Painful os intermetatarseum in athletes: a literature review of this condition is presented

Bernardino Saccomanni

Abstract  Painful os intermetatarseum is a very rare condition. Gruber et al. first described os intermetatarseum in 1877. This condition is usually asymptomatic. One should consider painful os intermetatarseum as being a possible cause of dorsal foot pain in athletes. Surgical excision of the os intermetatarseum should be considered for those patients failing conservative treatment. Here, a literature review of this condition is presented.

Keywords  Os intermetatarseum · Athlete · Deep peroneal nerve · Anterior tarsal tunnel syndrome

Introduction

The accessory bones of the foot have been reported by several authors. However, os intermetatarseum is less common than os tibiale externum, os trigonum and os perineum. Gruber et al. [5] first described os intermetatarseum in 1877. The condition is usually asymptomatic.

In 1980, Reichmister [12] reported three cases of painful os intermetatarseum. Compression of the deep peroneal nerve by the os intermetatarseum was described as the pain generator. Naguchi et al. reported a case of painful os intermetatarseum occurring in a soccer player [10]. They suggested that repeated impact on the instep when kicking led to deep peroneal nerve injury above the os intermetatarseum. The current literature regarding this painful condition is reviewed here.

Epidemiology

The os intermetatarseum is a relatively uncommon accessory bone of the foot, usually found between the base of the first and second metatarsal bones. Gruber first described it in 1877 [5]. The incidence of os intermetatarseum ranges from 1.2 to 14% [2, 3, 11, 14]. Pfitzer et al. [11] documented a 12.5% incidence of it in his report of 520 cadaver dissections. Burman et al. [2] reported 3.3% incidence in a review of 1,000 roentgenograms of the foot. The os intermetatarseum often begins as a separate ossification centre and it may be found at age 2 in females and at age 3 in males. Familial tendencies have been recorded. Most os intermetatarsea are asymptomatic. In the literature, a total of six cases of painful os intermetatarsea have been reported. In 1978, Scarlet et al. [13] reported a case of painful os intermetatarseum. Reichmister [12] described three cases of painful os intermetatarseum.

Noguchi et al. [10] reported a case of painful os intermetatarseum related to sports activity. Knackfuss et al. [6] described a case of compression of the medial branch of the deep peroneal nerve by an os intermetatarseum.

Clinical presentation

The onset is frequently related to local trauma. Clinically the patients complained of pain and paresthesia with numbness radiating from the dorsum of the foot to the hallux and second toe, increasing with plantar flexion.
Tight shoes, ankle instability and cavus feet also aggravated the symptoms. A positive Tinel-like sign was elicited and paresthesia was observed distal to the compression site. There was also weakness of hallux extension. These symptoms are consistent with those of anterior tarsal tunnel syndrome, which is characterized by compression of the deep peroneal nerve by the inferior extensor retinaculum [7–9].

Diagnostic testing

Standard anteroposterior, lateral and oblique radiographs of the foot should be taken to identify the os intermetatarseum. A CT scan, bone scintigraphy or MRI are useful in accurately determining certain characteristics such as the position, shape and size of a painful os intermetatarseum. Extostosis and calcification in the digital vessels should be ruled out.

Treatment

The patient should be treated first with conservative treatments including shoe wear modifications, prohibiting participation in sports-activities, nonsteroidal anti-inflammatory drugs (NSAIDs) and local steroid injections. However, in many cases conservative treatments are ineffective. Failure to relieve the patient’s symptoms conservatively could indicate the need for surgical treatment.

In previous reports, all patients except one were surgically treated by excision of the os intermetatarseum [6, 10, 12, 13]. One patient who declined the surgical treatment was not followed up in Reichmister’s report [12]. With all the cases treated surgically, surgical exploration revealed that the branch of the deep peroneal nerve was located on the os intermetatarseum and compressed by it. Therefore, surgical excision of the os intermetatarseum and nerve decompression relieved the symptoms. All the patients with the painful os intermetatarseum, did not complain of any postoperative symptoms and could return to their employment and sports activity after the excision of the os intermetatarseum.

Pathology

Noguchi et al. [10] reported a case of a painful os intermetatarseum in a soccer player and suspected that the branch of the deep peroneal nerve on the os intermetatarseum was compressed when the patient kicked a soccer ball. Dellon [4] reported the anatomic site of entrapment of the deep peroneal nerve over the dorsum of foot. They documented that anatomic “tightness” of the area where the deep peroneal nerve passes between the extensor hallucis brevis tendon and the first and the second cuneiforms. Any direct injury such as direct contusion to this area or footwear that places a band directly across the bony prominence would increase the pressure within this small space.

Borges et al. [1] described that the deep peroneal nerve was placed under maximum stretch with the foot plantar flexed and toes dorsiflexed. Athletes with an os intermetatarseum may suffer symptoms when combined with these foot and toe positions.

Conclusion

In conclusion, a painful os intermetatarseum should be considered as the cause of dorsal foot pain in athletes. Surgical excision of the os intermetatarseum can be indicated for those patients if conservative treatments fail to reduce their symptoms.

References

1. Borges LF, Hallett M, Selkoe DJ, Welch K. The anterior tarsal tunnel syndrome. Report of two cases. J Neurosurg. 1981;54(1):89–92.
2. Burman MS, Lapidus PW. The functional disturbances caused by the inconstant bones sesamoids of the foot. Arch Surg. 1931;22:936–75.
3. Case DT, Osserberg NS, Burnett SE. Os intermetatarseum: a heritable accessory bone of the human foot. Am J Phys Anthropol. 1998;107(2):199–207.
4. Dellon AL. Deep peroneal nerve entrapment on the dorsum of the foot. Foot Ankle. 1990;11:73–83.
5. Gruber W. Uber die beiden Arten des uberzahligen Zwischenknoehelcheens am Rucken des Metatarsum und uber den durch Ankylose eines dieser Knochelchen entstanden and und eine Exostone am Os cuneiform I und os metatarsale II vortauchenden Fortsatz. Arch Pathol Anat Physiol Klin Med. 1877;71:440–52.
6. 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(6):568–70.
7. Krause KH. Anterior tarsal tunnel syndrome. J Neurol. 1977;217:67–74.
8. Lindenbaum B. Ski boot compression syndrome. Clin Orthop. 1978;156:109–10.
9. Mariniucci AA. Neurological syndrome of the tarsal tunnels. Bull Los Angeles Neurol Soc. 1968;33:90–100.
10. Noguchi M, Iwata Y, Miura K, Kusaka Y. A painful os intermetatarseum in a soccer player: a case report. Foot Ankle Int. 2000;21(12):1040–2.
11. Pfitzer W. Beitrag zur Kenntniss des Menschlichen Extremitenskelets. IV Die Variationen in Aufbau des Fusskelets. Morphologische Arbeiten 1st edn Verlag Germany. 1986; pp 245–515.
12. Reichmister JP. The painful Os intermetatarseum. Clin Orthop. 1980;153:201–3.
13. Scarlet JJ, Gunther R, Katz J, Schwartz H. Os intermetatarseum-one, case report and discussion. J Am Podiatr Assoc. 1978; 68(6):431–4.
14. Waters L. Os intermetatarseum: case study and report. J Am Podiatr Assoc. 1958;48(6):252–4.