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## SUPERNUMERARY HUMERAL HEADS OF BICEPS BRACHII MUSCLE

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### ABSTRACT

Background: Biceps is the muscle of anterior compartment of the arm. The biceps in Latin means two heads. The two heads, long head and short head of biceps normally arise from scapula. The present study was carried out on twenty cadavers belonging central Indian population, to study the supernumerary head of biceps. Out of 40 arms studied, supernumerary head was seen in 5% of specimens, on left side. The knowledge of such variations is important in planning of surgery and post operative care provided by the physiotherapists.

**Keywords:** Biceps brachii, Supernumerary head, Humeral head

### INTRODUCTION

Biceps brachii is the muscle of anterior compartment of arm, normally having two heads; long head and short head. Long head arises from the coracoid process and short head from the supraglenoid tubercle of the scapula<sup>1</sup>. The supernumerary heads of biceps has been reported previously ranging from three heads to seven heads<sup>2,3</sup>. The most commonly reported variation was the biceps with third heads<sup>3,4</sup>. Frequency of occurrence of third head of biceps in cadavers showed variation in different populations. In Chinese frequency is 8 %, European white 10%, African black 12%, Japanese 18% and in South Africans black and white population it ranged from 8% to 20.5%<sup>2,3,4,5,6</sup>. The attachment of the supernumerary head fascicles are described from the coracoid process, pectoralis major tendon, proximal head of the humerus, articular capsule of the humerus or from

humerus itself. The supernumerary head arising from humerus is called as the humeral head of the biceps brachii muscle<sup>3,7</sup>. The supernumerary heads were classified as superior, inferomedial, and infero-lateral humeral heads<sup>6</sup>. In 10% cases the third head of biceps may arise from the superomedial part of brachialis and is attached to bicipital aponeurosis and medial side of tendon insertion<sup>1</sup>.

In the present study we reported two cases of supernumerary humeral head of biceps originating from inferomedial and inferolateral part of humerus which is quite rare.

### MATERIALS AND METHODS

The study was conducted at Shri Vasantnao Naik Government Medical College, Yavatmal. The study included both right and left upper limbs of 20 formalin fixed cadavers (n=40) irrespective of age and sex. The arm was dissected carefully as described in Cunningham's dissection manual<sup>8</sup>, to display the full length of the

biceps muscle from proximal attachment to the distal attachment. All other related structures were also exposed. The additional heads were examined for the origin and course at lower end<sup>9</sup>.

### RESULTS

Among the 20 cadavers studied (n=40), the third head of biceps was observed in two male cadavers (5%). The other 38 limbs the biceps had two normal heads.

In first observation, 79 year male cadaver variation observed was unilateral on the left side. Short head originated from tip of the coracoid process and long head from the supraglenoid tubercle. The supernumerary third head from the lateral aspect of humerus just below the insertion of deltoid and coracobrachialis (inferolateral head). The belly of the third head directed downward, medially and fused with common tendon of biceps just above the base of cubital fossa from the posterior aspect. The musculocutaneous nerve was present on the medial side, in between the third head and the brachialis which had normal origin. (fig 1,2)

The second observation was made on male cadaver of 64 years on the left side. The origin of the short head and long head was normal. The supernumerary humeral third head was seen arising from medial aspect of the humerus just below the insertion of coracobrachialis and above the origin of brachialis muscle (inferomedial head). The origin of brachialis was normal and musculocutaneous nerve was present on the lateral side of the supernumerary head. (fig 3)

Both the supernumerary heads received twig from the musculocutaneous nerve, were unilateral and on the left side. In both case, all the three bellies fused and was inserted normally on the lower half of radial tuberosity and bicipital aponeurosis. No other obvious abnormalities were observed.

### DISCUSSION

The variation in number of head of biceps is well known. The number of heads of biceps ranged from three to seven<sup>2,3</sup>. In our study we encountered three head of biceps in two cases (5%) out of 40 limbs studied. Gray's Anatomy reported the incidence of this variation to be as much as 10% while in South African population the incidence varied with ethnicity between 20.5% in blacks to 8.3% in whites<sup>1,2</sup>. In north Indian population the incidence was around 2.3% which was less when compared to our study while in population of southern coast of India the incidence was 7.1% which was more as compared to our study<sup>4,9</sup>. The other Indian study reported incidence of 9.37% of third head of biceps<sup>3</sup>.

In our study we observed two types of supernumerary humeral head; inferolateral and inferomedial heads of biceps brachii. The accessory head of Biceps brachii are classified according to their location as superior, inferomedial and inferolateral humeral heads. Most of the accessories head of Biceps brachii belong to these 3 groups. Among all, inferomedial humeral head is the most common variation, which takes origin from the anteromedial surface of humerus just beyond the insertion of coracobrachialis and is inserted into the conjoint tendon of biceps brachii<sup>3,6,11,12</sup>. Gray's anatomy reported third head arising from the superomedial part of the brachialis as 10% (inferomedial humeral head) while in our study this incidence was 2.5% and also inferolateral humeral head incidence was 2.5%<sup>1</sup>. Population along the western region of India reported inferomedial humeral head of humerus in 3.12% but inferolateral humeral head was not reported<sup>3</sup>. While in South African population the origin of inferomedial head of biceps were twice the origin of inferolateral head<sup>2</sup>.

Humeral origin of supernumerary head of biceps allow flexion of the elbow joint

irrespective of the position of the shoulder joint as the third head only crosses the elbow joint. The dual origin of the third head may contribute to supination of the forearm, as the muscle origin is in a lateral position (inferolateral) relative to the rotational axis of the arm. The medial brachial origin (inferomedial) head may contribute to pronation of the forearm irrespective of shoulder joint position<sup>2,13</sup>. In addition to allowing elbow flexion independent of shoulder joint position, the third head of biceps brachii may enhance the strength of elbow flexion<sup>2,4,13</sup>.

Embryological studies revealed this variation of the third head of Biceps brachii as a portion of the brachialis muscle supplied by the Musculocutaneous nerve, in which its distal insertion has been translocated from the ulna to radius. This may be helpful primarily in supination and secondary flexion of the forearm<sup>3,14</sup>. Phylogenetically the inferomedial head which arises from the insertion area of coracobrachialis, possibly represents a remnant of the long head of coracobrachialis, the ancestral hominoid condition<sup>2</sup>.

The unusual bone displacement which comes subsequent to fracture has been implicated to the presence of the supernumerary head of biceps<sup>4,13</sup>. It may affect the strength of elbow flexion and may also compress the neurovascular structure<sup>3,15</sup>.

### CONCLUSION

The anatomists and clinician should be aware of such variation. The knowledge of the supernumerary head of biceps is important for the orthopedician, traumatologist and neurovascular surgeon as it may influence the outcome of the surgery. This is also important in planning of surgery and post operative care provided by the physiotherapists.

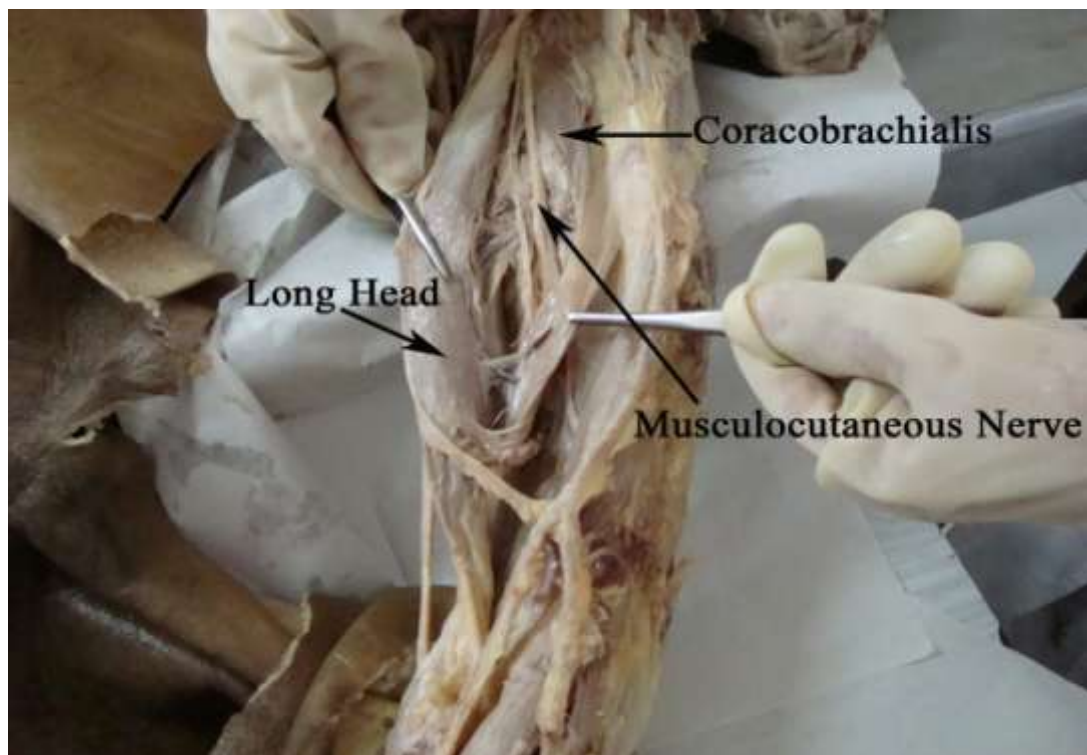
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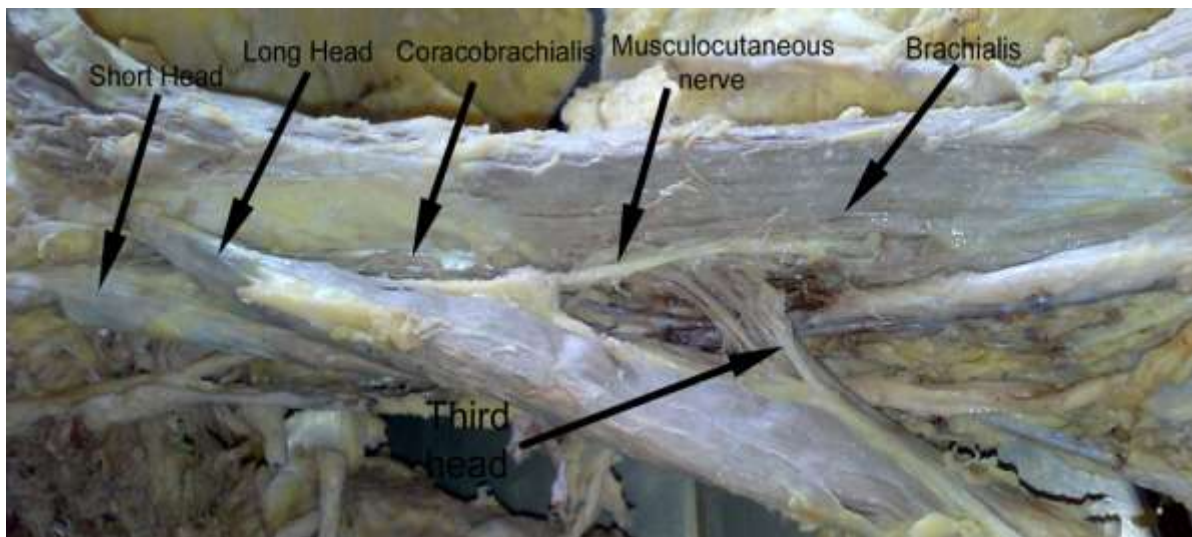
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**Figure 1: Musculocutaneous nerve on the medial aspect on supernumerary head of biceps**



**Figure 2: Inferolateral supernumerary humeral head arising from anterolateral aspect of humerus**



**Figure 3: Inferomedial supernumerary humeral head and Musculocutaneous nerve on the lateral aspect.**