

# Developmentally and Clinically Defined Rare Anomalous Muscles in Brachium and Antebrachium

ALOK SAXENA, KISHOR KUMAR AGARWAL, AMAL RANI DAS

## ABSTRACT

Biceps brachii is a flexor muscle of arm which frequently shows variations. Biceps has been recognised with a maximum number of seven heads. In forearm, flexor digitorum superficialis and palmaris longus show frequent variations. We have come across two additional muscles: one in arm and one in forearm. During routine dissection we observed an additional muscle belly in between biceps brachii and brachialis in left arm and an extra muscle in

forearm of same side. This extra muscle in forearm was close to Flexor Carpi Ulnaris (FCU). An additional muscle in arm took origin just below the coracobrachialis whereas, an extra muscle in forearm was originating from medial epicondyle. After careful examination, we concluded these muscles as third head of biceps brachii and digastrics FCU, a rare muscle in arm and forearm respectively. Digastric FCU can be utilised for tendon transfer, tendon lengthening in the patients with paralytic disorders.

**Keywords:** Biceps, Flexor carpi ulnaris, Forearm

## CASE REPORT

During routine dissection for medical undergraduate we came across two anomalous muscles unilaterally in a male cadaver: one on left flexor compartment of arm and another on same compartment of forearm.

**In Arm:** An additional muscle belly on anterior aspect of left arm was observed. This muscle was sandwiched between the biceps brachii and brachialis and supplied by a branch of Musculocutaneous Nerve (McN). This muscle was originating just below the insertion of coracobrachialis and it was merging with tendon of biceps in the lower part of arm [Table/Fig-1].

**In Forearm:** Another additional muscle was running parallel

and in the same plane along with the FCU in upper half but it was superficial to FCU in the lower part [Table/Fig-2]. On close inspection, it was found that this muscle was originating from medial epicondyle of humerus (common flexor origin). Though, this muscle had a thin belly but a long and thick tendon. Its tendon was passing superficial to flexor retinaculum and entering into palm where it got inserted into pisiform bone [Table/Fig-3]. Ulnar artery and ulnar nerve were running medial to the FCU, and deep to the additional muscle in the upper part and medial to the same muscle in the lower part.

## DISCUSSION

The most common variation of biceps is third head arising



**[Table/Fig-1]:** Left arm showing 3<sup>rd</sup> head of biceps (star mark) between Biceps brachii (Bb) and Brachialis (Brc.)



**[Table/Fig-2]:** Left forearm showing Digastric Flexor carpi Ulnaris (DFCU) medial to Flexor Carpi Ulnaris muscle (FCU).



**[Table/Fig-3]:** Picture showing insertion of DFCU into Pisiform (P) by retracting its tendon.

from proximal part of humerus. A study conducted on 96 upper limbs revealed three heads of biceps on both sides of a male cadaver (3.33%). A third head originated from the anterior limb of the 'V' shaped insertion of the deltoid on the humerus. This head was fused with the common belly of the biceps well before the bicipital tendon and its aponeurosis. Bilaterally, this third head was supplied by a twig of the McN [1]. Previous literatures have shown the common origin of third head of biceps brachii i.e., from the middle of anteromedial surface of humerus just below the insertion of coracobrachialis and insertion on radial tuberosity and bicipital aponeurosis [2-4]. An accessory FCU with absent palmaris longus was observed and presented with a separate belly that originated from the common flexor origin, passing downward on the radial side of FCU proper. Its tendon was inserted into the flexor retinaculum and hook of hamate and supplied by ulnar nerve [5]. Two adjacent muscle bellies were found on the anteromedial aspect of forearm. A larger belly (ulnar belly) was arising from the medial margin of the olecranon process, proximal two thirds of posterior border of ulna, a common aponeurosis for FCU, extensor carpi ulnaris and flexor digitorum profundus and intermuscular septum between it and flexor digitorum superficialis. Another smaller belly (humeral belly) on the lateral side was taking origin from the medial humeral epicondyle along with the other superficial forearm flexors. These muscle bellies with their tendon remained split and continued in the wrist. Two different branches of ulnar nerve were supplying these bellies [6]. Present case report shows two separate bellies of FCU which can be a result of failure of fusion of the two muscular elements. Sawant SP et al., showed two separate ulnar and humeral heads of FCU unilaterally. The humeral and ulnar heads were separated from each other by ulnar nerve. The tendons of both the heads of FCU were fused with each other just before their insertion. The ulnar artery was in contact with ulnar nerve where the two heads of FCU fused with each other [7]. The presence of an additional muscle belly

or tendon in relation to FCU, which can be generally termed as supernumerary FCU, is rare. The terminology applied to these supernumerary muscles is always confusing. This supernumerary muscle was categorised into three major groups by Bhardwaj P et al., [8].

**Type 1:** Single muscle with two tendons (Split tendon)

**Type 2:** Each head forming separate muscle and tendon (Digastric FCU)

**Type 3:** Extra muscle in addition to normal FCU (accessory FCU).

Myogenic mesodermal cells derived from the somites give origin to muscles. They start migration from the somites at approximately the fourth week. These cells coalesce into two common muscle masses, one anterior and one posterior, which then split to fashion the definitive muscles. Every muscle can be identified by 7<sup>th</sup> weeks. FCU is one of the first few muscles to split-off. Initially, it shows two muscular segments which gets fuse in later stage. However, tendons develop independently and are derived from limb bud mesoderm rather than from somites [6]. A surgery performed on a patient with long standing Volkmann's contracture to improve the thumb abduction and index finger flexion concluded that an additional belly of FCU with independent tendon can be utilised for tendon transfer technique. It was observed that patient was able to flex his index finger actively on the first post-operative day [8].

## CONCLUSION

On the basis of previous literatures it has been concluded the accessory belly in forearm is actually a digastric FCU which is a rare variation. Presence of digastric FCU can be used for surgical rehabilitation in patients with paralytic disorders, for tendon transfer and lengthening procedures. These accessory muscles simulate a ganglion or an abnormal tissue mass or cause pressure neuritis.

## REFERENCES

- [1] Kumar H, Das S, Rath G. An anatomical insight in to the third head of biceps brachii muscle. *Bratisl Lek Listy*. 2008;109(2):76-78.
- [2] Sreedevi G, Devi SS, Krupadanam K, Anasuya K. Bilateral occurrence of additional heads of biceps brachii –a case report. *Int J Res Dev Health*. 2013;1(4):195-99.
- [3] Wahengbam S, Karam R, Thounaojam K, Remei E. Incidence of third head of biceps brachii in Indian population. *Int J Anat Res*. 2015;3(4):1466-70.
- [4] Pathak B, Kharbuja R, Gaur SV. An anatomical study of the third head of biceps brachii muscle and its innervations. *International Journal of Biomedical and Advance Research*. 2016;7(5):223-25. Available from <http://www.ssjournals.com/index.php/ijbar/article/download/%203225/2313>.
- [5] Sakhivel S and Verma S. Accessory flexor carpi ulnaris and bilaterally variant vascular anatomy of upper limb: an unusual presentation. *Int J Appl Basic Med Res*. 2017;7(2):143-45.

- [6] Mohandas Rao KG, Bhat SM, Venkataramana V and Rodrigues V. Ulnar and humeral heads forming separate bellies. a rarecase of digastric flexor carpi ulnaris muscle. Int J Morphol. 2009;27(1):31-34.
- [7] Sawant SP, Shaguphta TS, More RM. Variant flexor carpi ulnaris muscle with high origin of dorsal branch of the ulnar nerve. International Journal of Health Sciences & Research. 2012; 2(6):100-06.
- [8] Bhardwaj P, Bhandari L, Sabapathy SR. Supernumerary flexor carpi ulnaris- case report and review. Hand Surg. 2013;18(3):393-97.

**AUTHOR(S):**

1. Dr. Alok Saxena
2. Dr. Kishor Kumar Agarwal
3. Dr. Amal Rani Das

**PARTICULARS OF CONTRIBUTORS:**

1. Assistant Professor, Department of Anatomy, Veer Chandra Singh Garhwali Government Institute of Medical Science and Research, Srinagar, Uttarakhand, India.
2. Associate Professor, Department of Anatomy, Veer Chandra Singh Garhwali Government Institute of Medical Science and Research, Srinagar, Uttarakhand, India.
3. Professor and Head, Department of Anatomy, Veer Chandra Singh Garhwali Government Institute of Medical Science and Research, Srinagar, Uttarakhand, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Alok Saxena,  
Assistant Professor, Department of Anatomy,  
Veer Chandra Singh Garhwali Government  
Institute of Medical Science and Research,  
Srinagar-246174, Uttarakhand, India.  
E-mail: alok.sxna@gmail.com

**FINANCIAL OR OTHER COMPETING INTERESTS:**

None.

Date of Publishing: Jan 01, 2018