



## Original Article

# A study on the prevalence of the anconeus epitrochlearis muscle by magnetic resonance imaging<sup>☆</sup>



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## ABSTRACT

**Objective:** To analyze magnetic resonance imaging (MRI) of the elbow area to quantify the presence of the anconeus epitrochlearis muscle.

**Methods:** A total of 232 exams were analyzed; 218 were included, of which 141 were of men and 77, women.

**Results:** Presence of the muscle was observed in 29 cases (13.3%), demonstrating that the presence of this muscle on images does not have a statistical correlation with the gender or age of the individual.

**Conclusion:** The prevalence of the anconeus epitrochlearis muscle is variable, without a pattern of normality.

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## Estudo da prevalência do músculo ancônio epitrocLEAR por ressonância magnética

## RESUMO

**Objetivo:** Analisar imagens de ressonância magnética da região do cotovelo para quantificar a presença o músculo ancônio epitrocLEAR.

**Métodos:** Foram analisados 232 exames, foram incluídos 218, dos quais 141 eram homens e 77 mulheres.

**Resultados:** Observou-se a presença do músculo em 29 casos (13,3%), a presença desse músculo em imagens não apresentou correlação estatística com o gênero ou com a idade do indivíduo.

## Palavras-chave:

Varição anatômica

Membro superior

Sistema musculoesquelético

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Conclusão: A prevalência do músculo ancônio epitrocLEAR é variável, sem a presença de um padrão de normalidade.

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## Introduction

Muscular anatomical variations are commonly observed; they may consist of the absence of a muscle in the majority of the population, accessory or surplus muscles, or deviation from the normal course, as well as presenting anomalous origin or insertion, or having a belly or supernumerary origin. Accessory muscles are anatomical variations that represent additional muscles, distinct from those found in most individuals.

With the technological advances in diagnostic imaging and the innovation of its equipment, especially regarding the quality of sectional images (such as computed tomography and magnetic resonance imaging), the analysis and study of muscular anatomical variations have become much simpler, due to the precision in distinguishing muscle tissue from other tissues. Furthermore, as it is an *in vivo* method, it is not necessary to dissect cadavers, which generates a significant increase in the population available for study.

The anconeus epitrocLEAR muscle (AEM) is present in several animal species, such as reptiles, amphibians, and mainly mammals; in humans, it is considered an anomalous or accessory muscle.<sup>1-3</sup> It follows the same path as the fibrous retinaculum, which forms the roof of the cubital tunnel, or the Osborne's ligament,<sup>4</sup> considered by Testut to be a fibrous remnant of this ligament.<sup>5</sup> It originates in the inferior region of the medial epicondyle, inserting posteromedially on the olecranon.

Its prevalence has varied greatly among authors since it was first described in 1866 by Gruber,<sup>6</sup> who termed it the sixth anconeus muscle: it ranges from 1% to 34%.<sup>2,7-10</sup> When compared to its constant presence in most primates, it is considered an evolutionary remnant in humans.<sup>1,4,11</sup>

The clinical importance of this accessory muscle is justified when its presence is symptomatic and is associated with ulnar tunnel syndrome, compressive neuritis of the ulnar nerve, and other painful elbow syndromes. In most cases, the AEM causes compression of the ulnar nerve in its passage through the groove of the ulnar nerve in the humerus, medially to the trochlea.<sup>2,3,9,10,12,13</sup>

## Objective

To analyze magnetic resonance imaging of the elbow region and assess the presence of the AEM. To quantify the presence of this muscle in relation to gender and age.

## Methods

A total of 232 magnetic resonance elbow exams were recorded on a PACS database, created in a Signa Horizon HDXT model

using a 1.5 T magnetic field, from General Electric Medical Systems. The analyzed images were T1- and T2-weighted with fat saturation, without contrast, acquired in the axial planes – the machine was programmed perpendicular to the plane of the elbow joint, starting at 10 cm above the joint until the radius tuberosity. The exams were provided by the diagnostic center for images of the institution involved, according to the opinion of the Ethics Committee (No. 1.051.245); the study was registered at Plataforma Brasil (CAAE: 42869015.0.0000.0070). The exams were filed on CD-R media and analyzed using the Centricity software DICOM viewer<sup>®</sup> 3.0 (General Electric Medical Systems), provided automatically in the filing of the exams. The identity of the patients was confidential; only gender, age, and the studied side were recorded.

In the evaluation of the presence of the AEM, the following reference points were considered: in the axial plane, from proximal to distal, the cuts were observed from the beginning of the medial epicondyle (medial supracondylar ridge), passing through the entire olecranon until the ulnar tuberosity level. The presence of a muscular belly was observed in the region of ulnar nerve groove in the humerus, in a section in which the capitellum, the trochlea, both humeral epicondyles, and the olecranon can be visualized on a single cut, characterizing the presence of the AEM.

Exams from healthy adults and without any previous surgery or placement of osteosynthesis in the region examined were included; those in which there was evident muscle injury or presence of neoplasias that altered the normal anatomy of the region of interest were excluded. The exams were separately assessed for the presence or absence of the AEM by two observers, who have over seven years of experience in sectional human anatomy by magnetic resonance imaging.

After the quantification of the AEM, metric and volumetric analysis were performed using AnalyzePro 1.0 software from AnalyzeDirect. Measurements of length and volume were considered as the mean calculated from the measurements made by each of the observers separately, using the same version of the same software.

## Results

Of the 232 exams evaluated, 218 met the inclusion criteria proposed in the present study's methods.

Of these, 141 were male (65%) and 77 female (35%); 127 exams were from right elbows (58%) and 91, left (42%). Of the elbows analyzed, 29 had the AEM (13.3%); [Table 1](#) presents the distribution between genders and sides.

The mean age of the evaluated patients was 44 years; the youngest patient was 13 years old and the oldest, 83. [Table 2](#)

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