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CASE REPORT

Evaluating Tibialis Posterior Transfer: A Surgical Approach to Residual Clubfoot in Children Over Two Years at TOBRUK MEDICAL CENTER

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Abstract

Clubfoot is a congenital condition where tendons on the medial aspect of the leg and ankle become shortened and tightened, including the Achilles tendon. If left untreated, the child may appear to walk on their ankles or the sides of their feet. In severe cases, the foot may appear upside down. The primary objective of this study is to evaluate the effectiveness of the Tibialis Posterior Transfer technique in correcting abnormal tarsal relationships, maintaining reduction, and establishing muscle balance to provide functional mobility and weight-bearing ability. This descriptive study was conducted on 60 clubfeet in patients aged 2 to 10 years, with an average age of 5 years. The study was carried out from January 2016 to December 2020, with a maximum follow-up period ranging from 3 to 4 years. Among the cases, 36 involved the right foot, 11 the left foot, and 13 were bilateral. The selection criteria included cases aged over two years, neglected cases, residual deformities after conservative treatment, and cases with previously failed surgical procedures. Good results were observed in 49 cases (81.6%), while 7 cases had residual metatarsus adductus, 2 cases experienced overcorrection leading to calcaneovalgus deformity, and another 2 cases were complicated by wound dehiscence. The PMR Turco Technique and Tibialis Posterior Transfer provided excellent exposure to the subtalar and posteromedial structures without major wound healing complications. This technique not only improved foot function but also offered a more cosmetic outcome, making it a preferable surgical intervention for clubfoot management in children above the age of two, especially in cases of residual deformities following failed conservative or surgical treatment

Keywords: Clubfoot, congenital deformity, Tibialis Posterior Transfer, abnormal tarsal relationships, muscle balance, functional mobility, weight-bearing,

INTRODUCTION:

Clubfoot is one of the most common congenital orthopedic deformities that require intensive treatment. This condition affects the structure and position of the foot, leading to an adducted and cavus deformity with a varus hindfoot. The foot remains in a fixed equinus position at the subtalar joint, making passive correction difficult. Approximately 50% of clubfoot cases are bilateral, with the male-to-female ratio varying from 1.6:1 to 3:1. The condition not only results in cosmetic concerns but also impairs normal ambulation and function if left untreated.The main goal of treating clubfoot is to achieve and maintain a normal tarsal relationship, prevent recurrence, and establish muscle balance between the evertors, invertors, dorsiflexors, and plantar flexors. Initial treatment is primarily non-operative and includes corrective manipulation, serial casting, and splinting. However, when these conservative methods fail or when the condition is neglected, surgical intervention becomes necessary. A variety of surgical techniques have been described in the literature to achieve anatomic restoration, including Codivilla's radical approach in 1906, Turco's one-stage posteromedial release in 1971, and complete subtalar release by McKay and Simons in 1983.

Patients and Methods

This prospective study included 74 clubfeet treated at our institution from January 2016 to April 2022. The age of the patients ranged from 2 to 10 years, with an average of 5 years. The maximum follow-up period extended from 3 to 5 years. Among the total cases, 44 involved the right foot, 15 the left foot, and 15 were bilateral. Functional rating scores were used to evaluate post-surgical outcomes, and the selection criteria included cases aged more than two years, neglected cases, residual deformities after conservative treatment, and cases with previously failed surgical interventions.Comorbidities included 3 cases associated with developmental dysplasia of the hip (DDH), 2 cases with spina bifida, 1 case with Down syndrome, and 7 cases with a strong family history of clubfoot. The study ensured that the surgical technique was performed uniformly across all cases to maintain consistency in results.

Surgical Technique

A single medial incision was made, extending from the base of the first metatarsal, passing proximally under the medial malleolus to the tendo-calcaneus. The procedure involved the identification of medial neurovascular structures and tendons, followed by the release and dorsal transfer of the Tibialis Posterior tendon through the interosseous membrane to the dorsum of the foot. The tendon was then reinserted into the second or third cuneiform bone with sutures. Additionally, the tendo-calcaneus and long toe flexors were lengthened, and the ankle, talonavicular, subtalar, and cuneiform-metatarsal joints were released. The interosseous talocalcaneal ligament was incised, and scar tissue surrounding the talonavicular joint was resected. The talonavicular and calcaneocuboid joints were pinned using K-wires, and the foot was held in a plantigrade position before closure and application of a compressive dressing with an above-knee slab.

Figure 1: photographic picture showing CTEV in child 2 year old pre-operative

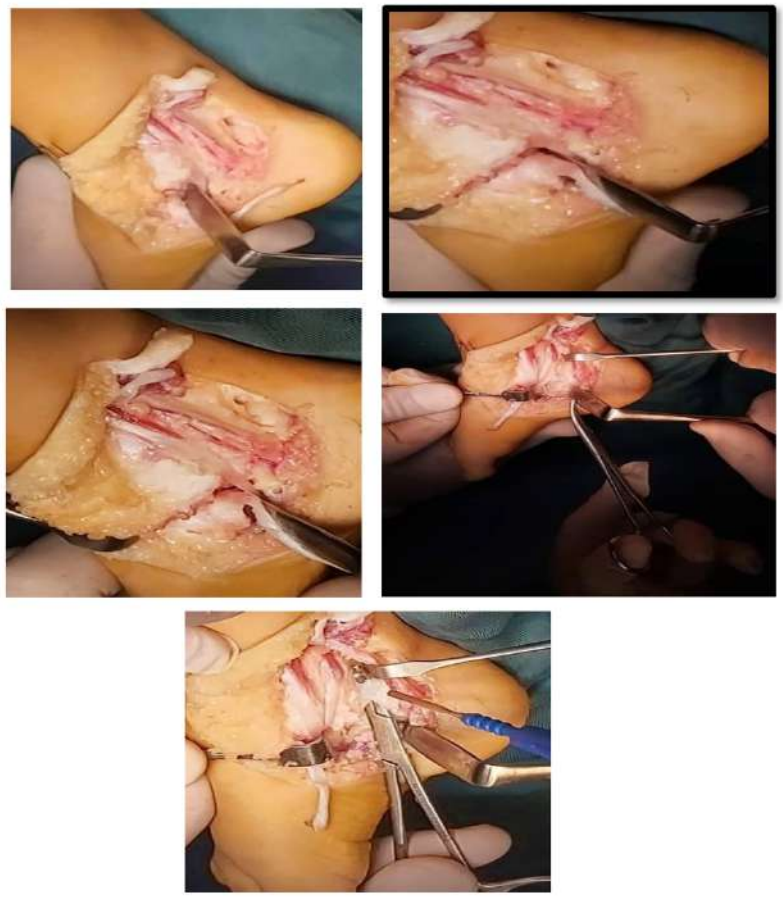

Figure 2: inert-operative photographic picture showing PMR in case CTEV

Figure 3: Photographic picture showing pre & post-operative correction

Figure 4: Photographic picture showing pre-operative CTEV with ankle and knee ulcer

Figure 5: Photographic picture showing pre-operative CTEV & post-operative correction & turco incision

Figure 6: Photographic picture showing pre-operative CTEV & intra- operative correction PM

Figure 7: Photographic picture (8) years post-operative follow up showing maintenance of the arch of foot and restoration of the normal foot

RESULT:

Excellent results were achieved in 57 cases (77.02%). Nine cases had residual metatarsus adductus, 3 cases had overcorrection leading to calcaneovalgus deformity, 3 cases were complicated by wound dehiscence, and 2 cases exhibited decreased ankle dorsiflexion. These findings suggest that while the technique is highly effective, minor complications may still occur in a small subset of patients.

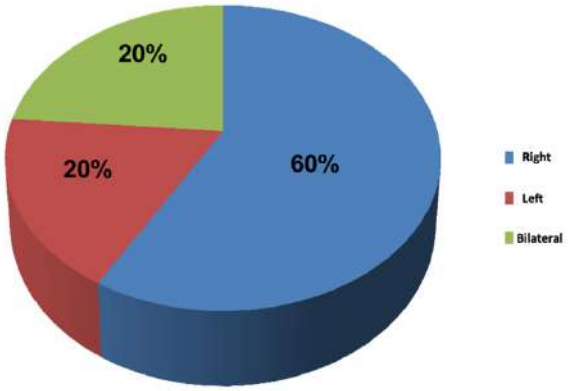

Figure 8: the involved side in the surgery

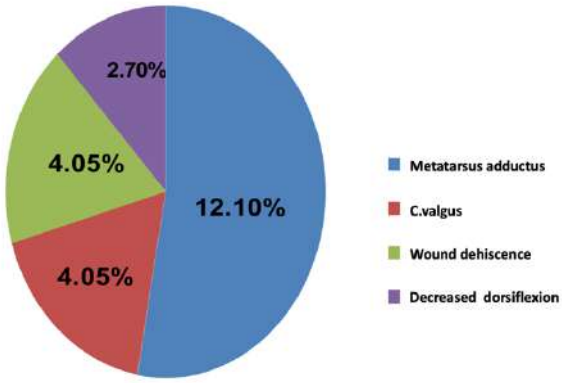

Figure 9: Complicated cases & residual Deformities

DISCUSSION:

In review of the result of tibialis anterior transfer in congenital club foot, it was found that fifty-two relapses occurred in a series of seventy _ tendon (Singer and fripp 1958)[17] 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 valgus 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 equine 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)[18] some surgeons found it effective dorsiflexors when transferred to dorsum of foot. It was apparent the tibialis anterior transfer had an extremely limited place in the management of club foot. An operative trail of tibialis posterior transfer through the interosseous membrane deforming force would be removed, and the tibialis posterior acting from its new it is insertion although weakened, would supplement the relatively weak 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 relapse 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 volume 41 page 243 to 252.[19] 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, volume 7, from Page No. 191 to Page No. 193[20] 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

Limitations

One limitation of this study is the relatively small sample size. Additionally, the follow-up period, although extensive, may not be sufficient to determine long-term recurrence rates in all cases. Further multi-center studies with larger sample sizes are recommended to validate these findings.

Recommendations

Given the favorable outcomes observed in this study, we recommend that the Tibialis Posterior Transfer technique be considered as a primary surgical intervention for clubfoot cases that fail conservative treatment. Future research should focus on refining the technique to further minimize complications and improve long-term patient outcomes.

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