

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

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

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

Introduction

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

In 1980, Reichmister [12] reported three cases of painful os intermetatarsium. Compression of the deep peroneal nerve by the os intermetatarsium was described as the pain generator. Naguchi et al. reported a case of painful os intermetatarsium 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 intermetatarsium. The current literature regarding this painful condition is reviewed here.

Epidemiology

The os intermetatarsium 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 intermetatarsium 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 intermetatarsium 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 intermetatarsia are asymptomatic. In the literature, a total of six cases of painful os intermetatarsia have been reported. In 1978, Scarlet et al. [13] reported a case of painful os intermetatarsium. Reichmister [12] described three cases of painful os intermetatarsium.

Noguchi et al. [10] reported a case of painful os intermetatarsium 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 intermetatarsium.

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.

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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 intermetatarsium. 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 intermetatarsium. 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 sport-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 intermetatarsium [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 intermetatarsium and compressed by it. Therefore, surgical excision of the os intermetatarsium and nerve decompression relieved the symptoms. All the patients with the painful os intermetatarsium, did not complain of any postoperative symptoms and could return to their employment and sports activity after the excision of the os intermetatarsium.

Pathology

Noguchi et al. [10] reported a case of a painful os intermetatarsium in a soccer player and suspected that the branch of the deep peroneal on the os intermetatarsium 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 intermetatarsium may suffer symptoms when combined with these foot and toe positions.

Conclusion

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

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