



Surgical Treatment of Calcaneo Navicular Coalition in the Children: Case Report

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ABSTRACT

The calcaneo navicular coalition is congenital fusion of the two bones of the tarsus, the calcaneus and the navicular bone. With the talocalcaneal coalition, it constitutes the most common form of tarsal coalitions. Often asymptomatic, the calcaneo navicular coalition, generally easy at radiological diagnosis when it comes to oblic foot exercise, requires in case of intense pain, a surgical operation. Several surgical methods are proposed by the authors, including the double arthrodesis and resection of the coalition with the interposition of the extensor brevis muscle or fat tissue. The interest of this study is to shed light on the interest of the pedal muscle interposition after resection of the tarsal coalition at the talocalcaneal articulation achieved before the end of the growth for the prevention of recurrence and total disappearance of symptoms in children. As sample, we propose the observation of a girl aged ten years old, with symptomatic form of calcaneo navicular coalition treated surgically by resection with pedal muscle interposition. Clinical results, valued at an average of twelve months after surgery, were satisfactory.

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1. Introduction

The calcaneo navicular coalition are infrequent anomalies: they affect 1 to 2% of the general population [1], [2], [3]. Some are well tolerated, others are accompanied by pain, functional impairment and strain the back foot, especially the flat foot and valgus foot [4]

We are bringing to discussion a case of a young girl of ten year's old suffering from calcaneo navicular coalition, which presented pain, stiffness of the hindfoot with a significant limitation of daily activities and sports performance.

A Surgical treatment of tarsal coalitions does not respond to well conducted measures, includes in most cases a resection with interposition to reduce recidivism [5] or arthrodesis.

The interposition options comprise fat grafting, the pedal muscle, bone wax, or a human acellular dermal matrix for tissue regeneration [6]. This work will show the effectiveness of our therapeutic choice is resection of the coalition with the interposition of the pedal muscle to completely remove the painful symptoms and prevent relapse by comparing our results to those of other published works.

2. Materials and methods

2.1. Observation

FZ.S. old ten year's old girl complained of mechanical pain of the tarsus and the left lateral malleolus for over a year. Those symptoms caused a progressive deterioration of walking with a significant worsening in the last three months. There was no history of trauma, either direct or indirect. Different treatments had been carried out without satisfactory results: two local infiltration of anesthetic, analgesic and anti-inflammatory drugs and cast immobilization.

On examination, the girl could walk using essentially two canes but there was a partial discharge of the left leg. It has been noted a flat foot with calcaneal valgus, an important limitation of passive mobilization of the mid-tarsal joint

contracture associated with peroneal muscles. There was also a pain on palpation of the subtalar region of the medial tarsal spaced and on the path of the peroneal tendons.

The radiological study of the foot, on the impact of front, side and oblic three quarters, suggesting the possibility of tarsal coalition (Fig. 1). The additional study by scanner of the ankle showed the existence of a calcaneo navicular coalition (Fig. 2 and Fig. 3).



Figure 1. X-ray of the ankle profile suspecting calcaneo navicular coalition.



Figure 2. Sagittal scan slice confirming calcaneo navicular coalition.

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Figure 3. CT reconstruction image showing the ankle bone fusion between the two bones of the tarsus: the calcaneus and the navicular bone.

2.2. Surgical Technique

The patient was installed in the supine position, with tourniquet at the thigh. The incision was anterolateral, in front of the sinus tarsal. The extensor digitorum brevis muscle was retracted distally, revealing synostosis (Fig. 4).

Subsequently, the patient underwent a resection of the calcaneo navicular coalition with interposition of the extensor brevis muscle at the site of the coalition (Fig.5). Our surgery was completed at the end by a cast boot for 4 weeks.



Figure 4. Intraoperative image showing the resected bone bridge coalition; the right screw clamp holds the pedal muscle.



Figure 5. intraoperative images showing different time pedal muscle interposition at the resection area of coalition. A: Dissection of the pedal muscle. B: tensile muscle resection through the zone by traction thread and fixing the side of the coalition. C: Final appearance with filling of the resection zone by muscle.

After surgery, a discharge was introduced for four weeks with a rehabilitation program started after a month consisting in a joint mobilization, muscle strengthening, and proprioceptive stimulation training of walking.

The patient evolved favorably with the normalization of walking and daily activities after a twelve-month decline.

3. Discussion

The tarsal coalition are congenital abnormalities, hereditary [2], [7] affecting about 1% of the population, consisting of abnormal bridge, bone or proper coalition, cartilage (synchondrosis) or fibrous (synfibrose) between two bones tarsus. The talocalcaneal and calcaneo navicular coalitions are the most common distance.

The coalition is the consequence of an abnormal differentiation or segmentation primitive mesenchyme that would occur in the first trimester of pregnancy [8], [9],[10].

There are associations with malformation syndromes more diffuse (hand-foot-syndrome uterus, carpal synostosis, symphalangism, Alpert syndrome, Nievergelt-Pearlman syndrome) [8].

Less frequently, the picture may be secondary to trauma, infection, surgery or joint pathology. Often asymptomatic, this coalition may be responsible for instability of the ankle.

The most characteristic clinical expression is flat foot contractured and painful spasm of the peroneal tendons. The radiographic diagnosis of calcaneo navicular coalition is usually easy, provided you ask affect \ll oblic foot or \gg place [1].

However, CT scans or MRI allows an accurate diagnosis of the type of research synostosis and other bone lesions. The scanner is now considered the gold standard in the diagnosis of coalition [8], [11], [12]. We came to the realization of frontal, axial and coronal centered on the area where synostosis has been suspected. These cuts must also be fine, not to miss abnormalities that may be slightly extended.

The scanner can view the bony bridge when escaped standard radiographs, but it also shows in partial with pathological irregularities normally separate surfaces, the medial border of the articulation subtalar virtually plumb with the malleolus medial and lateral portion of the calcaneo navicular joint. Some researchers [13], [14], [15], [16] have recommended conservative treatment as first-line treatment of symptomatic tarsal coalitions.

Conservative treatment provides satisfactory results in 22% to 46% of cases [16], [17], [18] but also disappointing to some [19]. Our results corroborate with the results of these researchers because our patient did not improve under adequate medical treatment. Surgical treatment involves resection of the coalition, indicated preferably before the end of growth, especially in the calcaneus-navicular forms [11].

In the series of Gonzalez [20], treating the calcaneo navicular coalition on 75 patients, the recurrence rate after resection and interposition of the short extensor muscle of toe was 22%. This rate was 10% in the series of Moyes and al [21] that had 90% of good results using the same surgical treatment process of the calcaneo navicular coalition, which has been chosen.

The recurrence rate was 66% in the heterogeneous series of Mitchell and al [22] made for children with an calcaneo navicular coalition or talocalcaneal, who had advocated just a simple resection of the coalition or without the interposition of the grease or the pedal muscle. Wouters [23] noted no recurrence in two patients in his series with calcaneo navicular coalition.

A guide previously prepared from the CT data helped steer resection according to the correct depth. Allogeneic fascia lata is then interposed at the location of the resecting site. However, despite the development of surgical procedures of calcaneo navicular coalition, the authors did not find an optimal method for treating this type of coalition.

4. Conclusion

The tarsal coalition are rare lesions that usually appear during childhood and adolescence and are responsible for an impaired walking. If diagnosed early, before the onset of radiological signs of osteoarthritis, the calcaneo navicular coalition remains good prognosis.

We believe that resection of the coalition with the interposition of the pedal muscle is the best method for providing pain relief and prevent the recurrence, because of its simplicity and specificity.

5. Disclosure of interest

The authors declare having no conflicts of interest related to this article

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