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Study of Surgical Management of Congenital Talipes Equino Varus by Soft Tissue Release

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Abstract:
Background*: Talipes equinovarus, is a congenital condition consisting of hindfoot equinus, hindfoot varus, forefoot adduction deformities. Clubfoot is probably the most common congenital orthopaedic condition requiring intensive treatment.*
Treatment should be started at a very early age, preferably immediately following birth. To avoid the degree of severity of deformity, baby's parents should be educated regarding the importance of early and prolonged and persistent treatment, as soon as the child is born. This will obviate the need for major surgical procedures which becomes necessary if the treatment is not started early.
Very early intervention without the benefit of a conservative treatment has proved disappointing. Early release of soft tissue for persistent or recurrent deformity is now being carried out with increasing frequency. Indeed some releases of the soft tissue have been carried out as early as 2 weeks after birth.
Objectives:
- *To evaluate the surgical results of surgically corrected CTEV with respect to PIRANI scores.*
- *To evaluate the functional results of surgical treatment with respect to attainment of plantigrade foot and development of normal stance.*

Materials and methods: *Study was conducted on 20 children with 25 club feet who had undergone soft tissue release in the period of December 2016 to September 2018. Only children with idiopathic clubfoot were included in the study. In this study all the patients included were in the age group between 1 day old to 2 years. The total period of study was 24 months with a minimum follow up of 8 months and a maximum follow up of 24 months.*
Results: *In our study, Of the total 20 patients 15 patients had good results 3 patients had fair results and 2 patients had poor results. Of the total 20 patients skin necrosis is observed in 2 patients as a complication. Of the total 20 patients 5 patients had forefoot adduction deformity, 2 patients have heel varus and 2 have equinus residual deformities.*
Conclusion: *We conclude that Posteromedial release by Turco's[40] single stage release or by Caroll's[52] dual incision technique gives very good results in idiopathic variety of rigid club feet.*
Key Words: *CTEV, Posteromedial release by Turco's,Caroll'sdual incision*

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I. Introduction

CTEV occupies a central and indeed almost unique place in the story of crippling disorders.Talipes equinovarus was first introduced into medical literature by Hippocrates[1] in 400 B.C.

Components of the Deformity:

I.V Ponseti[11] made valuable contributions in understanding the patho anatomy and management of club foot by conservative means.

Equinus: Equinus deformity is a composite of ankle joint equinus, inversion of the talocalcaneonavicular complex and plantar flexion of the forefoot.**Varus:** The whole tarsus, with the exception of the talus, is rotated inward with respect to the lower leg. As the forefoot follows, the inverted hind foot, a composite varus deformity occurs.**Adduction:** This medial displacement occurs at the Talonavicular and the anterior subtalar joint. In addition, some medial deviation occurs at the tarsometatarsal area and contributes to

this part of the deformity.**Cavus:** This is due to the forefoot plantar flexion. Equinus, varus and adduction components are intimately associated with each other, and the complete correction of any one component requires simultaneous correction of the other two.

SOFT TISSUE CONTRACTURES:

Contractures of the soft tissues adopt to the abnormal tarsal relationship and are as variable as the bony distortion. These contractures varies between patients, but some are constant and present in all cases. The Achilles tendon, tibialis posterior, deltoid, spring ligaments and the talonavicular capsule are prime contractures common to all patients.

The degree of soft tissue contractures are greatly exaggerated in neglected cases. There are generalized atrophic changes in all muscles. The individual muscles have a normal relationship to each other. The insertion of tendons is normal, but the direction of their course is somewhat altered. Early release of soft tissue for persistent or recurrent deformity is now being carried out with increasing frequency. Indeed some releases of the soft tissue have been carried out as early as 2 weeks after birth. During first three months of life, conservative treatment may achieve complete correction. If it does not, a surgical release of the appropriate capsules and ligaments alone can do so. After 3rd month, lengthening of tendoachilles and tibialis posterior along with soft tissue release. By this time the lateral dorsiflexor and peroneal tendons have become overlong and any corrected position will need to be maintained until bone growth has caught up with their excess length.Below four years of age, reduction can be achieved by soft tissue release alone. If the foot is rigid, to prevent dense scar tissue from retethering contracted soft tissues and causing recurrence of deformity, it is wise to excise ligaments, capsule and tendon sheaths.By the age of 3 - 4 years, correction of one or more of the bony elements of the deformity by osteotomy of the calcaneus, cuboid, or metatarsals indicated. By this time, the dorsiflexor and evertor muscles may have become so inadequate that a more extensive tendon transfer may be needed.After 6 years of age, correction of individual aspect of deformity by osteotomy is likely to give only partial correction of total deformity.As the child attains the age of ten years of age or older, the foot is skeletally mature, and the deformities are fixed, therefore, osteotomy of the oscalcis, tarsal reconstruction, or triple arthrodesis is required to provide a plantigrade foot.In older child, to shorten the overgrown lateral column, resection of the distal end of the calcaneus (Lichtblau [2] procedure) or vertical wedge resection (based laterally) of the anterior part of the calcaneus (as described by Simons), or calcaneal osteotomy inferiorly and laterally, held open by wedge of bone graft (Dwyer's[3] procedure) and done.In younger child with marked scarring and recurrence of deformity and with severe incongruity and instability of the talocalcaneonavicular and calcaneocuboid joints, idea of shortening the lateral column can be entertained (the lateral column is shortened and stabilized by calcaneocuboid joint resection and fusion) (Evans[4] procedure).

II. Material And Methods

Study was conducted on 20 children with 25 club feet who had undergone soft tissue release in the period of December 2016 to September 2018. Only children with idiopathic clubfoot were included in the study. In this study all the patients included were in the age group between 1 day old to 2 years. The total period of study was 24 months with a minimum follow up of 8 months and a maximum follow up of 24 months.

Inclusion criteria

- Newborn babies born with unilateral and bilateral CTEV.
- Patients aged less than 2 years with resistant CTEV or not responding to conservative treatment.
- Both sexes.

Exclusion criteria

- Age greater than 3 years.
- Neglected CTEV.
- CTEV associated with other conditions like Arthrogryposis multiplex congenita , neural tube defects, Vascular deformities.
- Bony procedures

Procedure methodology:

In our study we did surgical procedure by TURCO'S ONE STAGE POSTEROMEDIAL RELEASE and CARROLL'S DUAL INCISION TECHNIQUE

1) TURCO'S ONE STAGE POSTEROMEDIAL RELEASE:

Operation is based on the following concepts.

- The deformity is due to a congenital subluxation of talocalcaneonavicular joint.
- Correction of the abnormal tarsal relationship is prevented by rigid pathologic soft tissue contractures.

- There are two prerequisites for a lasting correction. Complete correction must be obtained, and the surgical correction must be maintained while tarsal bones remould to form stable articular surfaces.
- It is impossible to complete correct any one component of deformity without simultaneously eliminating the others.

Indications:
- Resistant congenital Idiopathic club foot that fail to respond to non - operative treatment.
- Recurrent deformity after unsuccessful soft tissue surgery.

Surgical Age:

Surgery can be done at an age as early as 6 months to 2 years. Age limit can be extended to 8 years. When it is suspected that deformity is due to myopathy, neurologic deficit or genetic syndrome, then early surgery should be avoided.

Skin Incision:

Skin incision is given along the medial border of the foot. Beginning at the proximal end of the 1st metatarsal, the incision is extended proximally to just below the medial malleolus and continued posteriorly to the tendoachilles.

Technique:

A postero medial plantar and subtalar release of all soft tissue contractures is carried out in a one stage operation. After contractures are released the navicular, and calcaneus are restored to their normal relationship with the talus. Surgical correction is stabilized by temporarily transfixing the talonavicular and talocalcaneal joints with percutaneous K wires. In older children a steindler's plantar stripping is also done. Soft tissue contractures will vary in each case, even in bilateral cases, the findings between two sides vary.

In each case one must transect all soft tissues contractures that prevent mobilization of navicular and calcaneus.

Exposure:

The operation is essentially an anatomic dissection of the medial, plantar and posterior aspects of the foot and ankle. The operation is facilitated by identifying and exposing the following five structures, posterior tibial tendon, flexor digitorium longus, neurovascular bundle, flexor hallucis longus and Achilles tendon. As the tendons are exposed, incise their tendon sheaths. Neurovascular bundle is identified and protected.

Medial plantar dissection is completed by transecting the master knot of Henry[5] . This fibro cartilaginous structure which is attached to the under surface of the navicular, the flexor digitorium longus and flexor hallucis longus, where they cross.

It is necessary to completely mobilize the navicular and permit transection of spring ligament. Abnormal origin of abductor hallucis also divided.

Medial plantar release :

Lengthening of posterior tibial tendon is done. Division of flexor hallucis longus and flexor digitorum longus is done if easy reduction cannot be obtained. Talonavicular capsulotomy is done. Spring ligament is cut and superficial part of deltoid ligament is cut.

SubtalarRelease :

The subtalar release to complete the mobilization of the calcaneus and navicular. Transection of talocalcaneal interosseous ligament and bifurcated Y ligament is done.

Posterior release :
- 'Z' plasty of tendoachilles is done.
- Capsulotomy of tibiotalar joint, talocalcaneal joint is done.
- Transection talofibular ligament and calcaenofibular ligament is done.

2) CARROLL'S[7] DUAL INCISION TECHNIQUE:

Two incisions are given:

Medial incision:

The optimal landmarks for the medial incision form a triangle and are the centre of the oscalcis , the front of the medial malleolus and the base of the first metatarsal, the incision is given parallel to the base of the triangle, but is curved proximally and distally.

Structures addressed through medial incision
- abductor hallucis
- deep fascia
- plantar fascia
- flexor digitorum brevis
- abductor digitiquinti
- the long and short plantar ligaments
- talonavicular joint capsule
- medial and plantar capsule of the calcaneo cuboid joint

Postero lateral incision: runs obliquely from the midline of the distal calf posteriorly to a point midway between tendoachilles and the lateral malleolus. Structures adressed through postero lateral incision are lengthening of tendoachilles and tibialis posterior, calcaneo fibular ligaments, posterior talofibular ligament and anterior portion of deltoid ligament. posterior capsulotomies of both ankle and subtalar joints are done.

III. Observation and Results

Study was conducted on 20 children with 25 club feet who had undergone soft tissue release in the period of December 2016 to September 2018. Only children with idiopathic clubfoot were included in the study. In this study all the patients included were in the age group between 1 day old to 2 years. The total period of study was 24 months with a minimum follow up of 8 months and a maximum follow up of 24 months.

AGE DISTRIBUTION:
Of the total 20 patients two patients are below the age of 6 months, 14 patients are between 7-12 months of age, 4 patients are between 13 to 24 months
SEX DISTRIBUTION:
Of the total 20 patients 12 patients are males and 8 patients are females.
SURGICAL PROCEDURE:
Of the total 20 patients 9 patients are operated by Caroll's dual incision technique and 8 patients are operated by Turco's single incision technique.
Results of surgery:
Of the total 20 patients 15 patients had good results 3 patients had fair results and 2 patients had poor results.
Complications:
Of the total 20 patients skin necrosis is observed in 2 patients as a complication.
Residual Deformities:
Of the total 20 patients 5 patients had forefoot adduction deformity, 2 patients have heel varus and 2 have equinus residual deformities.

Clinical results:

Preoperative Intraoperative

Post operative (2 months follow up)

IV. Discussion

Congenital talipes equinovarus (CTEV) is the commonest of all the congenital foot deformities. Various etiologies are put forward for the causation of CTEV – Mechanical factors inutero, neuromuscular defects, primary germ plasm defects, arrested foetal development, vascular theories, hereditary and environmental combined. In our series all were primary idiopathic club foot.It is important to differentiate the 'Rigid' from the severe club foot deformity. A foot that is persistently stubborn to the conventional modes of therapy is termed 'Rigid'. Interestingly also, the severity and the rigidity of a clubfoot never appear to correlate. The evaluation of treatment of CTEV reflects the gradual understanding of the pathoanatomy and kinesiology of the condition. The aim of all soft tissue release procedures done for CTEV is primarily to achieve full correction of all static deformities with mobile ankle and subtalar joints. Cosmetically the foot should look acceptable compared to normal foot. The goal is to attain a pliable, plantigrade foot.All cases were carefully and thoroughly assessed and surgery was planned accordingly. Surgery was done in sequential steps taking care of the neurovascular bundle.

In our study all the children were initially treated by manipulation and serial casting. Most of the cases were rigid which did not show any correction on conservative treatment.

Modified Turco [6] 's postero medial release with single incision and Carroll's [7] dual incision technique were done in our study. In our study tibialis posterior, flexor digitorum longus, flexor hallucis longus were lengthened and capsulotomies of talonavicular, naviculo-cuneiform, 1stmetatarso-cuneiform joints were done. Then capsulotomies of ankle and subtalar joints were done and tendoachilles was lengthened. In some cases k-wire fixation was done. In one case cuboid enucleation was done.Post operatively the child's foot was immobilized in an above knee POP cast and limb elevated and carefully monitored for signs of postoperative edema and 12-14 days later suture removal was done. The POP cast was continued for a period of 4-6 weeks at which time child was assessed for residual deformity. If any deformity was found to be present then fresh cast was applied for a period of 8-10 weeks.

If no deformity was found clubfoot orthosis was given for three to six months with passive stretching exercises. The parents were given clear instruction about use of club foot orthosis and manipulation.

Fore foot adduction was commonest persistent deformity in our study. These cases were treated by manipulation and serial casting.Three of the five poor results were due to nonadherence of the patient attenders to proper POP care and noncompliance to use of orthosis for stipulated period of time.

The results of our study was compared with the internationally accepted studies and our study showed a satisfactory result of 88% and other studies showed a satisfactory result of over 90%.

OUTCOME	**GAIT**	**X-RAY**	**SHOE WEAR**
GOOD	HEEL ON FLOOR ,PLANTIGRADE, NO INTOEING,NO LIMP	NORMAL ANGLES	NORMAL SHOES
FAIR	SLIGHT INTOEING LIMP	ANGLES LESS THAN NORMAL	NORMAL SHOES, ABNORMAL SHOE WEAR
POOR	WALKING ON LATERAL BORDER ,ROCKER BOTTOM LIMP	ABNORMAL ANGLES	INABILITY TO WEAR SHOES

Comparison with other studies:

Result	Turco[6]	Caroll[8]	Mckay[9]	Our study
Good	83.8%	82%	80%	75%
Fair	10.7%	11%	16%	15%
Poor	5.5%	7%	4%	10%

V. Conclusion:

In rigid variety of club foot, it is almost impossible to obtain a painless, plantigrade foot by conservative management. Hence surgery is the ultimate choice of treatment for this group of children with club foot. Fortunately very few children, approximately twenty percent require surgery.

We conclude that Posteromedial release by Turco's[6] single stage release or by Caroll's[10]dual incision technique gives very good results in idiopathic variety of rigid club feet. Ideal time of surgery is around the age of 6-8 months. Surgery can be done successfully upto the age of 4 years. Clear instructions were given to child's parents regarding use of club foot orthosis and manipulation. All the cases where these instructions were not properly followed resulted in poor outcome.

The results of our study are consistent with the authors that described these procedures and are effective with the help of further qualitative and improved radiological investigations.

References

[1]. Anand A, Sala DA, Clubfoot: Etiology and treatment. Indian J Orthop2008;42:22-8
[2]. Lichtblau S. A Medial and lateral release operation for clubfoot. J Bone Joint surg Am. 1973;55:1377-84.
[3]. Garceau GJ, Palmer RM.Transfer of the anterior tibial tendon for recurrent club foot. A long-term follow-up, J Bone Joint Surg Am. 1967 Mar;49(2):207-31
[4]. Evans D. Relapsed clubfoot. J Bone Joint Surg Br. 1961;43:722.
[5]. O'Sullivan E1, Carare-Nnadi R, Greenslade J, Bowyer G., Clinical significance of variations in the interconnections between flexor digitorumlongus and flexor hallucislongus in the region of the knot of Henry, Clin Anat. 2005 Mar;18(2):121-5.
[6]. Turco VJ. Surgical correction of the resistant clubfoot. One stage posteromedial release with internal fixation: a preliminary report. J Bone Joint Surg Am. 1971 Apr;53(3):477-97
[7]. HS Varma, Alok C Agrawal, Pradeep K Singh. Surgical management of congenital idiopathic clubfoot by two incisions. Journal of Orthopaedics and Allied Sciences 1(1),18,2013
[8]. Carroll N.C ., Pathoanatomy and surgical treatment of Resistant clubfoot.,AAOS . Instr. Course Lect. 37:43-106, 1988
[9]. McKay DW., New concept of and approach to clubfoot treatment: Section III—evaluation and results. J PediatrOrthop. 1983 May;3(2):141-8.
[10]. Tachdjian's textbook of paediatricorthopaedics, 3rd edition, WB Saunders, Philadelphia,
[11]. Ponseti I.V, Campos j., Observation on pathogenesis and treatment of congenital clubfoot, ClinOrthopRelat Res. 1972;84:50–60

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