Annals of Case Reports and Clinical Studies
Case Report (ISSN: 2834-5673)

Acquired Flat-Foot in Children Secondary to Neglected Tibialis Posterior Tendon Rupture a Case Report

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Citation: *Khaled Kamoun, Montassar Ayachi, Malek Ben Chaalia, Wajdi Arfa, Hassene Affes, Mourad Jenzri. Acquired Flat-Foot in Children Secondary to Neglected Tibialis Posterior Tendon Rupture a Case Report. Ann Case Rep Clin Stud. 2023;2(3):1-5.*

Received Date: 18 July, 2023**; Accepted Date:** 21 July, 2023**; Published Date:** 23 July, 2023

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ABSTRACT

Introduction: Flat foot (FF) is a complex deformity that affects often children. Although the cause of pediatric FF is not entirely clear, it is believed to be a multifactorial condition that may involve genetic, environmental, and biomechanical factors. This deformity can occurs when tibialis posterior tendon (TPT) is week in adult but also following a traumatic rupture of this tendon in childhood.

Case Presentation: We report a case of 15-year-old female patient presenting progressive unilateral foot deformity, with a history of neglected foot injury. Physical exam reveals a medial retro-malleolar scar and irreducible hindfoot valgus with medial arch collapse on podoscopic view. Ultrasound and MRI confirmed TPT rupture with retraction of the tendon stump. This deformity impacts on patient's sport activities. Surgical TPT reconstruction was performed using the flexor hallucis longus (FHL) tendon fixed on navicular through a tunnel bone. Surgery was followed by physiotherapy at cast release. At last follow up correction foot is maintained with restoration of medial arch and children didn't need a further surgery.

Discussion and Conclusion: Tibialis posterior tendon is important in medial arch foot stability. In children, traumatic rupture of TPT can leads to significant FF deformity. Direct tendon repair is possible when done in emergency but impossible when there is retraction tendon stump. Reconstruction could be a therapeutic alternative procedure using FHL. Our case shows the effectiveness of this procedure leading to foot correction and avoiding more aggressive surgery. However, TPT rupture should be early diagnosis to prevent such deformity.

Keywords: Flat-foot; Child; Tendon transfer; Tendon injuries; Posterior tibial tendon dysfunction

INTRODUCTION

Flat foot (FF) is a common deformity in children. Usually idiopathic, this deformity can be secondary to neurological diseases, traumatic injuries, retraction of the Achilles tendon and synostosis. Tibialis posterior tendon (TPT) plays an essential role for longitudinal medial arch stability. TPT rupture is often reported in elderly [1,2] due to repeated microtrauma [3], and leading to mechanical tendon dysfunction. Traumatic rupture of

the TTP in children is rare, and when misdiagnosis direct suture with therapeutic challenging the late discovery of such lesion that went unnoticed is even more unusual [4].

CASE REPORT

A 15-year-old female patient with a history of neglected open foot injury (non treated wound by broken glass at the age of five) presented with a right foot deformity that had slowly developed. This deformity had progressively worsened, impacting the patient's daily life with plantar pain during shoe-wearing and sport activities, as well as aesthetic discomfort.

Physical exam revealed, either a scar in the posteromediall ankle, disappearance of the medial plantar arch when loaded and unloaded compared with the left foot (Figure 1), a hindfoot valgus about 10°, not fully corrected in in toeing standing position.

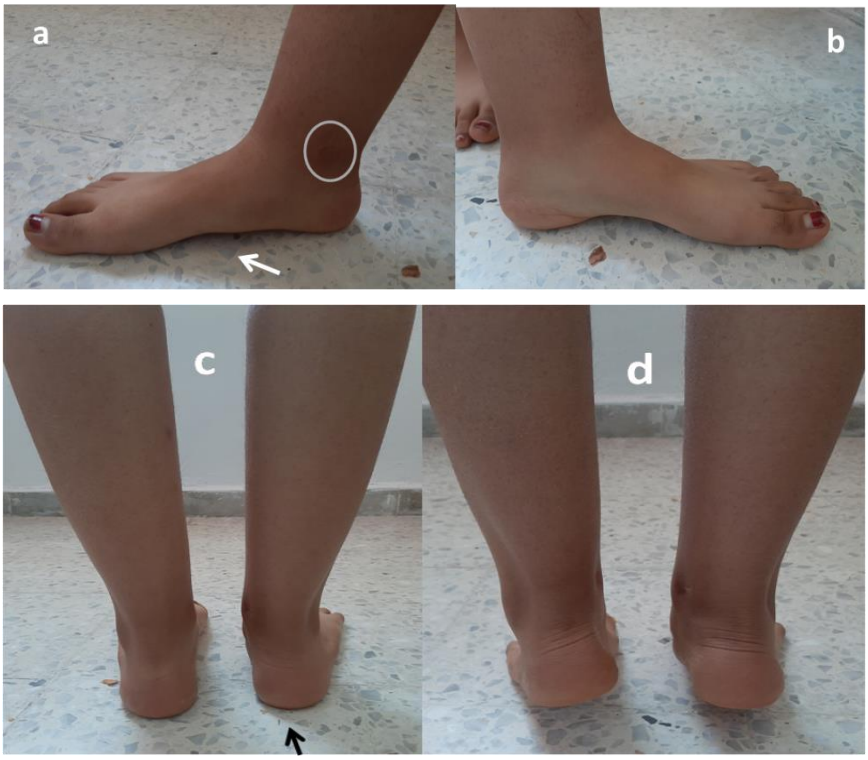

Figure 1: a- medial arch foot collapse with scare in retromaleollae ankle
b- comparative left foot with a normal medial arch
c-: hind foot valgus
d-non fully corrected in toeing standing maneuver

Muscle evaluation revealed a deficiency in the inversion of the right foot compared to the contralateral foot. The posterior tibial muscle was evaluated at 1/5. Standing foot x ray (Figure 2: 3a-b) confirm medial arch collapses with a lower pinch angle (Right/left: 15/40°), a higher talocalcaneal angle (right/left:36,/20°) confirming hi valgus hindfoot. Ultrasound revealed a TPT rupture with a measured space of 6 centimeters between the two ends of the tendons. MRI (Figure 2: c-d-e) was performed and confirms TPT rupture with retraction.

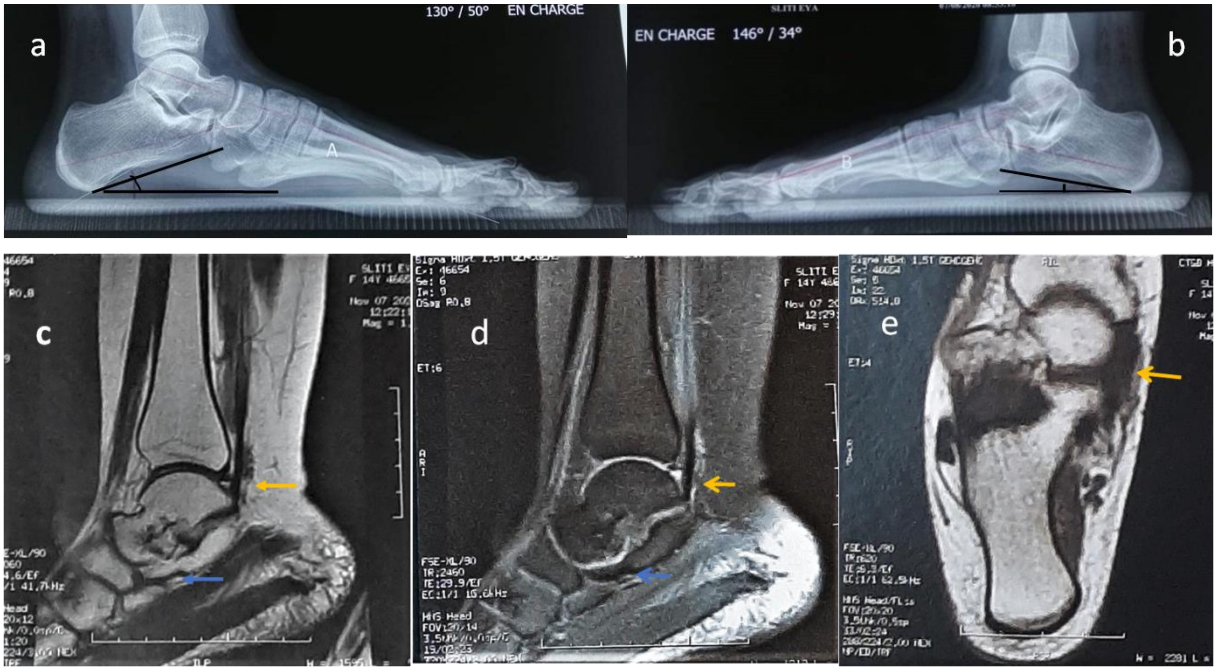

Figure 2: a- b-lateral x ray showing a lower pinch angle in right foot (a) with increased talocalcaneal angle , c-d-e: rupture and retraction of TPT on sagittal and axial sequences

Flat foot was secondary to missed TPT rupture. Surgery was indicated and direct suture was not possible due to retraction. TPT reconstruction was than performed using flexor hallucis longus (FHL) tendon. A posteromedial approach to locate proximal portion of TPT and the FHL, the incision is extended distally and the FHL was detached and then fixed to navicular using a tunnel bone. TPT and FHL was than sutured to each other proximity.

After six weeks of cast immobilization, physiotherapy sessions were initiated. The medial arch was restored. The patient regained a plantar arch like the opposite foot without pain or functional discomfort **(Figure 4)**

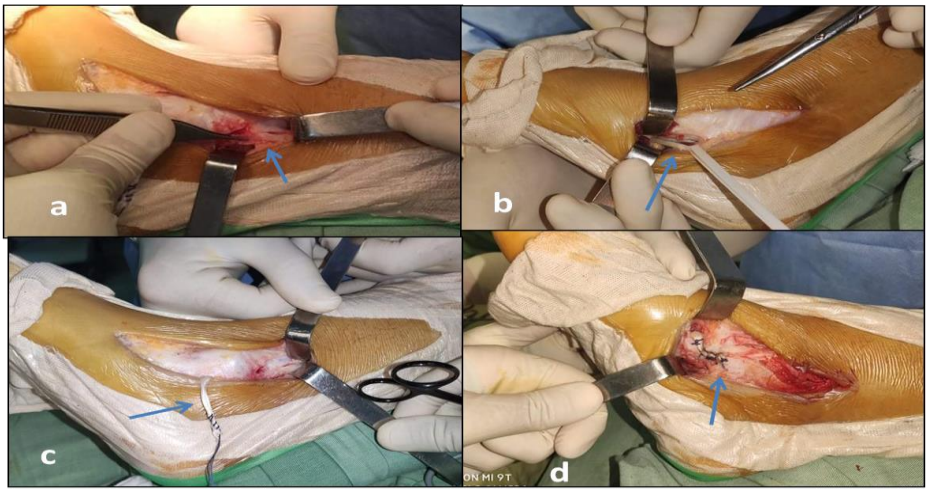

Figure 3: a- proximal portion of sectioned TPT, b- c: identifying and detaching FHL distally putting in vicryl2/0 , d: fixation of the FHL to a navicular throuhy tunnel bone

Figure 4: Restoration of plantar medial arch

DISCUSSION

Tibialis posterior tendon associated with the ligaments of the midfoot, plays an essential role in the stability of the medial arch of the foot. An anomaly of the TPT would lead to an overload of the other supporting elements. Damage of the calcaneonavicular ligament (spring ligament), which is the main passive stabilizer of the talonavicular joint is responsible in FF progression with a risk of talonavicular dislocation[5]. An insufficiency or even rupture of the TPT may be responsible for acquired FF (6), and the rupture could be misdiagnosed since foot inversion is compensated by toe flexors and tibialis anterior [2]. Often, the late appearance of flatfoot symptoms prompts patients to seek medical attention and discover this TPT insufficiency [4]. N. Citron reported two cases of TPT rupture in children who presented a few months later with symptomatic flatfoot [7], which was repaired directly by end-to-end suture; the outcome was satisfactory in one case, while the other required secondary intervention. A. Abosala also repaired TPT rupture by direct suture a few months after the injury, but the patient required re-exploration for inversion weakness. Therefore, direct TPT repair may not be effective with tendon retraction and poor suture outcome.

Mann and Thompson's reported correction of TPT rupture by transfering LFO into navicular or TPT advancement with excellent results in majority of cases. This type of repair is similar to our case but applied to adult population.[2]

E. Masterson [4] reported three cases of TPT rupture treated by transfer of the long flexor hallucis tendon. Our case concerns a child who was treated ten years after TPT rupture, which was retracted in a retro-malleolar position, and direct suture was not possible.

CONCLUSION

Traumatic TTP rupture can lead to gradual flatfoot in children, highlighting the importance of a careful clinical exam to identify any overlooked or missed wounds or lacerations in foot injury. LFO transfer can be effective if late diagnosis and this procedure could correct the medial arch collapse.

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