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Transfer of peroneus longus to tendo-achilles in the treatment of calcaneal deformity: A case series of 5 patients

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Abstract

Calcaneal foot deformity can be related to neuromuscular disorders or due to over lengthening of the Tendo-Achilles (TA) tendon. A careful neurological examination should be done including the lower back examination especially in patients with progressive deformity. Soft tissue procedures including plantar release and tendon transfers are done in younger patients to correct calcaneal deformity associated with cavus. We present a case series of 5 cases that had calcaneal deformity due to various reasons. The first case is a 9 year old male child with calcaneocavus deformity with a slowly progressive neurological disorder who was treated with plantar fasciotomy and peroneus longus transfer to the tendo-achilles. The second case is a calcaneal deformity in a case of myelomeningocele in the left foot that was treated with Plantar fascia tenotomy, lengthening of Tibialis anterior, EDL and EHL with the transfer of peroneus longus to tendo-achilles. The other three cases were of cerebral palsy the first being quadriplegic and the other two developed calcaneal deformity due to overlengthening of the tendo-achilles. Transfer of peroneus longus to the tendo-achilles was done in all the cases along with other procedures. The main focus of this paper is to determine the impact of peroneus longus transfer into tendo-achilles in the improvement of the calcaneal deformity.

Keywords: Calcaneal deformity, cerebral palsy, plantar release, tendo-achilles, peroneus longus

Introduction

Foot deformity in children is caused by muscle imbalance around the foot and by the impact of ground reaction forces. The calcaneal deformity is caused by active dorsiflexors and inactive posterior muscles. The calcaneal deformity can also occur in myelomeningocele most commonly with L4-L5 and S1 involvement. The calcaneal deformity can lead to difficulty in walking in the community and can ultimately lead to crouch gait.^[1] Cavus is a foot deformity that is described as a high plantar arch and a fixed forefoot equinus^[2]. Posteriorly the weight is borne on the calcaneal tuberosity and anteriorly on the heads of the metatarsal bones.^[3] Pronation of the first ray can also occur. Calcaneus in varus known as cavo-varus is the most common deformity whereas pure calcaneus or calcaneocavus is less common^[2]. Calcaneus feet in cerebral palsy are mostly iatrogenic due to overlengthening of the tendo-achilles tendon. With triceps surae weakness due to iatrogenic overlengthening of the heel cord, unopposed ankle dorsiflexors lead to excessive ankle dorsiflexion coupled with knee and hip flexion leading to the calcaneus deformity and crouched posture^[4]. Calcaneocavus foot is due to the weak triceps surae. The calcaneocavus deformity has a calcaneal pitch of greater than 30 degree on standing lateral view x-ray of the foot^[5]. Cavus deformity can be caused by weak muscles, osteoarticular diseases, or trauma. It can be progressive^[2]. Most of the cases of cavus deformity are idiopathic^[5]. Charcot-Marie-Tooth disease, a hereditary disorder, can lead to foot deformity in young patients with symptoms such as abnormal gait, forefoot pain, and ankle instability. So a proper family history should be taken^[2].

Case presentation

The first case is a 9 year old male child that came to us with a deformity of the right foot and difficulty in walking since early childhood.

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The patient had no history of progressive neurological disorder in the family and no history of low backache. On examination, the right foot had a calcaneocavus deformity and the left foot had a calcaneo-valgus (flatfoot) deformity. In the right foot, the plantar fascia was tight with a drop first metatarsal (hammer toe deformity of the great toe). (Figure 1) Power in the tibialis anterior and tibialis posterior muscles was 5/5. Power in evertors (peroneus longus and peroneus brevis) was also 5/5. Power in tendo-achilles was 0/5. Weakness in the tendo-achilles had led to a posterior cavus foot. The calcaneal pitch is 33 degree on standing lateral view x-ray of the foot (Figure 2). We did fractional lengthening of the tibialis anterior and percutaneous plantar tenotomy. Peroneus brevis was re-routed and attached to the peroneus longus stump. Peroneus longus was then transferred to the tendo-achilles. Above knee Plaster of Paris (POP) cast was applied for 6 weeks. Ankle foot orthosis was provided for regular use after the removal of the cast. At three months post surgery, the gait pattern had improved significantly. His cavus has improved (Figure 3). After one year, the power in tendo-achilles has improved to 3/5.

The second case is a 12 year old male child with meningomyelocele with bilateral foot deformity with paraplegia. On the left foot, there was a calcaneal deformity with scar of surgery over the tendo-achilles that was done previously elsewhere. Power in tendo-achilles was 0/5, in peronei it was 4/5, tibialis posterior 4/5 and there was flicker of movements in the toe. On the right foot, there is an equinus deformity and the foot was flail. We did plantar fascia release with lengthening of the tibialis anterior, extensor digitorum (EDL), extensor hallucis longus. (EHL) tendon on the left side. We did transfer of peroneus longus to the tendo-achilles on the left side. We did plantar fasciotomy with percutaneous tendo-achilles lengthening on the right side. Above knee POP was applied for six weeks on both the sides followed by the ankle foot orthosis. The power in Tendo-Achilles has increased to 3/5 on the left side. The deformity was corrected significantly and it was possible to fit the patient with ankle foot orthosis.

The third case was a 15 year old male, a case of Cerebral palsy with spastic quadriplegia. The patient was unable to stand or walk with drooling of saliva. The patient could speak in short sentences. There was spasticity in all four limbs. The spasticity was more on the lower limb as compared to the upper limb. Crouching was present with calcaneal deformity in both feet. We did bilateral tibialis anterior fractional lengthening and bilateral supracondylar recurvatum osteotomy. Peroneus longus was transferred to the Tendo-Achilles on both the sides. It was followed by above knee POP cast for six weeks followed by ankle foot orthosis. The crouching has improved and the patient is now able to ambulate with the help of a walker.

The fourth case is a 16 year old male, a case of cerebral palsy with spastic quadriplegia. The patient was operated upon earlier elsewhere for equinus deformity. The operation led to overlengthening of the tendo-achilles that converted equinus deformity into the calcaneal deformity on the left side and a crouch gait. We did the transfer of tibialis anterior and peroneus longus to tendo-achilles on the left side. Above knee POP cast was applied for 6 weeks followed by ankle foot orthosis (AFO). After one year, there is a significant improvement in crouching.

The fifth case is a 15 year old male with Cerebral palsy with spastic diplegia. The patient has difficulty in walking and had frequent falls. There was spasticity in all four limbs. The patient was operated and TA. lengthening was done elsewhere. Overlengthening of the tendo-achilles lead to conversion of equinus deformity into calcaneal deformity with progressive crouching. On examination fixed flexion deformity in both the knees was 70 degrees. We did bilateral medial hamstring lengthening, bilateral tibialis anterior, extensor hallucis longus and extensor digitorum longus lengthening with transfer of peroneus longus to the TA. Fixed flexion deformity at the knee was corrected. Above knee POP cast was applied for 6 weeks followed by AFO. There is significant improvement in crouching and the gait has improved significantly.

Case Number	Age	Cause of calcaneal deformity	Procedure done
1	9	Idiopathic	Right foot 1. Fractional lengthening of tibialis anterior 2. Percutaneous plantar fasciotomy. 3. Peroneus longus is then transferred to the tendo-achilles.
2.	12	Meningo- myelocele	Left foot 1. Plantar fascia tenotomy 2. Lengthening of Tibialis anterior, EDL and EHL. 3. Transfer of peroneus longus to tendo-achilles. Right foot 1. Plantar fasciotomy 2. Percutaneous Tendo-achilles lengthening
3.	15	Cerebral Palsy with spastic quadriplegia	1. Bilateral Tibialis anterior lengthening 2. Bilateral transfer of peroneus longus to tendo-achilles. 3. Bilateral supracondylar recurvatum osteotomy
4	16	CP with spastic quadriplegia (Overlengthening of tendo-achilles)	1. Transfer of tibialis anterior and peroneus longus to tendo-achilles on the left side.
5	15	CP with spastic diplegia (over lengthening of tendo-achilles)	1. Bilateral medial hamstring lengthening 2. Bilateral tibialis anterior, EHL and EDL lengthening 3. Bilateral transfer of peroneus longus to Tendo-achilles.



Fig 1: Shows clinical picture at the time of the initial presentation.



Fig 2: Shows X-ray of the lateral view of the right foot



Fig 3: Shows clinical image three months after the treatment.

Discussion

Correction of the deformity and strength balance are the two main goals in the treatment. Various procedures are recommended for the correction of the calcaneal deformity, depending on the severity of the deformity and the flexibility of the foot [2]. Lengthening of the tibialis anterior tendon and Achilles tenodesis to the fibula is proposed to correct calcaneal deformity [6]. Rodrigues and Dias reported simple tenotomy and tendon excision of all ankle dorsiflexors, peroneus brevis and peroneus longus tendon [7].

Technique of posterior transfer of anterior tibial tendon has also been proposed to correct the calcaneus deformity [8]. Tight plantar fascia is a very common finding in the cavus foot. Plantar release is the most common procedure to correct the cavus deformity [5]. In a study done by Shermann *et al* in 1981 there was a marked improvement in the forefoot adduction and the cavus deformity on the One hundred and ninety-one feet (191) of clubfoot or poliomyelitis with residual cavovarus deformities that were treated by plantar release followed by serial cast application. Hindfoot varus did not improve. The plantar release was particularly effective in improving residual cavus deformity with clubfoot in children who were more than six years old. There was also improvement in the cavus deformity in poliomyelitis and cavus deformity associated with the equinus angulation of the hind part of the foot [9]. Early tendon transfers are important in preventing calcaneal deformity from progressing and becoming fixed. Weakness in triceps surae can be reduced by transferring the tendon posteriorly into the calcaneus [10]. Calculating the power of tendo-achilles before the transfer is important for selection of the tendon. Plantar fasciotomy and tendon transfers are usually preferred in younger patients. Plantar fasciotomy and bony procedures including calcaneal, midtarsal and forefoot deformities are preferred in older patients [5]. Transfer is usually done from any muscle including peroneus longus, tibialis posterior, flexor digitorum longus to the calf muscle, if the power in the calf muscle is poor. All muscles can be transferred posteriorly, if there is no power in the tendo-achilles leading to the calcaneus deformity [5]. In the first case we have re-routed peroneus brevis tendon and attached to the peroneus longus stump along with fractional lengthening of tibialis anterior. The Peroneus longus tendon was then transferred to the Tendo-Achilles. In the second case we did plantar fasciotomy with lengthening of Tibialis anterior, EHL and EDL with transfer of peroneus longus to the tendo-achilles on the left foot. In the remaining three cases of cerebral palsy we did transfer of peroneus longus to the tendo-achilles along with other soft tissue procedures. We did see improvement in all the five patients. The tendo-achilles power improved to 3/5 in the first patient. Tendo-Achilles power improved to 3/5 on the left side in the second patient. In the remaining three patient there was significant improvement in crouching. In all these patients it was now possible to brace the foot in Ankle foot orthosis and the gait pattern had improved significantly.

Conclusion

Calcaneus deformity is usually related to neuromuscular disorders or due to overlengthening of the heel cord in cerebral palsy. Transfer of peroneus longus to the tendo-achilles can have a very significant effect in the improvement of the calcaneus deformity.

Conflict of Interest

Not available

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Not available

References

1. Park KB, Park HW, Joo SY, Kim HW. Surgical treatment of calcaneal deformity in a select group of

- patients with myelomeningocele. JBJS. 2008 Oct 1;90(10):2149-59.
2. Nogueira MP, Farcetta F, Zuccon A. Cavus foot. Foot and Ankle Clinics. 2015 Dec 1;20(4):645-56.
 3. Wicart P. Cavus foot, from neonates to adolescents. Orthopaedics & Traumatology: Surgery & Research. 2012 Nov 1;98(7):813-28.
 4. Dillin W, Samilson RL. Calcaneus deformity in cerebral palsy. Foot & ankle. 1983 Nov;4(3):167-70.
 5. Samilson RL, Dillin W. Cavus, Cavovarus, and Calcaneocavus An Update. Clinical Orthopaedics and Related Research®. 1983 Jul 1;177:125-32.
 6. Oberlander MA, Lynn MD, Demos HA. Achilles tenodesis for calcaneus deformity in the myelodysplastic child. Clinical Orthopaedics and Related Research (1976-2007). 1993 Jul 1;292:239-44.
 7. Rodrigues RC, Dias LS. Calcaneus deformity in spina bifida: results of anterolateral release. Journal of Pediatric Orthopaedics. 1992 Jul 1;12(4):461-4.
 8. Stott NS, Zionts LE, Gronley JK, Perry J. Tibialis anterior transfer for calcaneal deformity: a postoperative gait analysis. Journal of Pediatric Orthopaedics. 1996 Nov 1;16(6):792-8.
 9. Sherman FC, Westin GW. Plantar release in the correction of deformities of the foot in childhood. JBJS. 1981 Dec 1;63(9):1382-9.
 10. Westin GW. Tendon Transfers about the Foot, Ankle, and Hip in the Paralyzed Lower Extremity. JBJS. 1965 Oct 1;47(7):1430-43.

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