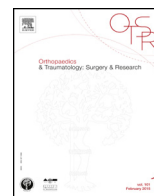




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Original article

Too-long calcaneal process: Results of surgical treatment and prognostic factors



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ABSTRACT

Introduction: The too-long anterior process (TLAP) can be responsible for ankle pain or repeated sprains in children or adolescents. The objective of this study was to assess the results of TLAP surgical treatment and to analyze influencing factors in case of this surgery's failure.

Material and methods: Retrospective single-center study conducted from 2009 to 2012 including all patients under 18 years of age for a TLAP with follow-up equal to or longer than 1 year. The results of surgical treatment were assessed using the AOFAS score. Failure was defined as no significant improvement in the AOFAS score at the last follow-up.

Hypothesis: Predictive factors of the result of surgical treatment for TLAP can be identified.

Results: At the mean follow-up of 2.5 years, 35 patients (43 feet) fulfilled the inclusion criteria. Thirteen feet (30%) presented surgical failure. According to the AOFAS score, the results were excellent in 30 feet (70%), good in four (9%), fair in five (12%), and poor in four (9%). Surgical failure was influenced by the patient's age at the onset of symptoms and at the time of surgery, the degree of functional limitation, the duration of symptoms before surgery, the number of sprains, and gender ($P < 0.05$).

Conclusion: Firstly, in this pediatric population with its high functional demand, the overall rate of failure of TLAP surgery was 30%. Secondly, the factors associated with failure demonstrated made it possible to identify the ideal patient for this surgery: male, with symptom onset between 7 and 10 years of age, who had experienced fewer than 15 sprains, and undergone surgery in the 3 years following the beginning of symptoms.

Level of evidence: IV.

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1. Introduction

Congenital calcaneonavicular coalitions can be bony (synostoses), cartilaginous (synchondroses), or fibrous (syndesmoses). They were defined by Harris and Beath [1] in a large epidemiological study. Later, in 1983, Hardy and Pouliquen [2] and then Rouvreau et al. [3] defined the rudimentary form of these coalitions, calling them too-long anterior processes (TLAPs). This was an abnormally long anterior process of the calcaneum, between the cuboid and the head of the talus, causing impingement with the navicular bone. According to Leonard [4], the normal distance between the anterior process of the calcaneum and the navicular bone should be between 5 and 10 mm: a distance less than 5 mm as demonstrated on MRI is a strong argument in favor of TLAP. The presence of a calcaneal spur

causes an impingement on the navicular bone upon supination of the foot, responsible for a “nutcracker” effect. Bilateral forms are frequent, ranging from 42 to 72% of cases [5,6].

Clinically, the TLAP manifests by repeated sprains in children or adolescents. It also causes sub- and mediotarsal pain when the foot is in supination, during sports, or on palpation of the tarsal sinus. Pain and repeated immobilization periods limit activities and result in a handicap in daily activities. Conservative treatment with a cast or orthotics is associated in two-thirds of cases with poor results according to Pouliquen et al. [6]. The results of surgical treatment for TLAP have not been sufficiently described in the literature [3,6–8].

The working hypothesis was that predictive factors of the results of surgical treatment could be identified. The main objective of this study was to report the results of surgery as reflected by the AOFAS Ankle-Hindfoot Scale score (AOFAS AHS) [9]. The second objective was to identify the factors associated with this surgery's failure.

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Fig. 1. Foot X-ray, three-quarter view: the too-long anterior process is visible.

2. Material and methods

2.1. Description of the cohort

We conducted a retrospective study including all patients under 18 years of age operated on for TLAP from 2009 to 2012 in our institution. We excluded patients with postoperative follow-up less than 1 year, patients presenting associated ligament lesions, synchondrosis, and complete tarsal synostosis.

Clinical suspicion of TLAP (number of sprains > 3, tarsal pain when participating in sports, subtalar joint stiffness) was confirmed by an oblique view of the medial foot (Harris projection) (Fig. 1) and an MRI of the tarsus (Figs. 2–4), showing an anteromedial process of the extended calcaneum, located between the talus and the cuboid and navicular bones with a distance less than 5 mm (oblique sagittal views in the plane of the first metatarsal in T1-weighted, proton density [PD] fat saturation, BASG, T2, and a DP fat saturation axial sequence).

2.2. Surgical technique

The same surgical technique was used for each intervention [10–12] with no interposition at the resection site [13,14]. The surgery was performed with a tourniquet cuff, via an approximately 3-cm diagonal incision in a skin fold, centered on the anterior process of the calcaneum. The skin and the subcutaneous tissue were folded back and the short extensor of the toes was incised. A spatula was used to identify the anterior process of the calcaneum as well as the talonavicular, talocalcaneal, and calcaneocuboid joints (Fig. 5). The TLAP was then resected en bloc using an osteotome. The residual bone fragments were removed using a bone nibbler to leave the interval between the navicular and calcaneum completely free (Fig. 6). Horsley wax was applied on the bone resection, and after testing the subtalar joint range of movement, the wound was closed in two planes. Postoperatively, the wound was protected with a simple bandage and early mobilization was encouraged. Walking was authorized the day following the intervention, assisted by a physical therapist.

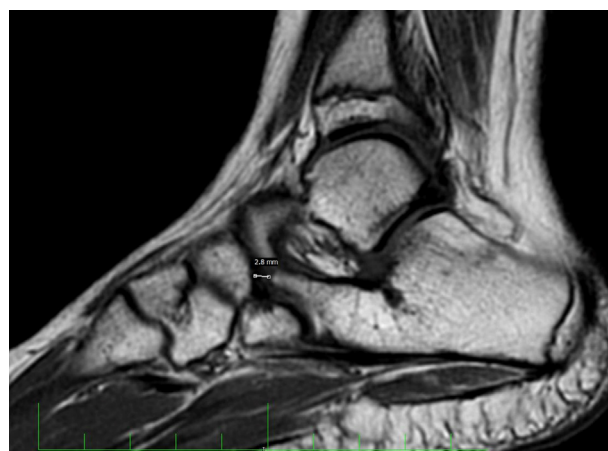


Fig. 2. MRI; sagittal T1-weighted view: the too-long anterior process is visible. Distance from anterior process to navicular bone < 5 mm.



Fig. 3. MRI; sagittal BASG view: the too-long anterior process is visible. Distance from anterior process to navicular bone < 5 mm.



Fig. 4. MRI; sagittal DP Fat-Sat view: the too-long anterior process is visible. Distance from anterior process to navicular bone < 5 mm.

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