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# Third head of biceps brachii in anterior compartment of left arm - A Case Report

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## ABSTRACT

Biceps brachii is a flexor of elbow joint and also a powerful supinator of the forearm present in the anterior compartment of arm and usually it originates from two head as its name indicating one is long head of biceps originating from supraglenoid tubercle of scapula and another one is short head which is originating from coracoids process of scapula. During routine dissection for Ayurvedic undergraduates, In the department of Shareera Rachana (Anatomy) in SDM Trust's Ayurvedic Medical College, Terdal, Tq. Jamakhandi, Dist. Bagalkot, we found that third head of biceps brachii was originating from medial side of shaft of humerus which is just below the insertion of coracobrachialis along with the intramuscular septa and inserting into the radial tuberosity along with long and short head of biceps. Such variations are important for clinicians and surgeons for diagnostic and surgical procedures of the upper limb.

**Key words:** Biceps Brachii, Third Head, Short Head, Long Head Musculocutaneous Nerve.

## INTRODUCTION

The Biceps brachii is a long fusiform muscle, present in the anterior compartment of arm, and arising by two heads, from which circumstance it has received its name. The short head arises by a thick flattened tendon from the apex of the coracoid process, in common with the Coracobrachialis. The long head arises from the supraglenoid tuberosity at the upper margin of the glenoid cavity, and is continuous with the glenoidal labrum. The tendon of long head,

enclosed in a special sheath of the synovial membrane of the shoulder-joint, arches over the head of the humerus then it emerges from the shoulder joint capsule and descends downwards in the intertubercular groove, it is placed in the groove by the transverse humeral ligament and by a fibrous prolongation from the tendon of the Pectoralis major. The two tendons succeeded by an elongated muscular belly, and the two bellies, although closely applied to each other, can readily be separated until within about 7.5 cm. of the elbow-joint. At the elbow joint they end in a flattened tendon, which is inserted into the rough posterior portion of the tuberosity of the radius, a bursa being interposed between the tendon and the front part of the tuberosity. As the tendon of the muscle approaches the radius it is twisted upon itself, so that its anterior surface becomes lateral and is applied to the tuberosity of the radius at its insertion. Biceps brachii is innervated by musculocutaneous nerve.<sup>[1]</sup> Usually the biceps is a two headed muscle, but in the present case study, it is three headed muscle. The third head originates from medial side of shaft of humerus which is just below

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the insertion of coracobrachialis along with the intra muscular septa and inserts in the radial tuberosity along with long and short head of biceps. The third head presence may increase the strength to the biceps during supination of forearm and the elbow flexion.

**CASE REPORT**

During periodic dissection of an approximately 55 year old male cadaver for Ayurvedic undergraduates in the department of Shareera Rachana [Anatomy] at SDM Trust’s Ayurvedic Medical College, Terdal, Tq. Jamakhandi, Dist. Bagalkot, Karnataka, India, we observed that third head of biceps brachii along with long and short head in left upper limb. Dissection was carried out as per the dissection instructions of Cunningham practical manual.

**Figure 1: Showing third head of biceps brachii**



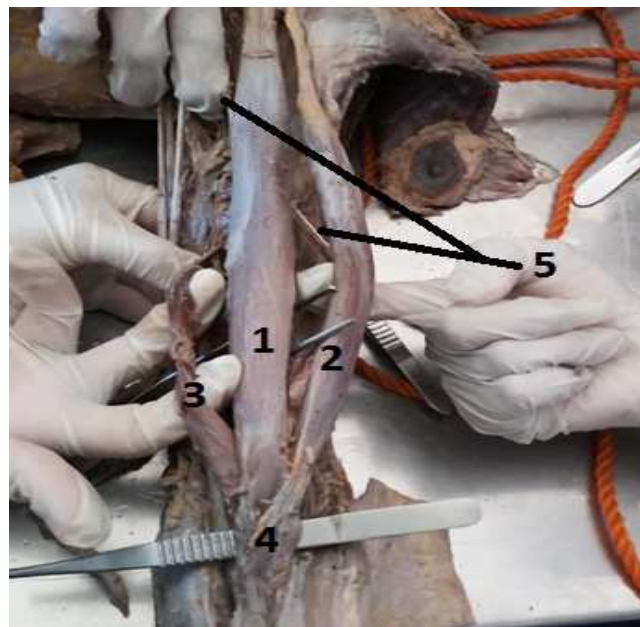
**OBSERVATIONS**

In the present case study the following observations were made on gross anatomy,

1. The third head of biceps brachii was found on the left upper limb of male cadaver aged about 55 years.
2. The third head originates from inferio medial side of shaft of humerus which is just below the

insertion of coracobrachialis along with the intra muscular septa.

**Figure 2: MNC innervation and three heads are joining before insertion.**



- 1) Short head of biceps brachii, 2) Long head of biceps brachii, 3) Third head of biceps brachii, 4) Union of three heads, 5) Musculocutaneous nerve, 6) Coracobrachialis muscle



**Figure 3: Musculocutaneous nerve piracies the coracobrachialis muscle and innervates biceps brachii muscle.**

3. The third head measuring about 15cm long and descends downward along with brachialis, and merged with the long and short heads of biceps brachii to form common tendon and was inserted on the radial tuberosity.
4. Musculocutaneous nerve was seen supplying the third head from its anterior surface Median nerve was passing with its usual normal course without piercing the third head of biceps brachii. The biceps brachii and neurovascular structure on the arm of right side were found to be normal.

**DISCUSSION**

The incidence of third head of biceps brachii was reported by many anatomists in their articles and also observed that it presents a wide range of variations.

Rodriguez-Niedenfuhr dissected and studied 350 arms in cadavers. On the basis of the study they classified the supernumerary bicipital heads into three different types.

SN	Name of head	No arms	Percentage
1	Superio humeral head	05	1.5%
2	Inferomedial humeral head	31	9%
3	Inferiolateral humeral head	01	0.3%

The inferomedial humeral head was observed in 31 out of 350 (9%) arms and was therefore the most common variation. In our study we also found that third head was originating from inferomedial aspect of humerus just below the insertion of coracobrachialis.<sup>[2]</sup>

According to Sweiter and Carmichael study the incidence of third head is more on the right upper limb but in our observation it is on left side.<sup>[3]</sup>

According to Kosogi et.al. and Asvat et.al. there are no clear gender differences in the occurrence of supernumerary head of biceps.<sup>[4],[5]</sup>

The presence of a third head of the biceps brachii muscle has its functional implications. The humeral origin of the third head of the biceps brachii muscle may contribute to the pronation of the forearm, irrespective of the position of the shoulder joint. Moreover, if the supernumerary heads are relatively large, they may provide additional strength to the biceps tendon. Literature review shows that incidence of third head of biceps brachii occurrence is more in males than females. In our study we also observed third head of biceps in male cadaver. The supernumerary heads may confuse a surgeon during shoulder operations and such variations, if unilateral, can be a cause of asymmetry between the two arms and hence, can be confused with pathological conditions such as tumours.<sup>[6]</sup>

According to Pushpa NB, Roshni Bajpe study, the third head of biceps brachii was arising from the anteriomedial surface of humerus at the point where coracobrachialis is inserted. Both long head and short head have their normal origins and insertions. The accessory head was medial to both heads and joined the common biceps brachii tendon for insertion. It was innervated by a branch of musculocutaneous nerve.<sup>[7]</sup>

Lokanandhan et.al. found supernumerary head bilaterally in two cadavers out of 40 cadavers. In one cadaver the third head originated from lower anterior part of humerus on its medial side and fused with common bulk of muscle before its termination into bicipital aponeurosis. In another male cadaver it had its origin from upper anterior part of humerus on its medial side. The third head fused with common bulk of muscle before the origin of bicipital tendon.<sup>[8]</sup>

In our case report, we found the additional head originating from the medial side of the shaft of humerus below the level of insertion of coracobrachialis along with intermuscular septa and descend downward along with Brachialis, combine with main intracapsular tendon and enter deep into cubital fossa and finally inserts in the radial tuberosity.

**CONCLUSION**

Knowledge of the variation of the biceps brachii muscle is important in numerous fields ranging from physical anthropology studying human evolution, basic medical sciences like human body as well as more applied specialties like oncology, general orthopedic or reconstructive surgery. Knowledge of the existence of the third head of biceps brachii will enhance pre-operative evolution, facilitate surgical intervention within the arm improve post-operative outcomes and will also facilitates the management of nerve impairments. Ignorance of presence of such a variation can inadvertently lead to iatrogenic injuries during surgery and invasive procedures.

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