



## Accessory Slips from Biceps Brachii Distal Tendon - A Case Report

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### ABSTRACT

**Introduction:** Biceps brachii muscle is one of the powerful muscles in the anterior compartment of arm. It is supplied by musculocutaneous nerve. Normally, the muscle takes origin by two heads: long head and short head. Sometimes it takes origin as supernumerary heads. It inserts on the posterior part of radial tuberosity of radius bone. It maintains the stability of the shoulder joint. It crosses two joints: shoulder and elbow joint.

**Case report:** In the present study, we found variation in the distal fibres which continued as flexor carpi radialis bilaterally. Several studies have been carried out about the origin of the muscles but few studies found regarding the variations in its insertion. Such finding may help the orthopedic surgeons for arthroscopy and surgical procedures.

**KEY WORDS:** Biceps brachii, Flexor carpi radialis, Supernumerary

### INTRODUCTION

The Biceps brachii muscle is one of the powerful muscles in the anterior compartment of arm. Normally, the muscle takes origin by two heads: long head and short head. The long head, from the supraglenoid tubercle of the scapula and short head from the tip of the coracoid process of the scapula along with the coracobrachialis muscle. It inserts on the posterior part of the radial tuberosity. The biceps muscle is a powerful flexor and supinator. It also maintains the stability of the shoulder joint.

The muscle is innervated by the musculocutaneous nerve. The muscle shows variations in the origin as a supernumerary head. Several studies have been carried out about the variability of the origin of the muscle but very few studies were found regarding the variations in insertion. Understanding the variations in the attachment of the muscle may help the orthopedic surgeons for arthroscopy and other surgical procedures.

This is a case report on the distal attachment of the biceps as an additional slip which was noted bilaterally.

### CASE REPORT

The findings in the cadaver:

The variation was observed in one cadaver and it was bilateral among the 20 upper limbs of the cadavers preserved in 10% formalin during the undergraduate teaching of academic year 2020-21.

The dissection was done meticulously to understand the variation or the attachment of the biceps brachii muscle in the department of Anatomy, JIPMER, Puducherry. Details of the morphology of biceps brachii were noted and photographed. Two measurements have been taken using digital Vernier calliper.

1. The distance between the point of muscle fibres termination and the origin of the fibres of the flexors of the forearm-64.23cm
  2. The distance between the point of muscle fibres termination to its insertion on the posterior part of the radial tuberosity-9.08cm.
- The proximal attachment of the biceps was normal. The distal tendon of the muscle inserted to the posterior part of the radial tuberosity and the bicipital aponeurosis, which blended with the deep fascia of the forearm and attached to the upper half of the posterior border of the ulna bone.

On the right side- a single slip was joining the proximal fibres of flexor carpi radialis (FCR), whereas on the left side the slips were to flexor carpi radialis and Pronator teres. After the bicipital aponeurosis was cut, the brachial artery was observed to be tortuous at its termination.

**PICTURES:**



**Figure I:** biceps brachii tendon



**Figure II:** termination of brachial artery



**Figure III:** measurement of the total length of biceps tendon

**DISCUSSION**

The flexor compartment of the upper limb is an area of interest to the anatomists, radiologists and surgeons. The variation in attachments of flexor carpi radialis and pronator teres have been reported in various studies and also the abnormal attachments of the biceps brachii. But most of them had been reported in the origin of biceps brachii not so commonly the distal attachment. 1. Paval J et al (2006) reported a case wherein some of the fibres of biceps took origin from the medial aspect of midarm and formed a separate tendon. The tendon supra divided into two slips, lateral and medial. The lateral slip got fused to the flexor carpi ulnaris and the medial slip to the medial supracondylar ridge.



2. Kulshrestha R et al (2006) had reported a predictable complex arrangement of fibres in a clockwise and anticlockwise spiralled manner of biceps tendon.

3. Dirim et al, 2008 reported about the distal tendon of biceps brachii appeared to be bifurcated which was possible to separate completely in 25% of the cadavers. They had also confirmed their studies histologically and reviewed with the MRI findings.

4. Trivedi S et al, 2015 reported a case of abnormal musculotendinous slip from biceps brachii. They observed that the bicipital aponeurosis got replaced by a musculotendinous slip which was attached from the medial side of biceps and got attached to the flexor carpi radialis & pronator teres. They found termination of brachial artery deeper to it.

5. Datta M et al, 2016 reported a case of an additional slip of flexor carpi radialis as a variant origin from the terminal end of biceps brachii which got fused with the usual slip of origin from the medial epicondyle. The finding was unilateral.

6. Shweta Solan, 2017 reported an additional slip of flexor carpi radialis from the distal end of biceps brachii & bicipital aponeurosis. She also observed the slip got fused with the pronator teres throughout the length of the muscle.

7. In the book of Anatomy atlases, the FCR has been noted to receive additional slips from the biceps tendon. They also mentioned that the tendon of biceps can give accessory slips to lower end of the humerus, the ulna, radius, antebrachial fascia, or neighbouring muscles. Thereby, supernumerary heads may also arise from brachialis, brachioradialis, or the fascia or files of the pronator teres muscle. Also a fleshy slip may arise from the medial border of biceps and pass to the medial intermuscular septum or medial epicondyle over the brachial artery. The brachial artery may actually pass through this slip or its tendon. This is a potential entrapment site for the brachial artery. Other fascicles have been reported passing to brachialis, pronator teres, flexor carpi radialis, flexor digitorum profundus, or to the lateral side of brachioradialis.

•Macalister found one biceps, which was inserted by four slips, besides the normal insertion, to the internal (medial) brachial ligament, to the capsule of the elbow joint, to the coronoid process, and to the pronator teres;

• The slip which was arising from the biceps and crossing the brachial artery, is sometimes traceable down as far as the fascia over the pronator teres and is described by Struthers as a "brachio-fascialis:" it is also illustrated by Quain;

8. Union between Pronator teres and biceps

9. Others have reported clear separation of tendinous extensions from either of bellies of biceps brachii muscle (Standring, 2008), or no separation at all (Sinnatamby, 1999; Hoppenfeld and deBoer, 2003), this study demonstrates a more complex arrangement of tendinous fascicles. The results of this study suggest that most distal biceps brachii tendons have multiple connections between the tendinous bands that originate from each muscle belly. (QUENTIN A. FOGG- clinical anatomy).

Anatomical variations related to muscles of flexor compartment of forearm have been considered as subjects of many anatomical and radiological studies. It is not uncommon to get the variations related to FCR muscle [2-6]. Both congenital absence [2] and duplication in the form of two separate musculotendinous units, a FCR and a FCRB (flexor carpi radialis brevis) have been reported [4]. Further the importance of FCR muscle has been documented and studies have highlighted the use of supernumerary tendons of FCR muscle as inter-positional graft during reconstructive surgeries [8,9].

**Conflicts:** there is no conflict of the study.

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