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Case report

Brachymetatarsia with accessory navicular in right foot: A rare coincidental finding

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ABSTRACT

A 33 years old female patient presented with posttraumatic pain in the right foot for which radiographs of the right foot was advised. No fracture was detected on radiographs and patient was managed conservatively on medications and posterior splint immobilization. We found coincidentally a short fourth metatarsal and an accessory navicular bone in the right foot radiographs. After 3 weeks of immobilization, she underwent mobilization of the right foot, weight bearing and intensive physiotherapy for 6 weeks. After two months of injury she was still complaining of pain on the plantar aspect of right foot which was diagnosed as metatarsalgia and operated on by excision of the neuroma present in the 3rd web space of the right foot. After surgery she was completely relieved of pain and could do activities well related to the right foot.

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Introduction

Brachymetatarsia also known as congenital short metatarsus is a rare condition that develops from early closure of the growth plate. Females are almost exclusively affected (F:M = 25:1). It typically involves the 4th ray or, less frequently, more than one metatarsal bone. Brachymetatarsia can be related to several genetic conditions and syndromes. An accessory navicular also known as os tibiale externum is a large ossicle adjacent to the medial side of the navicular bone. The tibialis posterior tendon often inserts with a broad attachment into the ossicle. Most cases are asymptomatic but in a small proportion it may cause a painful tendinitis due to traction between the ossicle and the navicular. An accessory navicular bone is present in 10% (range 4%–21%) of the population and is usually first detected near adolescence. This is more commonly seen in female patients with reported bilateral prevalence of 70% (range 50%–90%). In our case, this co-occurrence of short fourth metatarsal and an accessory navicular in a foot is never reported before in the literature which prompts us to report this case. All procedures performed in our case report involving human

participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from the patient included in our case report.

Case report

A 33 years old female presented to orthopaedic outpatient department with pain and swelling of right foot after twisting of the foot while walking on stairs. She was advised to have a radiograph of right foot. No fracture or major injury detected on radiographs. She was advised to take analgesics, anti-inflammatory medication and immobilization for 3 weeks in posterior below knee splint. We found two coincidental findings 1) short fourth metatarsal and 2) an accessory navicular in radiograph of right foot (Fig. 1). Clinically she was having short 4th ray of right foot (Fig. 2). After 3 weeks of immobilization, she underwent mobilization of right foot, progressive weight bearing and intensive physiotherapy for 6 weeks. After two months of injury she was still complaining of pain on the plantar aspect of right foot which was diagnosed as metatarsalgia and operated by excision of the neuroma present in the 3rd web space of right foot. Postoperatively, she was advised not to wear footwear with narrow toe-box to avoid recurrence. After surgery she was completely relieved of pain and could do activities well related to the right foot.

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Fig. 1. X-ray AP and oblique views of the right foot showing accessory navicular bone and short fourth metatarsal.



Fig. 2. Clinical photograph of bilateral foot of the patient.

Discussion

Brachymetatarsia is a rare condition of the foot characterized by shortening of the metatarsal bones. The reported incidence is 0.02%–0.05% and female patients exceed males by a ratio of approximately 25:1.^{1,2} It is thought to be the consequence of retarded growth or premature closure of the epiphyseal plate. Brachymetatarsia may be congenital or idiopathic in etiology and may be associated with systemic diseases such as pseudo-hyperparathyroidism, Turner's syndrome, Down's syndrome, Apert syndrome, enchondromatosis, multiple epiphyseal dysplasia, sickle cell anemia, and poliomyelitis.^{3–9}

Brachymetatarsia may affect one or more metatarsals and may be unilateral or bilateral.^{1–7,10–12} with the incidence of bilateralism more than 50%.^{8,13} This may be accompanied by hypoplasia of the phalanx, hypoplasia of the soft tissue, brachydactyly, brachymetatarsia, or osteochondromatosis.

The pathology of brachymetatarsia may result in abnormal pressure distribution of the forefoot causing excessive load and pain at adjacent metatarsals. In addition, the digit of the shortened metatarsal may be dorsally displaced, resulting in callous and shoe-wear problems.⁴ Lastly, some patients may be concerned exclusively with the appearance of the foot.

Patients seeking treatment commonly have cosmetic concerns. However, many may also complain of pain in the forefoot or toes, callosities, or problems with shoe wear due to toe malalignment.^{12,14} Multiple surgical techniques have been reported for the management of brachymetatarsia. These include acute lengthening with internal fixation and gradual lengthening by the manner of distraction osteogenesis. Several articles regarding brachymetatarsia are reported in the literature. In our case, patient is not having any complaint related to short fourth metatarsal and related to its appearance.

An accessory navicular is an extra bone that is on the inner center arch of the foot. Up to 2.5% of individuals are born with the accessory navicular. Throughout early childhood, this condition is not noticed. However, in adolescence, when the accessory navicular begins to calcify, the bump on the inner aspect of the arch becomes noticed. This is more commonly seen in female patients with reported bilateral prevalence of 70% (range 50%–90%). For most, it is never symptomatic. However, for some, there is some type of injury, whether a twist, stumble, or fall, that makes the accessory navicular symptomatic.

There are three different types of accessory navicular. This extra cartilage, which is turned into bone, is found attached to the tibialis posterior tendon, just at medial (inside) navicular bone. The accessory navicular can affect the insertion of the posterior tibial tendon. This tendon is responsible for keeping your foot aligned and helping to maintain an arch. The accessory navicular can be associated with a normal foot posture and alignment, or sometimes with a flat (pes planus) foot as seen in our patient.

In most of the patients it is asymptomatic and found incidentally on radiographs. Although medial side foot pain is the most common presenting feature of accessory navicular bone, the pain is aggravated by walking, running and weight bearing activities. When large, it can protrude medially and cause friction against footwear. An accessory navicular bone is located posterior to the posteromedial tuberosity of the tarsal navicular bone. Radiographs show a medial navicular eminence which is best visualised on the lateral-oblique view. A symptomatic accessory navicular may appear as a 'hot spot' on a bone scan and bone marrow oedema can be seen on an MRI. Acute pain can be managed by corticosteroid injection and immobilization of the foot for 2–3 weeks. For refractory cases surgical management can be considered.

In our case, we used radiographs to detect that the patient had an accessory navicular bone in the right foot coincidentally after falling on some stairs. Patient was having no symptoms related to presence of accessory navicular bone but having pes planus in her right foot.

In review of the literature, we found several cases of short fourth metatarsal and accessory navicular bone in the foot reported separately in articles. But, we did not find a single case with co-occurrence of a short fourth metatarsal and accessory navicular bone in a foot of a single patient.

References

1. Mah KK, Beegle TR, Falknor DW. A correction for short fourth metatarsal. *J Am Podiatr Med Assoc.* 1983;73:196–200.
2. Urano Y, Kobayashi A. Bone lengthening for shortness of the fourth toe. *J Bone Jt Surg Am.* 1978;60:91–93.
3. Bioke AM, Gerber MR, Snyder AJ. Brachymetatarsia. Axial lengthening by using the callus distraction technique. *J Am Podiatr Med Assoc.* 1993;7:373–378.

4. Ferandez L, Yubero J, Usabiaga J, et al. Congenital brachymetatarsia: three cases. *Foot Ankle*. 1993;14:529–533.
5. Fox IM. Treatment of brachymetatarsia by the callus distraction method. *J Foot Ankle Surg*. 1998;37:391–395.
6. Magnan B, Bragantini A, Regis D, et al. Metatarsal lengthening by callotaxis during the growth phase. *J Bone Jt Surg Br*. 1995;77:602–607.
7. Robinson JF, Ouzounian TJ. Brachymetatarsia: congenitally short third and fourth metatarsals treated by distraction lengthening – a case report and literature summary. *Foot Ankle Int*. 1998;19:713–718.
8. Wada A, Bensahel H, Takamura K, et al. Metatarsal lengthening by callus distraction for brachymetatarsia. *J Pediatr Orthop B*. 2004;13:206–210.
9. Davidson RS. Metatarsal lengthening. *Foot Ankle Clin*. 2001;6:499–518.
10. Kawashima T, Yamada A, Ueda K, et al. Treatment of brachymetatarsia by callus distraction (callotaxis). *Ann Plast Surg*. 1994;32:191–199.
11. Levine SE, Davidson RS, Dormans JP, et al. Distraction osteogenesis for congenitally short lesser metatarsals. *Foot Ankle Int*. 1995;16:196–200.
12. Takakura Y, Tanaka Y, Fujii T, et al. Lengthening of short great toes by callus distraction. *J Bone Jt Surg Br*. 1997;79:955–958.
13. Kessler I, Baruch A, Hecht O. Experience with distraction lengthening of digital rays in congenital anomalies. *J Hand Surg Am*. 1977;2:394–401.
14. Shim JS, Park SJ. Treatment of brachymetatarsia by distraction osteogenesis. *J Pediatr Orthop*. 2006;26:250–254.