

## Case Report

# Os supranaviculare contributing to anterior ankle impingement: a case report

Bruno Jorge de Sousa Cancela<sup>1</sup> , José Inácio Menezes<sup>1</sup> , Inês Genrinho<sup>1</sup> , Sofia Meixedo<sup>1</sup> , Yuriy Mazin<sup>1</sup> , José Luís Carvalho<sup>1</sup> 

1. Centro de Reabilitação do Norte, Porto, Portugal.

### Abstract

The os supranaviculare is a rare accessory ossicle of the midfoot, typically considered asymptomatic. We report a case of chronic dorsal midfoot and anterior ankle pain in which the os supranaviculare likely contributed to an anterior ankle impingement mechanism with associated tibiotalar synovitis and extensor hallucis longus tenosynovitis. Dynamic ultrasound was essential in demonstrating mechanical interaction during dorsiflexion and in guiding targeted treatment. This case suggests that the os supranaviculare may play a clinically relevant role within the spectrum of anterior ankle impingement and should be considered in the differential diagnosis of chronic dorsal midfoot pain.

**Level of Evidence IV; Case report.**

**Keywords:** Tenosynovitis; Bone diseases; Fractures, Stress.

### Introduction

The os supranaviculare, also known as Pirie's bone, is one of the many reported midfoot anatomical variants<sup>(1)</sup>. It presents with an estimated 1%-3,5%<sup>(2)</sup> and typically does not cause any symptoms<sup>(1)</sup>, although it is reported that, in rare instances, it can cause midfoot pain and be associated with stress fractures<sup>(3-5)</sup>.

Despite these reports, the biomechanical mechanisms by which the os supranaviculare may contribute to pain remain incompletely understood, particularly regarding its interactions with adjacent soft tissues and the anterior ankle joint during motion. We present a case of chronic dorsal midfoot and ankle pain in which dynamic ultrasound evaluation supported a multifactorial mechanism involving anterior ankle impingement, tibiotalar synovitis, and extensor hallucis longus (EHL) tenosynovitis, with the os supranaviculare acting as a contributing anatomical factor.

### Case description

A 59-year-old man presented with dorsal foot pain located to the anterior aspect of the tibiotarsal joint (TTJ) and midfoot.

The pain had been progressively worsening for 2 years, with a mechanical pattern and exacerbation during maximal dorsiflexion. At the time of observation, the patient rated the pain at 4/10 on the Visual Numerical Scale (VNS). The patient denied any history of falls, trauma, strains, excessive exercise, or work or safety boots. Objectively, palpation of the superior aspect of the TTJ and navicular was painful, with no inflammatory signs.

Point-of-care ultrasound (US) was performed using a high-frequency linear probe with the patient in the prone position, with the knee flexed, the ankle in plantar flexion, and the foot resting on the examination table, thereby allowing optimal visualization of the TTJ and dorsal midfoot structures. This revealed TTJ effusion, lateral mediotarsal synovial effusion, and a small quantity of liquid in the EHL tendon sheath. The patient underwent a US-guided TTJ corticosteroid infiltration, with no improvement after two months, then a US-guided hyaluronic acid infiltration was performed. A year later, pain was controlled (VNS 1/10), with occasional episodes of discomfort. The patient was submitted to yearly TTJ hyaluronic acid infiltrations for the next three years, reporting to be asymptomatic for 6-8 months following each infiltration, with recurrence of pain after that period.

Study performed at the Centro de Reabilitação do Norte, Porto, Portugal.

**Correspondence:** Bruno Jorge de Sousa Cancela. Complete Address and Zip Code: Rua Sophia Mello Breyner 52 3.5 4430-692 Vila Nova de Gaia. **E-mail:** [bruno.sousa.cancela@gmail.com](mailto:bruno.sousa.cancela@gmail.com). **Conflicts of interest:** None. **Source of funding:** None. **Date received:** October 17, 2025. **Date accepted:** January 20, 2026.

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Five years after the initial presentation of symptoms, the case was reviewed. The radiological studies initially performed (ankle and foot radiography and magnetic resonance imaging (MRI) shown in Figures 1-3) demonstrated no TTJ degeneration, a dorsal osteophyte on the talar neck, and an os supranaviculare, suggesting a potential site of mechanical conflict with surrounding structures. An ultrasound scan was repeated, demonstrating accumulation of fluid in the EHL tendon sheath, with thickening of the synovial sheath (primarily adjacent to the os supranaviculare) and dynamic friction between these structures. Dynamic maneuvers, including active and passive ankle dorsiflexion and hallux flexion-extension, were performed, demonstrating mechanical interaction between the EHL tendon sheath and the os supranaviculare.

The patient underwent US-guided infiltration of the EHL tendon sheath adjacent to the os supranaviculare with 40 mg of methylprednisolone. Fifteen months after the procedure, the patient reported an 80% subjective improvement and no need for further procedures. A ten-month follow-up MRI (Figures 4-6) confirmed an os supranaviculare and showed no signs of EHL tenosynovitis.

## Discussion

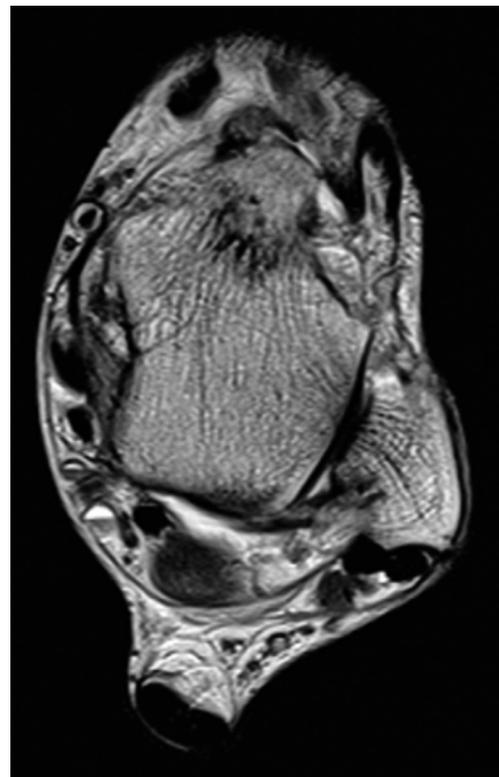
Most accessory ossicles of the foot are infrequent or rare, including the os supranaviculare<sup>(2)</sup>. This ossicle can be mistaken for an avulsion fracture of the talonavicular joint<sup>(1)</sup>, but the patient denied any history of significant trauma or acute onset of pain and swelling in the region, making this hypothesis very unlikely.



**Figure 1.** Ankle and foot radiograph (side view) showing accessory ossicle (os supranaviculare) and absence of degenerative changes of the tibiotarsal joint.



**Figure 2.** Initial presentation magnetic resonance imaging (density proton sagittal view) showing os supranaviculare and absence of degenerative changes of the tibiotarsal joint.



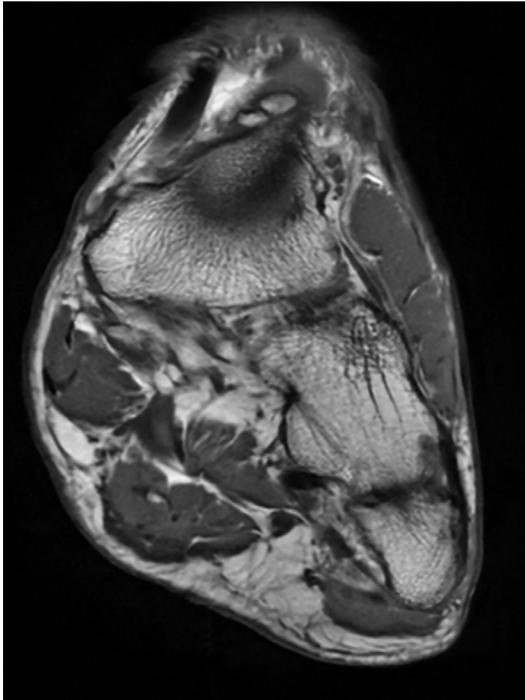
**Figure 3.** Initial presentation magnetic resonance imaging RI (T2 transverse view) showing subtle thickening of the extensor hallucis longus tendon.

Considering the symptoms and the initial US findings (mainly the TTJ effusion), the most likely hypothesis was ankle osteoarthritis, which is relatively common, and it

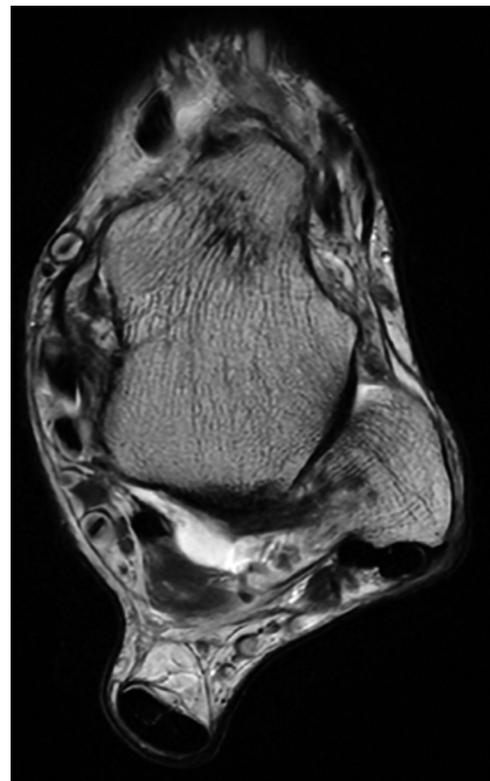
could partially explain the pain<sup>(6)</sup>. The good response to hyaluronic acid can also point to this diagnosis, but the absence of radiographic findings of degeneration of the TTJ point to early-stage osteoarthritis (if present). Importantly, the recurrent pattern of symptoms despite repeated intra-articular interventions raised the possibility of a concomitant extra-articular pain generator.

The hypothesis of midtarsal or tarsometatarsal osteoarthritis was also considered, based on US findings of synovial effusion in the region and MRI evidence of bone oedema; however, these findings were inconsistent with the clinical history and physical examination, making this diagnosis less likely.

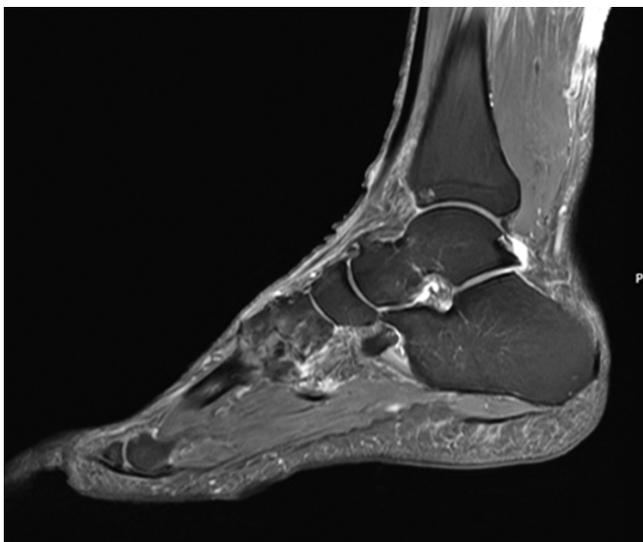
Given the location of the pain, pathologies of the navicular bone should also be considered and excluded. In particular, Müller-Weiss syndrome, which represents an osteonecrosis-like process of the navicular bone, typically presents with midfoot pain, often associated with deformity and collapse of the longitudinal arch<sup>(7)</sup>. In this patient, there was no history of trauma, no physical exam findings compatible with this diagnosis, and the imaging studies showed no navicular abnormalities. Another important differential diagnosis is a navicular stress fracture, an overuse injury generally seen in the context of repetitive loading of the foot, such as in



**Figure 4.** Five-year follow-up magnetic resonance imaging (T1 coronal view) showing os supranaviculare.



**Figure 6.** Five-year follow-up magnetic resonance imaging (T2 transverse view) showing no thickening or fluid accumulation of the extensor hallucis longus tendon.



**Figure 5.** Five-year follow-up magnetic resonance imaging (density proton sagittal view) showing os supranaviculare and bone oedema of the tarsometatarsal joint.

athletes, which manifests with pain exacerbated by weight-bearing and localized tenderness over the navicular bone<sup>(8)</sup>. However, in this patient, both the epidemiological context (occupational and sports history) and the MRI findings (absence of navicular bone oedema) make this hypothesis unlikely.

The symptoms and anatomical region also raise the possibility of compression beneath the inferior extensor retinaculum (anterior tarsal tunnel syndrome). However, the absence of radiating pain typical of the deep peroneal nerve distribution (between first and second toes), absence of neuropathic complaints (paresthesia, burning pain) or motor deficits, together with imaging findings that localized inflammation to the EHL tendon sheath rather than to neural structures, made retinacular entrapment less likely in this case.

After reassessment and repeat US scan, the findings were consistent with EHL tenosynovitis, with sheath thickening and fluid accumulation most evident adjacent to the os supranaviculare. In addition, radiographic review revealed a dorsal prominence of the talar neck, consistent with a dorsal osteophyte, which may contribute to anterior impingement. Taken together, these findings support a broader hypothesis in which the os supranaviculare participates in an anterior ankle impingement complex, potentially promoting repetitive conflict during dorsiflexion, intra-articular synovitis, and secondary irritation of adjacent soft tissues, including the EHL tendon sheath.

We opted to treat the patient with a corticosteroid infiltration into the EHL tendon sheath due to the US finding of fluid accumulation in the region in contact with the os supranaviculare (without any structural involvement of the tendon), making the procedure safe. We expected this treatment to reduce fluid accumulation by controlling the inflammatory process and, secondarily, by potentially

decreasing local mechanical irritation. The patient's sustained improvement supports the presence of an inflammatory component at this site. Nevertheless, the patient's prior response to intra-articular procedures suggests that intra-articular synovitis and/or early osteoarthritis may have also contributed to symptoms. Therefore, clinical evolution supports a multifactorial mechanism, namely anterior impingement-related conflict with TTJ synovitis and EHL tenosynovitis, where the os supranaviculare likely plays an important role in this patient.

Based on the findings and proposed pathophysiology, we can argue that the corticosteroid infiltration can be repeated in the future if symptoms reoccur. Surgical intervention can also be considered if symptoms are persistent or refractory, removing the accessory ossicle and eliminating this likely contributing factor of the tenosynovitis.

To our knowledge, this is the first report using dynamic US to support a soft tissue mechanism (anterior impingement with secondary TTJ synovitis and EHL tenosynovitis) to explain a symptomatic os supranaviculare, whereas prior reports have primarily emphasized its association with navicular stress injury in athletic populations<sup>(9,10)</sup>.

The os supranaviculare is a rare anatomical variant that is usually asymptomatic; however, it may contribute to dorsal midfoot and ankle pain as part of a broader spectrum of anterior ankle impingement. This case illustrates that the ossicle can participate in a multifactorial mechanism involving anterior impingement-related conflict. Dynamic ultrasound proved particularly valuable in identifying soft-tissue involvement and mechanical interaction during motion, supporting both diagnostic clarification and targeted treatment. The os supranaviculare should therefore be considered in the differential diagnosis of chronic dorsal midfoot or anterior ankle pain when more common causes have been excluded.

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**Authors' contributions:** Each author contributed individually and significantly to the development of this article: BJSC \*(<https://orcid.org/0000-0003-1461-5340>) Conceived and planned the activities that led to the study, interpreted the results of the study, participated in the review process, involved in the bibliographic review and formatting of the article; JIM \*, SM \*(<https://orcid.org/0009-0007-0334-3905>), and YM \*Participated in the review process and contributed to the bibliographical review; IG \*(<https://orcid.org/0000-0003-1159-0491>) Conceived and planned the activities that led to the study, participated in the review process and contributed to the bibliographical review; JLC \* Conceived and planned the activities that led to the study, interpreted the results of the study, participated in the review process, conducted clinical examination of the patient. All authors read and approved the final manuscript. \*ORCID (Open Researcher and Contributor ID) 

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