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Case report

Distal metatarsal synostosis: A case report

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ABSTRACT

We report a rare case of distal metatarsal synostosis of the 4th and 5th metatarsals in an 11 year old male. He was referred with forefoot pain. Clinical examination and radiographs have confirmed an osseous connection of the distal 4th and 5th metatarsal. This was treated surgically with bony bridge excision and the patient is now asymptomatic.

1. Introduction

Synostosis is the osseous union of any two adjacent bones and it can occur anywhere in the body. It is either acquired i.e. post-traumatic or congenital due to abnormal embryonic mesenchymal separation. Synostosis of the forefoot is rare and in particular synostosis of the metatarsals is extremely rare. It usually forms part of various congenital anomaly patterns and syndromes (Table 1). Most of the cases reported are congenital between the base of the 4th and 5th metatarsal and less commonly between the 1st and 2nd metatarsals [1–4].

2. Case report

An 11 year old was referred to the paediatric orthopaedic department with increasing pain in his forefoot. He had an unremarkable birth history and achieved all childhood milestones appropriately. He was the second child of healthy unrelated parents who are not known to have any abnormality of their extremities. He did not have any issues with regards to his feet prior to this episode.

Clinical examination demonstrated a 5th digit that appeared shortened and pointing medially. The 5th metatarsal head was found to be plantarly pointing and a callosity had developed underneath it. The 4th digit was found to be pointing slightly dorsally. Both the 4th and 5th digits were found to be stiff. Clinically there was evidence of flatfoot deformity caused by the abnormal synostosis (Photos 1 and 2).

Radiographs at the time showed a metatarsal bar between the 4th and 5th metatarsal distally. The physeal plate of the 5th metatarsal was found to be pointing laterally. There was medial subluxation of the 5th proximal phalanx in relation to the epiphysis of the 5th metatarsal (Figs. 1 and 2).

Initially the child was treated conservatively with custom made shoe orthosis. However as the child remained symptomatic, surgical management was recommended. This involved excision of the bony bridge and separation of the space between the 4th and the 5th metatarsal. A periosteal sleeve from the two metatarsals was lifted and laid over the bare areas in order to prevent a repeat bony bridge forming. This was followed with a dorsal medial closing wedge osteotomy for the 5th metatarsal that was fixed with a 5 hole mini fragment plate, and a lateral closing wedge osteotomy for the 4th metatarsal that was also fixed with a 5 hole mini fragment plate (Figs. 3 and 4). The post-op period was uneventful and the child was treated with a plaster bootee for 6 weeks (3 weeks non weight bearing and 3 weeks partial weight bearing). He was followed-up for 4 years until physeal closure.

3. Discussion

Metatarsal synostosis of the 4th and 5th metatarsals is very rare and is usually a manifestation of various syndromes. The synostosis usually occurs proximally at the bases of the metatarsals.

The Pfeiffer-Kapferrer syndrome was described in 1988 [5]. It is very rare with a prevalence of <1/1,000,000. It has an autosomal dominant pattern of inheritance. This syndrome is associated with early fusion of the bones of the skull, sensorineural deafness, psychomotor delay, abnormal dermatoglyphics, genital anomalies (hypospadias in males) and foot and hand anomalies. The big toes as well as the thumbs are usually broad and deviated. Partial

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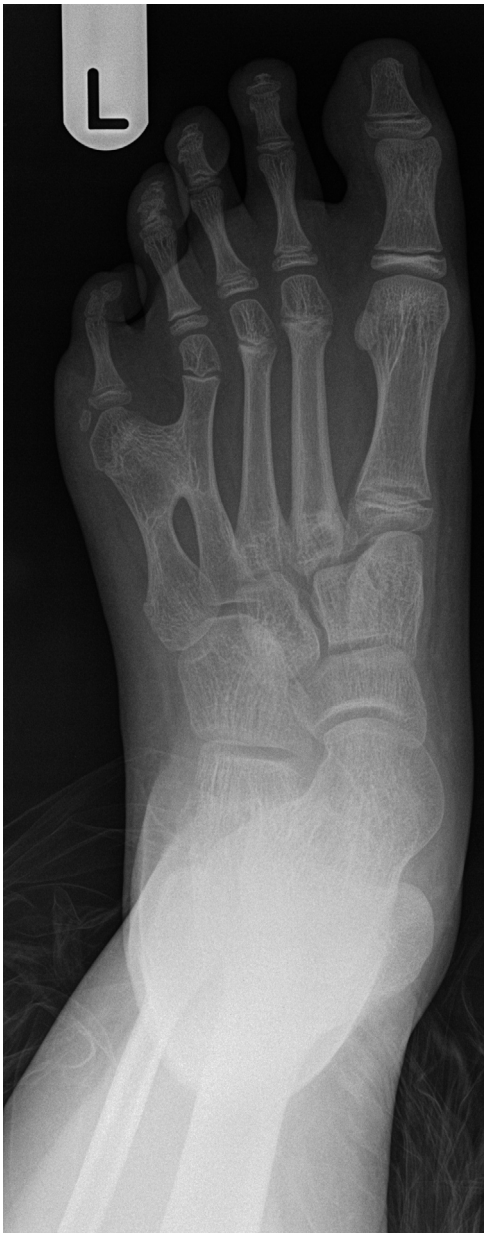

Fig. 1. Preoperative anterio-posterior radiograph of the left foot that shows the distal metatarsal synostosis between the 4th and 5th metatarsals.

syndactyly of hand and feet is common. Bilateral synostosis of the metatarsals as well as the 4th and 5th metacarpals is often seen in these cases. The diagnosis is based on the presence of abnormal thumbs or first toes with craniosynostosis [6].

The Cenani-Lenz syndactyly also manifests with metatarsal synostosis [7,8]. This is an autosomal recessive congenital

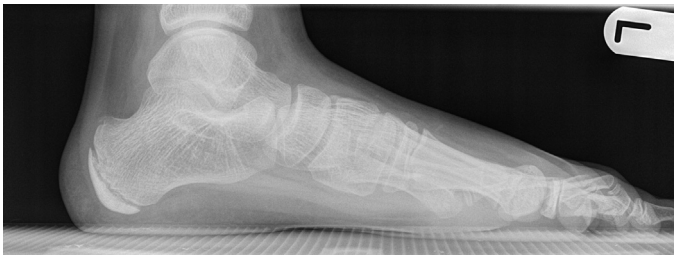

Fig. 2. Preoperative lateral radiograph of the left foot.

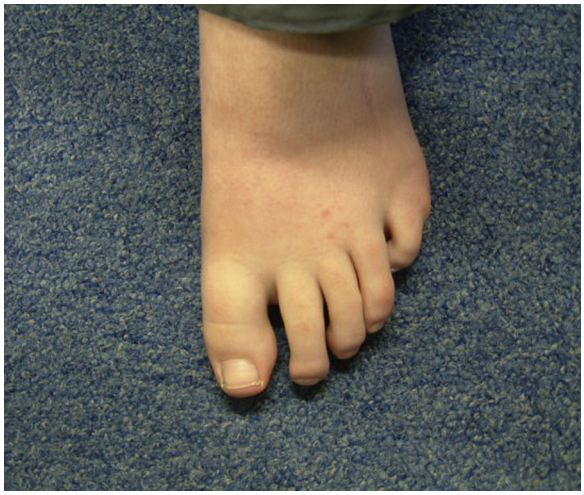

Photo 1. Preoperative photograph of the left foot (dorsal aspect).

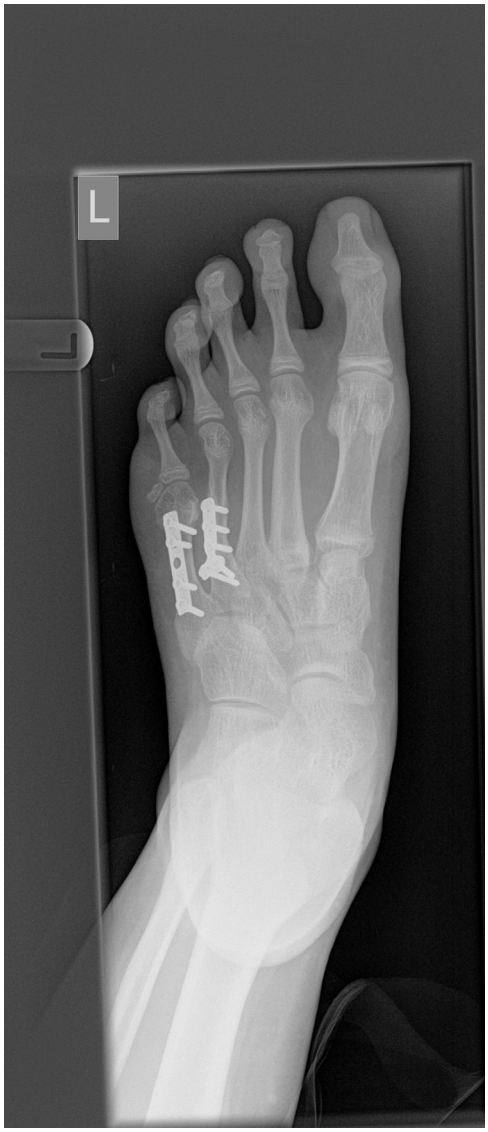

Fig. 3. Postoperative anterio-posterior radiograph of left foot following medial closing wedge osteotomy for the 5th metatarsal and a lateral closing wedge osteotomy for the 4th metatarsal.