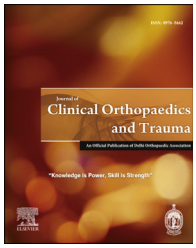
Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/jcot



Case report

Os intermetatarseum – A case report

*Viswanath H. Chavali M.S. Orthopaedics**

Assistant Professor, Dept of Orthopaedics, Baroda Medical College, Vadodara, Gujarat 390001, India

ARTICLE INFO

Article history:
Received 6 August 2011
Received in revised form
11 October 2011
Accepted 8 November 2011
Available online 16 June 2012

Keywords:
Os intermetatarseum
Accessory ossicles
Anterior tarsal tunnel syndrome
Dorsal foot pain
Deep peroneal nerve

ABSTRACT

Accessory ossicles and sesamoid bones are skeletal variations, more commonly seen in the region of foot and ankle. Most such accessory and sesamoid bones remain asymptomatic. However overuse and trauma can make such feet symptomatic. Knowledge of such bony ossicles is essential in the management of patients presenting with foot pain.

Dorsal foot pain can be caused by a symptomatic Os intermetatarseum – an accessory ossicle found between the bases of first and second metatarsals and the medial cuneiform. Its incidence has not been well established because of insufficient appropriate multi-centric anatomical, radiological and orthopaedic studies. A case of dorsal foot pain in a soccer player, caused by an Os intermetatarseum is reported here. A brief review of the literature is also presented.

1. Introduction

Sesamoid and accessory bones are found in the region of the foot and ankle with varying incidence. The Os intermetatarseum also called as Os intermetatarseum-One[1] and Os intermetatarsale[2] is a less common accessory ossicle, found in the space between the medial cuneiform and the bases of first and second metatarsals. Its size and shape varies[1,3–5] and is frequently asymptomatic.[3,4,6,8] However cases of dorsal foot pain and/ or parasthesias in the first web space, related to a symptomatic Os intermetatarseum have been reported[1,5,6–11]; some related directly to the compression of the medial branch of the deep peroneal nerve.[6,8,10] Association of hallux valgus deformity with Os intermetatarseum has also been documented by some authors.[4,7,9,11–13]

Like many other accessory bones the Os intermetatarseum can occur in surprisingly high frequencies in some populations, yet usually goes unnoticed because the bone itself lacks distinct morphology.[2] The incidence of Os intermetatarseum has not been well established because of insufficient appropriate multi-centric anatomical, radiological and orthopaedic studies. Whereas a few studies of accessory bones of the feet[2–4] and case reports[1,5–12] have drawn attention to the presence of Os intermetatarseum, this article is probably the first reporting of an Os intermetatarseum from the Indian subcontinent. It is the author's intention to draw attention to this uncommon but possible cause of dorsal foot pain. The presentation of this case and a brief review of its literature will definitely create awareness regarding the clinical features and management of this accessory ossicle.

* A-109, Swami Residency, Near Air Force Station, Makarpura Road, Vadodara, Gujarat 390014, India. Tel.: +91 9426125857.
E-mail addresses: cviswanath1974@yahoo.co.in, vhcindia@gmail.com.
0976-5662/$ – see front matter
doi:10.1016/j.jcot.2011.11.002

2. Case report

An Indian male, 21-year old, experienced pain over the dorsum of his right foot while playing football. As he continued playing for the session, the pain increased and he experienced severe discomfort in kicking the ball. He was referred to the orthopaedic clinic to rule out an internal injury. Physical examination revealed physiologic pes planus (Figs. 1 and 2) and mild hallux valgus involving both feet. There was tenderness around the mid dorsum of the right foot close to the base of the first and second metatarsal. A positive percussion (Tinel like) sign was elicited in this region extending to the first web space. However no subjective parasthesias were found distally. No swelling or erythema was noted in the tender region. Pain and tenderness increased on standing tip toe and with full plantar flexion. The opposite foot was normal to palpation except for the visible pes planus. Past history was unremarkable and deemed non contributory. Roentgenogram of the affected side showed a tiny hourglass shaped ossicle between the base of the first and second metatarsal (Fig. 3). An X-ray of the opposite foot for comparison also showed similar findings (Fig. 4). The hallux valgus (HV) angle was 20° in the right foot and 22° in the left foot. The intermetatarsal (IM) angle was 11° on the right side and 13° on the left side. The condition was diagnosed as a case of symptomatic Os intermetatarseum. Because the clinical findings did not support a nerve compression, nerve conduction velocity studies were not performed. The clinical symptoms, signs and radiological findings strongly supported the diagnosis of an Os intermetatarseum, hence further imaging studies were kept reserved in the event of failure to respond to initial management.

As the patient had no history of similar episodes of dorsal foot pain in the past, he was advised non-surgical treatment in the form of NSAIDS, physiotherapy and foot wear modification. Moreover he was advised to refrain (for lifetime) from sports which involved running and kicking as he had bilateral pes planus with hallux valgus and Os intermetatarseum. He responded to this management within a week and was totally asymptomatic at the end of three weeks. When last followed up at six months, he was totally asymptomatic as regards to his feet, but had lately resumed his earlier sports activities even against medical advice.

Fig. 1 – Physiologic pes planus: loss of longitudinal arch on weight bearing.

Fig. 2 – Physiologic pes planus: normal appearance of longitudinal arch on non-weight bearing.

3. Discussion

Accounts of potential number and incidence of accessory bones in the foot and ankle region differ in literature. Reports

Fig. 3 – X-ray of right foot showing Os intermetatarseum.

Fig. 4 – X-ray of left foot showing Os intermetatarseum.

also differ as to the frequency of occurrence of the Os intermetatarseum. The earliest reporting of Os intermetatarseum was done by Wenzel Gruber.[2,6,7,10–12] However authors differ on the exact year of his reporting :1852,[2] 1856[7,11,12] 1877.[6,10] Pfitzner in 1896 had performed the most comprehensive anatomic study on cadavers in this regard.[2,10,12] The incidence of Os intermetatarseum ranges from 0.2–14% in literature.[1–4,6,7,10] Anatomical studies suggest a very high frequency (8–14%)[2] whereas radiographic studies tend towards frequencies less than 2%. This disparity can probably be attributed to the position of the Os intermetatarseum in the foot because this bone is said to be difficult to diagnose properly in standard radiographic views. It can be found as early as age two in females and age three in males.[1,6] It has been stated that bilateralism is the rule,[1] but unilateral occurrence was reported.[2,4] There has been enough evidence to maintain the hypothesis that the Os intermetatarseum represents a true accessory bone and not a supernumerary metatarsal as is seen in central polydactyly.[2,11,12] Pedigrees and family screenings have shown the Os intermetatarseum to be an inherited defect.[1,2,6,11,12]

The Os intermetatarseum can be divided in to three basic types: free standing, articulating and fused.[2,5,7] A free standing Os intermetatarseum is a completely independent ossicle with no articular or osseous connections to any of the neighbouring bones.[2] Articulating variety exhibit synovial articulations with either the first/second metatarsal or the medial cuneiform.[2] Such articulating surfaces were found to be covered by articular cartilage.[1,2,5,9] The fused forms are the rarest and often referred to as spurs.[2,5,7] Hallux valgus caused by such a fused form of Os intermetatarseum has been reported.[4,7,9,11–13] Morphologically this ossicle may be round, oval, kidney shaped, linear, spur-like or may even resemble a rudimentary metatarsal.[1,4] Histologically, cross sections of these ossicles represent a normal bone.[1,5,7,8] Differential diagnosis as regards to the X-ray picture includes exostosis, calcification of digital vessels or an avulsion fracture.[1,5,6]

Most Os intermetatarsia are asymptomatic.[3,4,6–8] Painful Os intermetatarsia have been reported following local trauma[5,10] and sports activities[6,8] probably because such events caused compression of the deep peroneal nerve. However a few cases of symptomatic Os intermetatarseum have been reported wherein a specific history of trauma or sports activities has not been highlighted.[1,7,9,12] Cavus feet, forced plantar flexion combined with toe dorsiflexion, tight shoes and ankle instability exaggerate the symptoms of pain and parasthesias.[6,10] All authors who have reported cases of Os intermetatarseum believe that this lesion should be managed initially by non-surgical methods including shoe wear modification and local corticosteroid injection. Surgery has been recommended and proved beneficial for cases not responding to conservative methods. Such Os intermetatarsia have frequently been found to compress the medial branch of the deep peroneal nerve.[6,8,10] Additionally, none of the reports mentioning surgical excision of a symptomatic Os intermetatarseum state the finding or presence of adventitious bursitis, tendonitis or any other significant local pathology that can be contributed to pain.

In agreement with some previous reports of an Os intermetatarseum becoming symptomatic during sports activities[6,8], in the case reported here as well, the symptoms appeared in the patient while playing soccer, probably due to kicking of the ball causing local trauma to the mid foot region. Further, the patient responded to conservative lines of management. Even a local corticosteroid injection was withheld because of the early relief in symptoms. This can partially be attributed to the physiological pes planus and loss of the medial longitudinal arch of the foot relatively decreasing the anatomic tightness of the local area (where the medial branch of the deep peroneal nerve passes through between the first and second metatarsal and the medial cuneiform). This association of an Os intermetatarseum with pes planus foot has not yet been reported in the literature, although a statistically insignificant association of hallux valgus with pes planus has been observed.[13] The patient was advised to avoid sports involving kicking and running for two reasons: first, he had bilateral Os intermetatarseum; one of which had caused symptoms and second, he had bilateral pes planus with hallux valgus; although the author agrees here that there is no direct scientific evidence to support this. At 6 months of follow up he was totally asymptomatic with regard to the feet but had of-late, resumed playing football. However if the clinical findings and investigations suggested anterior tarsal tunnel like syndrome compressing the deep peroneal nerve, a surgical exploration and excision of the accessory ossicle would have been warranted.

The clinical significance of accessory bones of the foot should be well recognised to properly evaluate patients with foot symptoms. A painful Os intermetatarseum should be

considered in cases of dorsal foot pain where the cause is not immediately apparent, especially in athletes.[5,8]

Conflicts of interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES

1. Scarlet JJ, Gunther R, Katz J, Schwartz H. Os intermetatarseum-one: case report and discussion. *J Am Podiatry Assoc*. 1978;68:431–434.
2. Case DT, Ossenberg NS, Burnett SE. Os intermetatarseum: a heritable accessory bone of the human foot. *Am J Phys Anthropol*. 1998;107:199–209.
3. Cilli F, Akçaoğlu M. The incidence of accessory bones of the foot and their clinical significance. *Acta Orthop Traumatol Turc*. 2005;39:243–246.
4. Coskun N, Yuksel M, Cevener M, et al. Incidence of accessory ossicles and sesamoid bones in the feet: a radiographic study of the Turkish subjects. *Surg Radiol Anat*. 2009;31:19–24.
5. Reichmister JP. The painful os intermetatarseum: a brief review and case reports. *Clin Orthop Relat Res*. 1980;153:201–203.
6. Nakasa T, Fukuhara K, Adachi N, Ochi M. Painful os intermetatarseum in athletes: report of four cases and review of the literature. *Arch Orthop Trauma Surg*. 2007;127:261–264.
7. Noguchi M, Ikoma K, Inoue A, Kusaka Y. Bilateral hallux valgus associated with os intermetatarseum: a case report. *Foot Ankle Int*. 2005;26:886–889.
8. Noguchi M, Iwata Y, Miura K, Kusaka Y. A painful os intermetatarseum in a soccer player: a case report. *Foot Ankle Int*. 2000;21:1040–1042.
9. Dunkerley GE. Os intermetatarseum. *Arch Dis Child*. 1957;32:243–244.
10. Knackfuss IG, Giordano V, Nogueira M, Giordano M. Compression of the medial branch of the deep peroneal nerve, relieved by excision of an os intermetatarseum. A case report. *Acta Orthop Belg*. 2003;69:568–570.
11. Waters L. Os intermetatarseum; case study and report. *J Am Podiatry Assoc*. 1958;48:252–254.
12. Henderson RS. Os intermetatarseum and a possible relationship to hallux valgus. *J Bone Joint Surg Br*. 1963;45-B:117–121.
13. Coughlin MJ, Jones CP. Hallux valgus: demographics, etiology, and radiographic assessment. *Foot Ankle Int*. 2007;28:759–777.