

Symptomatic Os Cuboideum Secundarium in a High-Risk Foot: A Rare Anatomical Variant with Clinical Consequences

Arthur Evensen, DPM; Jaime Moore, NP



Abstract

Os cuboideum secundarium is an exceedingly rare accessory ossicle located plantar-lateral to the cuboid, with only a small number of documented cases in the literature (1). Although typically asymptomatic, it may contribute to lateral column pain or ulceration in individuals with biomechanical deformities or neuropathy. We present the case of an 80-year-old male with diabetes and peripheral neuropathy who developed a plantar-lateral foot ulceration after self-debriding a callus. Radiographs revealed a well-corticated ossicle proximal to the fifth metatarsal base and plantar-lateral to the cuboid, consistent with os cuboideum secundarium. The bony prominence correlated with the ulcer location. Conservative treatment, including off-loading and accommodative diabetic footwear, resulted in near-complete epithelialization. This report highlights the importance of recognizing rare accessory ossicles as contributors to ulceration risk in high-risk foot types, particularly cavovarus feet with fat-pad atrophy. Increased awareness may prevent misdiagnosis and help guide optimal management.

Introduction

Accessory ossicles of the foot are common anatomic variants and are typically incidental findings, yet a small subset are exceedingly rare and poorly understood. Among them, the os cuboideum secundarium is one of the rarest, with only a handful of documented cases described in the medical literature. The ossicle is typically located plantar or plantar-lateral to the cuboid and may articulate with the cuboid, calcaneus, or the base of the fifth metatarsal, depending on its developmental origin (1). Due to its rarity, the true prevalence is unknown, and most clinicians will never encounter a symptomatic case in practice.

To date, the literature includes only a small number of imaging-confirmed symptomatic cases. Logan et al. (1996) described one of the earliest clinical and radiographic accounts, reporting a patient with lateral column pain associated with this accessory ossicle (2). Gaulke and Schmitz (2003) published a case involving a surgically excised “free os cuboideum secundarium,” noting its potential to mimic a fracture and cause persistent pain (3). Kauffmann and Stacy (2014) presented a case in which the ossicle was identified during MRI evaluation and emphasized its ability to simulate a soft-tissue mass or neoplasm on advanced imaging (4). More recently, Vermeulen et al. (2023) reported an additional case from a radiology perspective, reinforcing its rarity and variable presentation on cross-sectional imaging (1). Collectively, these cases demonstrate that although the ossicle is benign, it has meaningful potential to become symptomatic under the right biomechanical circumstances.

In high-risk feet, particularly those with cavovarus deformity, plantar fat-pad atrophy, neuropathy, or diabetes, even small structural prominences may generate pathologic pressure. Patients with neuropathy lose the ability to detect early callus formation or focal overload, increasing the risk of skin breakdown. Therefore, a plantar-lateral ossicle such as the os cuboideum secundarium can function as a pressure point capable of precipitating ulceration.

Despite these biomechanical implications, no published reports to date have described os cuboideum secundarium as a contributor to diabetic plantar ulceration, making this case uniquely important. This report expands on the extremely limited body of literature by illustrating how a rare accessory ossicle, combined with cavovarus foot structure and neuropathy, produced a focal pressure-related ulceration in an elderly diabetic patient. Improved recognition of this ossicle may prevent misdiagnosis, avoid unnecessary workup for fracture or mass, and guide both conservative and surgical management strategies in high-risk populations.

Case Report

An 80-year-old male was evaluated for a bony prominence on the right lateral plantar foot associated with an ulcer that developed after self-treatment of a callus. In October, he used a pumice stone for callus reduction and inadvertently created a wound. His primary-care provider referred him to wound care and podiatry, and he had been followed regularly with progressive improvement. He reported receiving new diabetic shoes and inserts through the Veterans Affairs system. He denied fevers, chills, or systemic complaints.

Medical and Social History

His history included type 2 diabetes mellitus (non–insulin dependent), peripheral neuropathy, hypertension, hyperlipidemia, prior STEMI and CABG, TIA, arthritis, and onychomycosis. Surgical history included bilateral cataract extraction, cholecystectomy, hernia repair, bilateral carpal-tunnel release, colonoscopy, and PCI. He was married, retired, a lifelong non-smoker, and non-alcohol user.

Clinical Examination

The clinical examination revealed palpable dorsalis pedis and posterior tibial pulses with brisk capillary refill and no edema. Neurologically, the patient demonstrated diminished light touch, vibratory sensation, and loss of protective sensation bilaterally. Dermatologic assessment showed a nearly healed ulcer at the right plantar-lateral fifth metatarsal base measuring 0.6 × 0.5 × 0.1 cm, with newly epithelialized tissue and no signs of drainage, malodor, or infection. Musculoskeletal evaluation noted bilateral cavovarus foot structure, decreased plantar fat pad, tailor’s bunionette prominence, hammertoe deformities, and a palpable bony prominence at the fifth metatarsal base, more pronounced on the right.

Imaging

Right-foot radiographs demonstrated a well-corticated, irregular accessory ossicle located plantar-lateral to the cuboid and proximal to the fifth metatarsal base, characteristic of os cuboideum secundarium. The ossicle corresponded directly to the area of ulceration. The ossicle measured 14mm x 18.7mm x 16.4mm.

Management

Conservative treatment was recommended due to the progressive healing of the ulcer. The patient was instructed to continue off-loading, use accommodative orthotics, and wear his VA-issued diabetic footwear. Surgical excision of the ossicle and underlying bony prominence was offered but deferred until future need.



Discussion

The os cuboideum secundarium is among the rarest accessory ossicles, with extremely limited documented clinical presentations (4). Although commonly incidental, symptomatic cases may result from repetitive trauma, lateral column overload, tendon irritation, or pressure from footwear (3). In neuropathic or diabetic patients, even a small plantar-lateral prominence may precipitate ulceration. In this case, the patient’s cavovarus foot type, fat-pad atrophy, and neuropathy set the stage for elevated lateral-column plantar pressures; the os cuboideum secundarium created a focal prominence aligned with the ulcer location.

Radiographically, one expects a well-corticated ossicle with smooth margins, aiding differentiation from fracture fragments or heterotopic ossification (2). CT or MRI can further characterize anatomy and soft-tissue inflammation when indicated (5). Here, plain radiographs sufficed. Treatment should be guided by symptoms. Most cases respond to off-loading, accommodative footwear, and modification of pressure. When persistent ulceration, pain, or tendon irritation occurs, surgical excision has been described with good outcomes (3). In this patient, conservative treatment was successful given the healing status of his ulceration. This case therefore expands the limited literature by documenting os cuboideum secundarium as a contributor to diabetic ulceration—an association not extensively described.

Discussion

Os cuboideum secundarium, although exceedingly rare, can serve as a clinically significant biomechanical stress point, particularly in patients with neuropathy, cavovarus foot structure, fat-pad atrophy, or other conditions that increase lateral column loading. As demonstrated in this case, even a small accessory ossicle can become a focal source of pressure sufficient to precipitate plantar ulceration in high-risk individuals. Early recognition of this anatomic variant is essential when evaluating unexplained plantar-lateral wounds, recurrent callus formation, or localized pain, especially when these findings do not correlate with the more common etiologies of diabetic foot ulceration. Conservative measures such as targeted off-loading, accommodative diabetic footwear, and close wound monitoring may effectively prevent recurrence once identified; however, surgical excision should be considered when conservative strategies fail or when the prominence repeatedly contributes to skin breakdown. Beyond the individual patient, this case broadens the limited body of literature on os cuboideum secundarium and underscores the need for heightened clinical awareness of rare ossicles that may influence plantar pressure patterns. By integrating anatomical variants into the differential diagnosis of lateral plantar ulcerations, clinicians can better tailor treatment, reduce complication risk, and optimize limb preservation in vulnerable populations.

Conflict of Interest Statement

The authors of this article declare no conflict of interest. The companies involved had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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