

# An anomalous insertion fascicle of the caput laterale of the triceps brachii. Case report

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## SUMMARY

We report a case of an undescribed anomaly of the triceps brachii muscle during routine cadaver dissections of the upper limb, at the "Nueva Granada" Military University (UMNG) and School of Medicine in Santafé de Bogotá, Colombia. This finding prompted us to review the literature in order to ascertain the prevalence and probable clinical significance of this tendinous structure, which originated distally from the caput laterale of the triceps brachii and inserted proximally into the scapula, passing directly posterior to the neurovascular bundle containing the axillary nerve and posterior circumflex humeral artery and dividing the spatium axillare laterale (quadrilateral space) in two. A thorough review of the literature failed to disclose any previous reports of this variant and therefore, this report constitutes the first description of this anomaly.

## INTRODUCTION

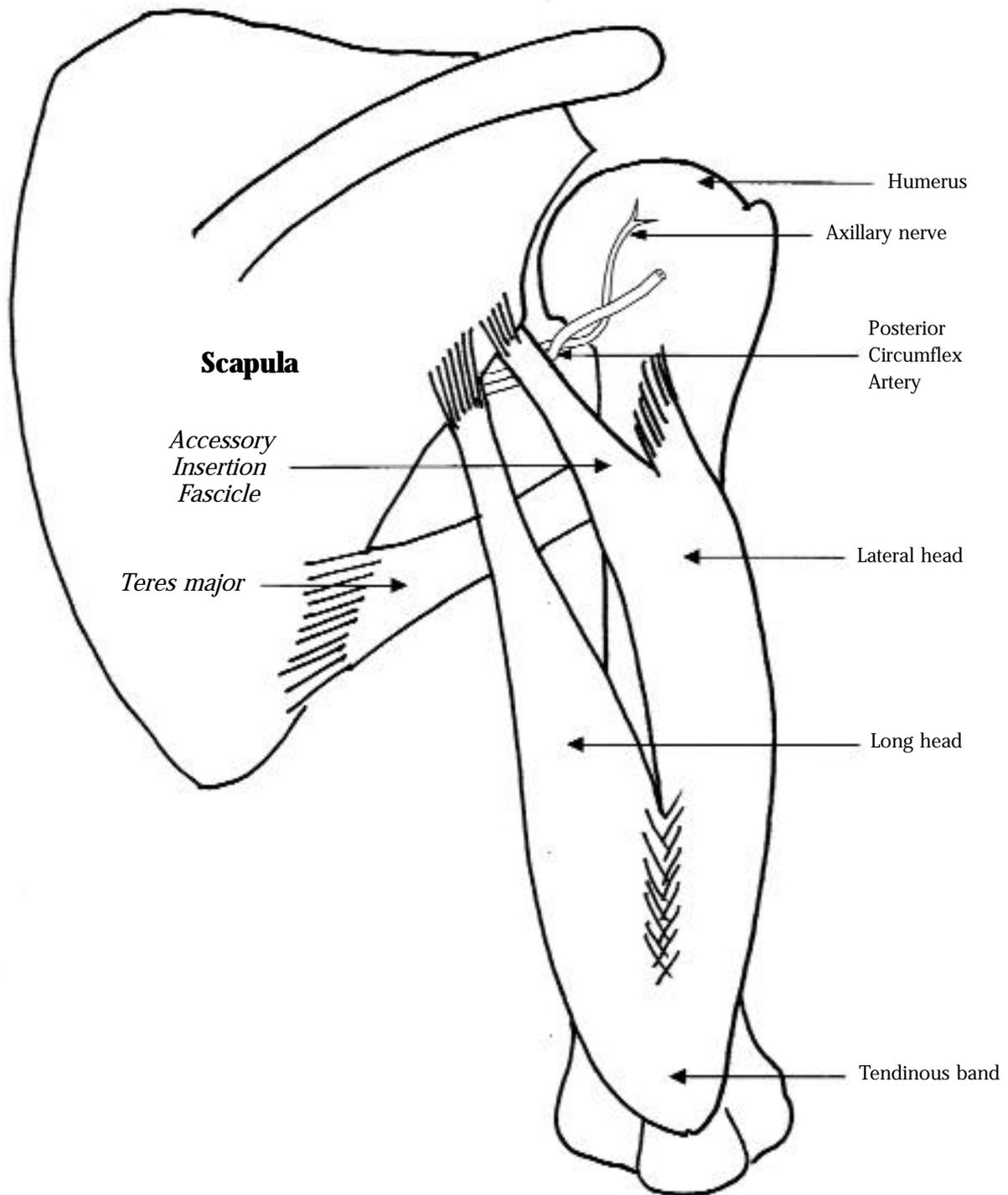
The triceps brachii is a three-headed muscle covering the posterior aspect of the arm and contributing mainly to the extension of the forearm (Gray, 1973; Hollinshead and Rosse, 1985). The three heads of the triceps brachii are described as the caput longum, caput laterale and caput mediale. They originate proximally from different surfaces of the humerus and scapula and join in a single common tendon that inserts into the proximal end of the olecranon process of the ulna.

The caput laterale arises from the posterior surface of the humeral body, superior and later-

al to the groove of the radial nerve. The line of origin leads from the insertion of the teres minor as far as the humeral groove for the radial nerve distally and from the aponeurotic arch formed by the lateral intermuscular septum as it crosses the radial groove. The muscle fibers of the caput laterale descend to the tendon of insertion in specific ways. The superior fibers pass vertically and the inferior fibers pass obliquely to insert into the dorsal and ventral surfaces of the proximal lateral margin of the primary (common) tendon of insertion (Tountas and Bergman, 1993).

The muscle belly of the caput mediale usually lies deep to the bellies of both the caput longum and caput laterale. Unlike the other two heads, the origin of the caput mediale is "fleshy" (minimally tendinous in origin) and arises from the posterior surface of the humerus below the radial (nerve) groove and from the dorsal surfaces of the medial and lateral intermuscular septa. Most of the fibers that arise from this extensive area of origin insert into the deep surface of the primary (common) tendon (Tountas and Bergman, 1993).

The caput longum arises proximally at the infraglenoid tubercle of the scapula and passes downward between the teres minor and teres major (Hollinshead and Rosse, 1985). Here, it delineates the spatium axillare laterale (quadrilateral space), also known as the "Velpeau's quadrangle" (Testut, 1902). It is bounded by the caput longum of the triceps brachii, teres major, teres minor and the proximal humerus (Gray, 1973). Important anatomic structures found here are the axillary nerve and posterior circumflex humeral artery (Fig. 1).



**Figure 1.-** Diagram of the posterior aspect of the right shoulder and arm, depicting the position of the *accessory insertion fascicle* of the triceps brachii in relation to the associated structures (Illustration by Fred Rincon, MD).

Here, we report the appearance of an additional insertion fascicle of the triceps brachii, originated distally from its caput laterale and inserted proximally into the scapula, passing directly posterior to the neurovascular bundle containing the axillary nerve and posterior circumflex humeral artery and dividing the the spatium axillare laterale (quadrilateral space) in two.

#### CASE REPORT

*Specimen procurement.* We dissected 16 cadavers at the Morgue of the “Universidad Militar Nueva Granada” and Medical School (UMNG), which were stored in 10% formalin for adequate preservation. A longitudinal incision was performed on the anterior aspect of the arm from the level of the acromion to the elbow joint.

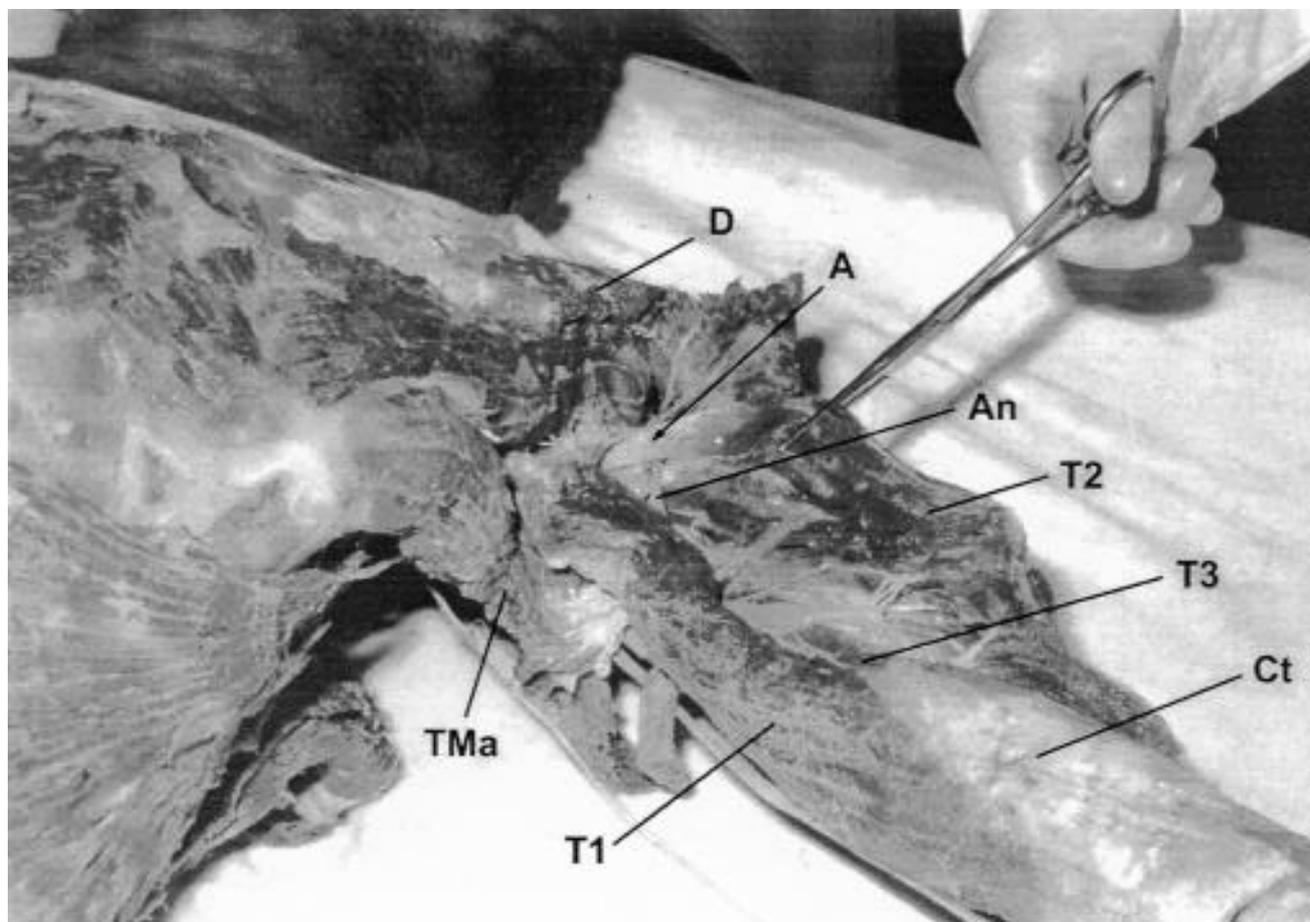
Extension of the incision to the posterior aspect of the arm was achieved by bilateral perpendicular incisions in both proximal and distal segments. Careful dissection and separation of skin, subcutaneous fat and fascia achieved exposure of the muscular apparatus. One arm was found to have an additional insertion fascicle for the caput laterale of the triceps brachii. This was a Hispanic male of approximately 50-55 years of age.

*Anatomy of the variation.* The triceps brachii muscle examined in our specimen demonstrated all the normal characteristics of the typical arrangement of the posterior compartment described above, with the exception of an additional tendinous insertion fascicle (Fig. 1). This fascicle originated from the caput laterale approximately 22 cms superior to the distal insertion of the triceps brachii and inserted into the scapula, just superior to the insertion of the caput longum on the infraglenoid tubercle. Initially, it seemed that the neurovascular bundle was perforating the insertion fascicle of the caput laterale of the triceps brachii, giving the impression of a divided tendon. However, thorough dissection unveiled a separate sheet of fascia surrounding

this structure and a separate insertion tendon for the caput laterale. There was no apparent fibrous connection to the joint capsule. The tendon divided the spatium axillare laterale (quadrilateral space) in two (Fig. 2), passing posterior to the axillary nerve and posterior circumflex humeral artery and anterior to the teres major muscle. It was related medially to the caput longum of the triceps brachii.

## DISCUSSION

Anatomic variants of the triceps brachii have been described, but are relatively uncommon and infrequent (Fabrizio and Clemente, 1997). The scapular attachment may extend along the axillary border of the scapula and the three heads may become more or less fused with neighboring muscles. The latissimocondyloideus or dorsoepitrochlearis muscle is found in about 5% of individuals and is described as a part of the triceps brachii that attaches proximally to the latissimus dorsi tendon of insertion (Anson, 1966; Tountas, 1993); it is normally seen in prosimians and monkeys.



**Figure 2.-** Posteromedial aspect of the arm showing the triceps brachii muscle with its caput longum (T1) running posteriorly to the teres major (TMa), caput laterale (T2) with the accessory fascicle (A) crossing superficial to a branch of the axillary nerve (An) before innervating the deltoid muscle (D), which has been cut and reflected, the caput mediale of the biceps brachii (T3) and common insertion tendon (Ct).

The anconeus epitrochlearis is more common in humans, presenting in approximately 25% of individuals (Masear et al., 1988; Tountas and Bergman, 1993). It has an attachment to the medial border of the olecranon process and, after spanning the groove for the ulnar nerve, attaches to the medial epicondyle of the humerus (Gessini et al., 1981). The tendon of insertion may contain a sesamoid bone: the patella cubiti (sesamum cubiti or elbow disk) (Tountas and Bergmann, 1993).

A fourth head of the triceps brachii may be found arising from various points in the humerus, scapula, shoulder joint capsule or the coracoid process (Piersol, 1907; Anson, 1966).

Here we describe an anatomic anomaly most likely originated during normal embryogenesis, hypothetically occurring by separation of the proximal muscle fibers of the caput laterale of triceps brachii by the neurovascular bundle. It is unlikely that this anatomic structure is a divided tendon of the caput longum, as described by Henle (1871), whose proximal insertion was immediately beneath the described novel arrangement. Moreover, it presented as an additional tendon with an isolated fascia from the caput laterale of the triceps brachii, with a different proximal insertion fascicle to the scapula (Fig. 2). We do not believe this structure was caused by chronic trauma with subsequent inflammation.

**Clinical significance.** The close relationship of this accessory tendon to the neurovascular structures found in the spatium axillare laterale (quadrilateral space) raises suspicion of the possibility of having caused a chronic or intermittent compressive neuropathy of the axillary nerve in this subject. As the neurovascular bundle enters this space it may be compressed, eliciting clinical symptoms characterized by: (1) pain weakly localized to the shoulder, (2) paresthesia in a non-dermatomal distribution, (3) discrete point/localized tenderness in the spatium axillare laterale (quadrilateral space), and (4) an arteriogram showing compression of the posterior circumflex humeral artery with abduction of the shoulder. Cahill and Palmer (1982) have recognized this constellation of symptoms as the "quadrilateral space" syndrome.

Additional symptoms caused by anatomic variants of the triceps brachii have also been documented. Reis (1980) describes a case of a patient with ulnar neuritis, presenting with an anomalous tendon, positioned in the ulnar groove behind the medial epicondyle of the

humerus when the elbow was in extension. The patient feels a painful snapping over the median aspect of the elbow with flexion and may develop progressive numbness of the fingers innervated by the ulnar nerve.

Therefore, surgeons, orthopedic surgeons and medical community in general should be knowledgeable of this anatomic variant when dealing with some of the clinical syndromes mentioned previously. A thorough review of the literature failed to reveal any previous reports of this variant and hence, this constitutes the first description of this anomaly.

## ACKNOWLEDGEMENTS

The authors wish to thank Mr. Casimiro Cañon, Curator of the Morgue of the "Nueva Granada" Military University (UMNG) and School of Medicine, for his active cooperation in the dissection of the specimens.

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