

Computed tomography and magnetic resonance imaging findings of os styloideum in a symptomatic athlete*

Achados de imagem por tomografia computadorizada e ressonância magnética do os styloideum em atleta sintomático

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Abstract Os styloideum is an accessory ossicle located dorsally on the wrist that represents an anatomic variant. Association between the os styloideum and wrist pain is clinically known as "carpal boss syndrome". The authors report a case of bone marrow edema in the os styloideum diagnosed by magnetic resonance imaging in a young tennis player, and present a literature review on this finding.

Keywords: Os styloideum; Bone marrow edema; Magnetic resonance imaging.

Resumo Os styloideum é um ossículo acessório, imóvel, localizado dorsalmente no carpo, que representa uma variante anatômica. A associação entre os styloideum e dor no punho é conhecida clinicamente como "carpal boss syndrome". Os autores relatam um caso de os styloideum com edema ósseo trabecular no estudo por ressonância magnética em atleta jovem tenista, com revisão da literatura deste achado.

Unitermos: Os styloideum; Edema ósseo trabecular; Imagem por ressonância magnética.

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INTRODUCTION

Os styloideum is an unmovable accessory ossicle located dorsally on the carpus, that represents an anatomic variant. It is located between the capitate and trapezoid bones, and between the second and third metacarpal bones. The association between the presence of *os styloideum* and wrist pain is known as carpal boss syndrome^(1,2).

Imaging methods are critical to achieve a correct diagnosis of this syndrome. In spite of the relevant role played by magnetic resonance imaging (MRI) in the differential diagnosis of symptomatic os

styloideum, studies involving the use of this method for this purpose are still scarce in the literature^(3,4).

The authors present a case of symptomatic os styloideum evaluated with MRI, with a literature review on this finding.

CASE REPORT

A 14-year-old, white, female, semiprofessional tennis player coming from Curitiba, PR, Brazil, presented for an orthopedic consultation, complaining of wrist pain for more than one year, with symptoms worsening in the last month. Even with the symptoms exacerbation, the patient kept training, but utilizing the other wrist and experimented the onset of a subtle pain. At clinical-orthopedic examination of the wrists, there was a hard prominence, painful at palpation, on the base of the right third metacarpal bone, with a subtle soft tissue swelling. The patient reported a slight pain at the end of flexion and extension, although without limitation to the joint amplitude.

The patient underwent computed tomography (CT) with multiplanar and 3D

reconstruction which demonstrated the presence of an os styloideum on the dorsal region of the wrist (Figure 1). At MRI, a decrease in signal intensity on T1-weighted images, increase on T2-weighted images, and os styloideum signal enhancement after intravenous paramagnetic contrast (gadolinium) injection were observed, suggesting the presence of trabecular bone edema (Figure 2).

DISCUSSION

Os styloideum, an accessory carpal ossicle, is included in a spectrum of conditions characterized by the presence of a bony protuberance at the base of the second and third metacarpal bones, constituting the carpal boss⁽⁵⁾. Among the differential diagnoses, fracture of the base of the second and third metacarpal bones, osteophytes (osteoarthritis), exostosis, bone and soft tissue neoplasias and cystic bony lesions are highlighted^(3,5). According to Conway et al., os styloideum was firstly described in 1725 by Saltzman⁽⁶⁾, but the term carpal boss was proposed by Fiolle in 1931⁽⁷⁾.

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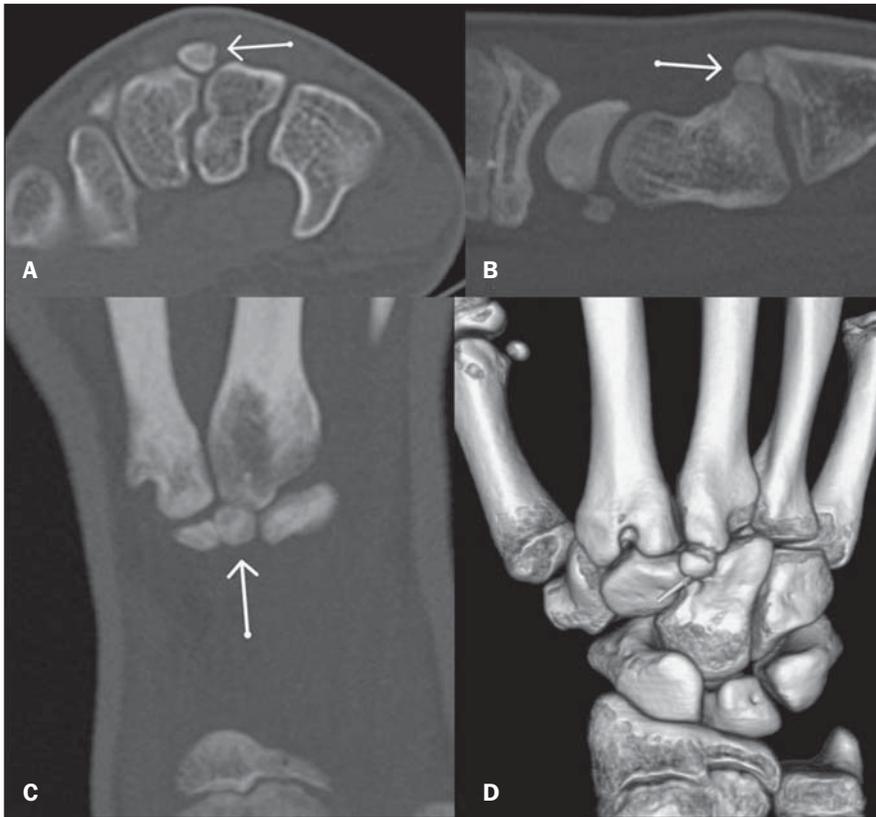


Figure 1. Computed tomography, axial (A), sagittal (B), coronal (C) and 3D (D) reconstructions demonstrating the accessory ossicle surrounded by the trapezoid bone, capitate bone and the base of the third metacarpal bone.

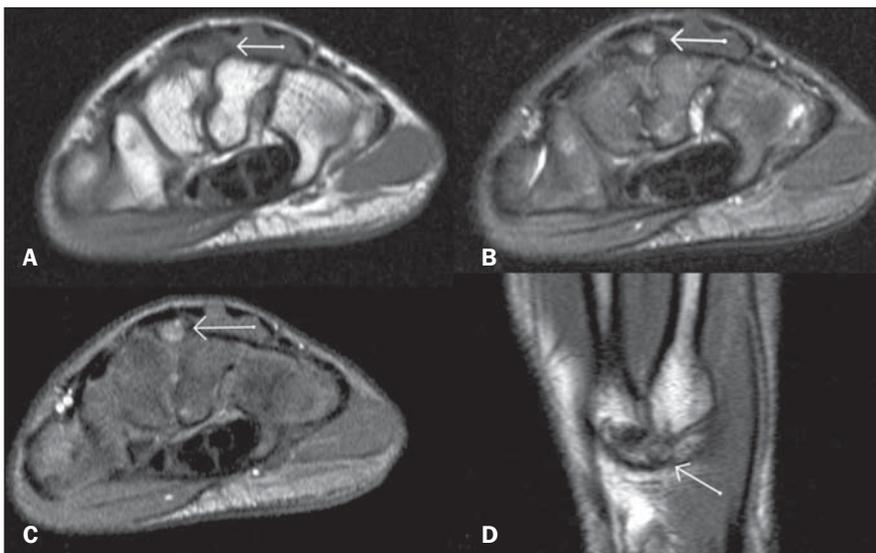


Figure 2. Magnetic resonance imaging demonstrating the accessory ossicle with decreased signal intensity on axial, fast spin-echo, T1-weighted sequence (A), increased signal intensity on T2-weighted sequence with fat-suppression (B), gadolinium uptake on T1-weighted images with fat suppression (C) and coronal proton-density image (D).

The most plausible explanation for the etiology of os styloideum is based on the persistence of an accessory ossification center that emerges and, in most of cases,

tends to disappear during the embryonic development. However, in cases where this abnormality persists, it may interfere with the biomechanics of the carpal joint. This

condition may be found isolatedly (2%), fused with the capitate bone (3.5%) or with the trapezoid bone (0.5%), but, in most of times (94%) the os styloideum is fused with the base of the second and third metacarpal bones^(3,5).

Most of the chronic symptoms associated with the carpal boss may result from a bone degeneration process, inflamed ganglion, bursa or extensor tendon on the bony prominence. On the other hand, in cases of acute symptoms on the dorsal region of the wrist in association with trauma, one should suspect metacarpal base fracture, avulsion of the tendon of the extensor carpi radialis brevis, or os styloideum fracture^(3,5).

The clinical presentation is variable, with symptoms such as spontaneous pain or pain triggered by excessive use of the joint (racket sports or golf), subcutaneous edema and absence of joint blocking sensation. The pain may be aggravated by focal pressure and forced wrist extension, usually stopping with rest⁽⁵⁾.

Imaging methods play an essential role in the diagnosis of os styloideum. At radiography, lateral view of the wrist with the hand in flexion, supine at 30–40° and with 20–30° ulnar deviation has been described as the most appropriate one^(5,8). However, pathological conditions associated with this accessory ossicle cannot be appropriately assessed with this imaging method. Bone scintigraphy has also been utilized, demonstrating an increase in radiotracer uptake (^{99m}Tc MDP) at the ossicle site^(1,8). Multiplanar CT with three-dimensional reconstruction is useful in the evaluation of the relationship between the os styloideum and adjacent bones⁽⁸⁾. However, in cases of acute, trauma-related pain or persistent pain, MRI is the most accurate imaging method to evaluate the integrity of metacarpal, carpal and accessory bones, as well as the bone marrow, enthesis and regional ligaments⁽³⁾. In the reported case, the authors observed trabecular edema on the os styloideum, probably resulting from biomechanical changes with repeated traumas.

The initial treatment of os styloideum consists of immobilization and administration of anti-inflammatory drugs. In patients with persistent pain, surgical excision, with or without arthrodesis, is usually indicated^(1,3,6,8).

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