abnormal tarsal relation.

ii) To maintain the reduction

iii) To establish muscle balance between evertors and invertors, dorsiflexors and plantar flexors.

iv) To provide mobile foot with normal function and weight bearing

Initial treatment of CTEV, is always mainly by nonoperative means of corrective manipulation, strapping, serial cast application and splitting. After a period of serial casting, if deformity persists or resists correction soft tissue surgical release is indicated.
The rationale for soft tissue release is that realignment of the talus, calcaneum and navicular allows remodelling of the articular surfaces to occur. The first surgical procedure has to be done to achieve complete correction.

A variety of surgical procedures and techniques have been described to achieve the goal of complete anatomic restoration. The first description of a radical approach was published by Codivilla (1906). The one stage posteromedial release described by Turco (1971) has been the standard procedure in many centres; complete subtalar release was described by Mckay and Simons (1983). Carroll used two separate incisions, a curvilinear medial and a posterolateral incision to allow adequate exposure for lateral, posterior, plantar and medial release.

**Epidemiology:**

Congenital clubfoot (talipes equinovarusadductus) is one of the commonest congenital deformities of the lower limb. The incidence is estimated at between 1 in 700-1000 live births in the USA and Western Europe. A higher incidence is found in the Polynesians and a lower in the Chinese. Boys are affected twice as often as girls. Almost half the cases are bilateral.
Pathogenesis and etiology:

About 80% of all clubfeet occur in children who are otherwise physically and mentally normal. Despite much research, the exact pathogenesis and etiology remain obscure. It does not seem to be caused by intrauterine injury or germ defect or by neuromuscular disease. The only feature that is well known is heredity: the risk of having another child with clubfoot is close to 10%. The other 20% of clubfeet are associated with neuromuscular disease, like spina bifida and arthrogryposis multiplex, skeletal dysplasia or congenital malformation syndromes. Even in these cases the pathogenesis is unclear: it is not a consequence of simple muscular imbalance.

Pathological anatomy:

Most data about the pathological anatomy of clubfeet derive from studies of fetuses or stillborn infants, which may not be representative of the clubfeet seen in daily practice. One intriguing feature of the clubfoot deformity is the great variety of stiffness, ranging from easily correctable to very stiff feet, which do not respond to any manipulation at all. In the classical description (Irani and Sherman 1972) of the pathological anatomy, the whole foot is in equinus in the talocrural joint, the hindfoot is in varus and the midand
forefoot are in adduction, supination and cavus. The talus is smaller and the talar head and neck deviate in the plantar and medial directions. The capsules and ligaments at the posterior and medial sides of the foot and ankle are thickened and shortened, as also are the tendons, tendon sheaths and muscles. The dislocation of the talonavicular joint is supposed to be the essential lesion.

McKay (1982), Carroll et al. (1978), Simons and Sarrafian (1983) and recently Epeldegui and Delgado (1995) are credited with a more extensive description of the morbid anatomy. There has been a lot of debate about the position of the talus in the talocrural joint and about the presumed malrotation in the skeleton of the leg. McKay (1982) has shown that the tibia and fibula have a normal rotational position in relation to each other, and the axis of the talar body has no abnormal rotational position relative to the transverse axis of the ankle. The axis of the talar neck and head may deviate in the medial and plantar directions. The main abnormality is in the so-called subtalar complex, consisting of the talocalcaneal, the talonavicular and calcaneocuboid joints. The complete deformity of the foot can be explained as a triplane malposition, the interosseous ligament between the talus and os calcis acting as a central pivot. The navicular is localized next to the medial malleolus, leaving the anterior aspect of the talar head uncovered and pointing laterally instead of medially. The talar head can thus be palpated easily on the lateral side of the foot. Whether the position of the joints of the tarsus should be called a dislocation, a subluxation or an extreme
malposition is more a semantic than an anatomical question. An essential part of the description of the pathological anatomy of the clubfoot is the so-called posterolateral tether (Scott et al. 1984). The posterior part of the Os calcis is kept firmly close to the tip of the lateral malleolus by a mass of fibrous tissue, consisting of the fascia of the deep dorsal compartment of the leg, the sheaths of the peroneal tendons, capsules and ligaments of the talocrural and subtalar joints. It prevents the tuber calcanei from moving downwards and medially during dorsiflexion and eversion of the foot.

**Physical examination:**

Once you have seen a clubfoot, it is not difficult to recognize the next one. The feet show varying degrees of stiffness and passive correctability. In almost all cases there is a single deep transverse skin crease over the distal Achilles tendon instead of the usual 4 or 5. Sometimes there is a transverse skin crease at the medial side of the foot. One finds redundant skin over the anterolateral side of the tarsus, where the talar head can be felt. At an attempt to dorsiflex the foot, the tuber calcanei remains in its high position, and therefore the heelpad is empty. Special attention should be paid to the spine and the hips to exclude congenital neuromuscular disease and hip dysplasia. Congenital malformation syndromes are often obvious. If in doubt, a pediatrician, clinical genetist or pediatric neurologist should be consulted.
There is no need to confirm the clinical diagnosis of clubfoot by radiography. Other congenital abnormalities in the skeleton of the foot are very rare but, when suspected, may require radiography for diagnosis.

**Patient and Method:**

At our institution, we selected 60 clubfeet for this prospective study. The age group from age of 2 years to a maximum of 10 years and average age was 5 years. The duration of the study was from January 2016 to December 2020. The maximum follow-up was 3 to 4 years.

Right side was involved in 36 cases and left side was involved in 11 cases. 13 cases were bilateral.

We relied on functional Rating scoring to evaluate our cases after the surgery and based on data that we have inferred through this scoring system we were able to know the effectiveness of this technique.

2 Cases Associated With DDH.

2 Cases Associated With Spina Bifida.

1 Case Down Syndrome.

7 Cases With Strong Family History.

**Selection Criteria:**
1. AGE more than 2 year
2. Neglected Cases
3. Treated Conservatively But With Residual Deformities
4. Failed Operation Before

**TECHNIQUE OF OPERATION:**

**Incision**- single medial incision extending from the first metatarsal base, passes proximally under the medial malleolus to the tendocalcaneus.

**PROCEDURE:** Turco emphasized correcting the deformity of the calcaneus beneath the talus which required complete subtalar (lateral, medial and posterior) release. All medial neurovascular structures and tendons are identified. Tibialis posterior tendon is released then transferred dorsally through interosseous membrane to the dorsum of foot and reinserted again to the 2nd or 3rd Cuneiform bone by suture. Tendocalcaneus and long tow flexors are lengthened and repaired; capsules of ankle joint posteriorly; talonavicular joint, (dorsally, medially & inferiorly), Subtalar joint, and cuneiform-metatarsal joint are all released.

Interosseus talocalcaneal ligament is incised. Anterior part of deltoid ligament and calcaneonavicular ligament are sectioned. Spring ligament and Henry’s knot and mass of scar an medial side of talonavicular joint are excised. Reduced talonavicular joint and pinned with K wire And
calcenocuboidal joint is pinned with ‘K wire in older age group’ after held the foot plantigrade position. wound closed and compressive dressing applied with above knee slab applied.

**POSTOPERATIVE PROTOCOL:**

On 14\textsuperscript{th} postoperative day, we removed the sutures and applied long leg cast with knee in 90 degree flexion and ankle and foot in neutral position.

On subsequent follow-up remove the cast after 3 month post operative then we applied club foot shoes directly after remove the cast.

**RESULTS:**

The good result reported with 49 cases.. and 7 cases with residual metatarsus adductus and 2 cases with over correction C.valgus deformity and other 2 cases complicated by wound dehiscence.

The excellent result according to functional rating scoring were achieved in 49 cases (81.6%)
### TABLE 1
**SEX RATIO**

<table>
<thead>
<tr>
<th>Sex</th>
<th>No</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male children</td>
<td>45</td>
<td>75%</td>
</tr>
<tr>
<td>Female Children</td>
<td>15</td>
<td>25%</td>
</tr>
</tbody>
</table>

### TABLE 2
**INVOLVED SIDE**

<table>
<thead>
<tr>
<th>No. of cases</th>
<th>Bilateral</th>
<th>Unilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Unilateral</td>
</tr>
<tr>
<td></td>
<td>Bilateral</td>
<td>R</td>
</tr>
<tr>
<td>60</td>
<td>13</td>
<td>36</td>
</tr>
</tbody>
</table>

### TABLE 3
## TIMING OF SURGERY

<table>
<thead>
<tr>
<th>Age group in months</th>
<th>PMR And TNJ And CCJ Is pinned by K Wire</th>
<th>No</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>6</td>
<td>6</td>
<td>10.9%</td>
</tr>
<tr>
<td>24- 36</td>
<td>22</td>
<td>22</td>
<td>36.6%</td>
</tr>
<tr>
<td>36 - 48</td>
<td>13</td>
<td>13</td>
<td>21.6%</td>
</tr>
<tr>
<td>48 – 60</td>
<td>10</td>
<td>10</td>
<td>18%</td>
</tr>
<tr>
<td>60 – 72</td>
<td>8</td>
<td>8</td>
<td>14.5%</td>
</tr>
<tr>
<td>More than 72m</td>
<td>1</td>
<td>1</td>
<td>1.8%</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>60</td>
<td>100%</td>
</tr>
<tr>
<td>Mean</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.D.</td>
<td>42.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ASSOCIATED CONGENITAL DEFORMITIES

- DDH: 3.30%
- S.P: 3.30%
- D.$: 1.60%

COMPLICATED CASES & RESIDUAL DEFORMITIES

- Metatarsus Adductus: 3.30%
- C.Valgus: 3.30%
- Wound Dehisence: 11.60%
Timing Of Surgery

Age Group In Months

- 24
- 24 - 36
- 36 - 48
- 48 - 60
- 60 - 72
- > 70

0.00%
5.00%
10.00%
15.00%
20.00%
25.00%
30.00%
35.00%
40.00%
Discussion:

In review of the result of tibialis anterior transfer in congenital club foot it was found that fifty tow relapses occurred in series of seventy six tendon (singer and fripp 1958) transfer in addition certain undesirable sequelae resulted from operation such as dorsiflexed hallux and dropped first MTB head in fifty seven. the other thing disturbed muscle balance the transposed muscle producing excessive pronation forefoot in eleven pt and excessive valugs hind foot in three pt.

the results suggested that the basic principle of operation was incorrect because tibialis anterior is an important dorsiflexor of foot as well as invertor in transferring it may cause encourage recurrence of equinus deformity because transfer always weakens the muscle this tendency aggravated by power of tibialis posterior in influence of this muscle seen in soft tissue release or correction the lengthening must be done to correct the deformity by power of tibialis posterior (Brockman 1930) some surgeons found it effective dorsiflexors when transferd to dorsum of foot. it was apperant the tibialis anterior transfer had extremely limited place in management of club foot. An operative trail of tibialis posterior transfer through interosseous deforming force would be removed and the tibialis posterior acting from new it is insertion although weakened would supplement the relatively waek peroneal
muscle and at the same time the dorsiflexor power of tibialis anterior unimpaired.

In many studies that have been conducted, it has been shown how effective this technique is in correcting or treating club foot, including a study prepared in South Africa Martin singer cape town. on 28 cases, the results of which were excellent in 27 of them and did not show any Relapsing during the follow-up period that exceeded three years.

There is also another study conducted in a Beilinson medical center of kupat_Holim, petah Tiquah JBJS Morch1959 volum 4 page 243 to 252.. on fifty-six cases, thirty of whom obtained reasonable results throughout the follow-up period, which exceeded four years. One case suffered from excessive correction.

Another study that was conducted on a large number and presented in the International Journal of Orthopedics, volum 7, from Page No. 191 to Page No. 193 says that the complete correction by transfer tibialis posterior tendon to the dorsum of foot was very excellent in most cases compared to the PMR alone. Notice that when combining these two techniques, excellent results appear. With no relapse in a follow-up period of more than five years.

This is what we have done transfer in sixty cases, and indeed the results were very excellent in forty-nine cases
without any relapse throughout the follow-up period, which exceeded the four years by 81% of our total case and eleven cases had some complications, divided as follows seven of them He has metatarsus adductus, two over correction C.valgus, and the other two have wound dehiscence

**CONCLUSION:**

**PMR TURCO TECHNIQUE AND Tibialis posterior tendon TRANSFER** offers goods exposure to the subtalar and posteromedial structures without wound healing problems. This technique gives supple and cosmetic foot.

With our GOOD experience in this technique, it is definitely a procedure of choice in the surgical management of club foot in age more than two year and residual deformities after failed surgical or conservative management and finally in neglected cases.