

## Case Report

# UNILATERAL VARIATION IN BICEPS BRACHII MUSCLE WITH FOUR HEADS

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## ABSTRACT

Biceps brachii is one of the muscles of the anterior compartment of the arm. Normally it has two heads; long head which originates from the supraglenoid tubercle of glenoid cavity and short head from the tip of coracoid process of scapula. During routine Anatomy dissection for first MBBS students, in an adult male cadaver aged approximately 65 years, a biceps brachii muscle with four heads was observed. The short and long heads had their normal origin. In addition to this third head was found to be originating obliquely from the shaft of the humerus along the lateral side of insertion of the coracobrachialis muscle and the fourth head originated from superomedial margin of origin of the brachialis muscle. Both additional heads were directed downwards and laterally and joined the deeper surface of short head. All heads of this variant biceps brachii muscle were supplied by the musculocutaneous nerve. Earlier, Poudel PP and Bhattarai C (2009) reported the presence of 3<sup>rd</sup> head in 6.2% and 4<sup>th</sup> head also in 6.2% where as Standing (2008) reported the presence of 3<sup>rd</sup> head in 10%. Knowledge of the existence of such variations of biceps brachii may be significant in surgeries of the arm in trauma, tumors, etc.

**KEY WORDS:** Biceps brachii, Heads, Musculocutaneous Nerve.

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## INTRODUCTION

Biceps brachii is one of the muscles of the anterior compartment of the arm. It derives its name from its two proximally attached parts or 'heads'. The short head arises from the coracoid apex, together with coracobrachialis. The long head starts within the capsule of the shoulder joint as a long narrow tendon, running from the supraglenoid tubercle of the scapula. The two tendons lead into elongated bellies. Biceps brachii ends in a flattened tendon, which is attached to the rough posterior area of the radial

tuberosity. A bursa separates the tendon from the smooth anterior area of the tuberosity [1].

Musculocutaneous nerve (C5,6) with separate branches passing to each belly, innervates the muscle. Biceps brachii acts as a powerful supinator especially in rapid and resisted movements & flexes the elbow most effectively when the forearm is supinated. Its short head acts as a flexor of the shoulder joint. Lowering the hand under the influence of gravity by extension at the elbow, calls for controlled lengthening of biceps.

## MATERIALS AND METHODS

During routine Anatomy dissection for first MBBS students at Aurobindo Medical College, in an adult male cadaver aged approximately 65 years, a biceps brachii muscle with four heads was observed on right side.

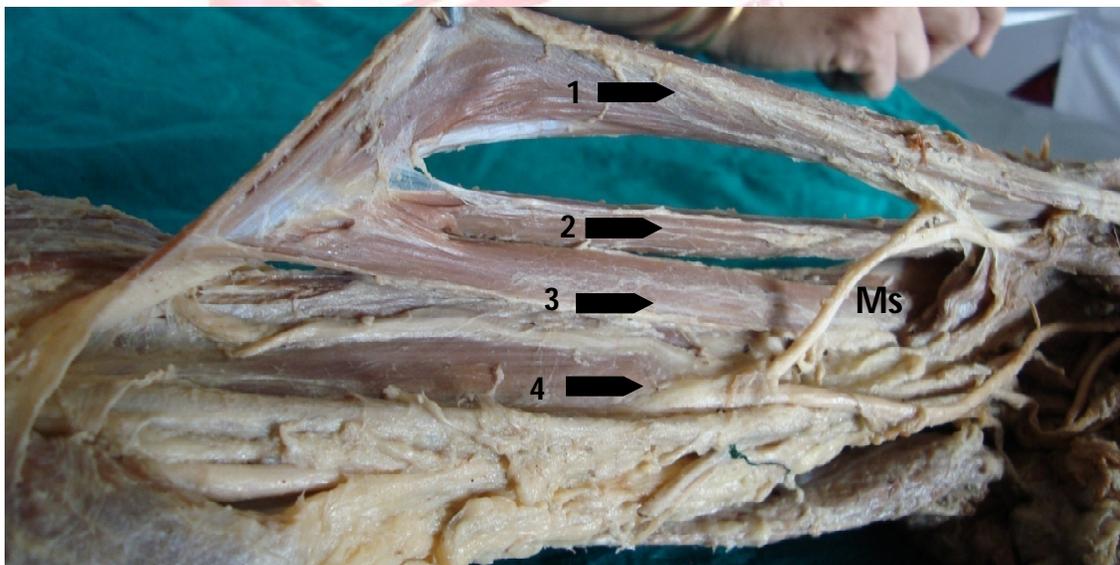
## OBSERVATIONS

In the present report, we found the following variation in the upper limb. The short and long heads had their normal origin. In addition to this third head was found to be originating obliquely from the shaft of the humerus along the lateral side of insertion of the coracobrachialis muscle

(Fig.1,2). The fourth head originated from superomedial margin of origin of the brachialis muscle. Both additional heads were directed downwards and laterally and joined the deeper surface of short head. All heads of this variant biceps brachii muscle were supplied by the musculocutaneous nerve which (below the elbow) after piercing the deep fascia continues downward as the lateral cutaneous nerve of the forearm (Fig.1,2).

On the left side, the biceps brachii muscle with short & long heads had their normal origin. There was no variation found on the left side.

**Fig.1:** Photograph showing four heads of Biceps brachii muscle (  ) & musculocutaneous nerve (Ms) is seen.



**Fig.2:** Photograph showing four heads of Biceps brachii muscle (  ) & musculocutaneous nerve (Ms) is seen.



## DISCUSSION

**Table 1:** Reported cases of supernumerary heads of Biceps Brachii muscle.

Sr. No.	Name of Reporter	Year	Incidence of Supernumerary head	Incidence of Four heads of Biceps brachii
1	Jadhav et al[5]	2005	10.76% (Out of 130 limbs)	1.54% (2 out of 130)
2	Poudel PP et al[6]	2009	12.5% (out of 32 arms)	6.2% (out of 32 arms)
3	Avadhani et al[8]	2012	16.67% (8 Out of 48 arms)	2.08% (1 out of 48 arms)
4	Sawant et al[7]	2012	12% (6 out of 50 arms)	Nil
5	Pakahale et al[10]	2012	3.75% (3 Out of 80)	Nil
6	Illyperuma et al[2]	2011	3.7% (5out of 270)	Nil
7	Aggrawal et al[4]	2009	Case report	1 case
8	Cricenti et al[9]	2008	Case report	1 cases

The biceps brachii muscle presents a wide range of variations. In 10% of cases, a third head arises from the superomedial part of brachialis and is attached to the bicipital aponeurosis and medial side of the tendon of insertion. Less often other slips may spring from the lateral aspect of the humerus or intertubercular sulcus [1]. This case report is presented a variant of biceps brachii and it is discussed in the light of the available literature. Most common variation is supernumerary head. Earlier, reported cases of supernumerary heads of biceps brachii muscle are given in Table.No.1.

The presence of supernumerary heads of biceps brachii may be explained on the basis of its embryological evolute. The opinions and views of different researchers are as follows: Embryologically it has been stated that the third head of biceps brachii arises from the brachialis muscle and in such instances its distal insertion has been translocated from ulna to the radius. The innervations and vascularization of the third head were from musculocutaneous nerve agrees with the normal embryologic development of the related dermatomes and myotomes. It is presumed that the development of the biceps brachii is likely to influence the course and the branching pattern of musculocutaneous nerve [2,3].

Muscles of front of arm develop from myogenic precursor cells that arise from ventral dermomyotome of somites. In these precursor cells, muscle regulatory genes like Pax 3 and Myf 5 are activated and transcription factors like Myo D, myogenin and myogenic regulatory factors are expressed. Further growth of muscle occurs by fusion of myoblasts and myotubes and later are

invested by connective tissue. Variation of muscle patterns may be a result of altered signaling or stimulus between mesenchymal cells [2]. One school of thought is that these accessory heads of biceps brachii may be due to the musculocutaneous nerve that pierces biceps and cause a longitudinal splitting of myotubules which get a covering of connective tissue and becomes a separate belly.

These variations in muscle arise primarily due to genetic composition, an inheritance carried over from ancient origins, many or most variations are totally benign, some are errors of embryologic developmental timing or persistence of an embryologic condition [4]. Supernumerary head of biceps brachii as a portion of the brachialis muscle which may enhance primarily supination and secondary flexion of the forearm [3]. Clinically presence of supernumerary heads may cause compression or entrapment of neurovascular bundle especially musculocutaneous nerve due to its intramuscular course. This may results in paraesthesia and weakness of elbow flexion and supination. Moreover, in humeral fractures, the supernumerary head may cause unusual displacement of the fracture ends due to the alteration of the biomechanical forces applied on the humerus.

## CONCLUSION

Knowledge of the existence of such variations of biceps brachii may be significant in surgeries of the arm in trauma, tumors, etc.

**Conflicts of Interests: None**

## REFERENCES

- [1]. Standring S, Borley NR, Collins P, Crossman AR, Gatzoulis MA, Healy JC, et al. Gray's Anatomy: The anatomical basis of clinical practice. Churchill Livingstone 40<sup>th</sup> Ed. 2008; 825&826.
- [2]. Ilayperuma I, Nanayakkara G, Palahepitiya N. Incidence of humeral head of biceps brachii muscle – Anatomical insight. *Int J Morphol* 2011;29(1):221-225,
- [3]. Testut, L. & Latarjet, A. Compendio de anatomia descriptiva. 22nd Ed. Buenos Aires, Salvat, 1981.
- [4]. Aggarwal A, Kaur H, Sahni D, Aggarwal A. Four-headed biceps brachii muscle with variant course of musculocutaneous nerve: anatomical and clinical insight. *Internat J Anat Variations* 2009;2: 127–130.
- [5]. Jadhav SD, Joshi SD, Joshi SS, Athavale SA. Extra Heads of Biceps Brachii. *J Anat Soc Ind*;54, No. 1 (2005-01 - 2005-03).
- [6]. Poudel PP, Bhattarai C. Study on the supernumerary heads of biceps brachii muscle in Nepalese. *Nepal Med Coll J* 2009;11(2):96-98.
- [7]. Sawant SP, Shaikh ST, More RM. Variant heads of biceps brachii muscle with clinical importance. *Ind J Basic App Med Res* 2012; 1(4):245-250.
- [8]. Avadhani R, Chakravarthi KK. A Study on morphology of the biceps brachii muscle. *NUJHS* 2012; 2(3): 1-5.
- [9]. Cricenti SV, Cardoso TL, Garcia AN, Faro PF, Vincenzo CS. Anatomic variation regarding number of heads of the brachial biceps muscle. *J Morphol Sci* 2008; 25(1-4):157-214.
- [10]. Pakahale SV, Borole BS, Mahajan AA. Study on the Accessory Head of the Biceps Brachii in Indians which was Done during Cadaver Dissections. *J Clinic Diag Res* 2012, 6(7): 1137-1139.
- [11]. Jayanthi AA, Elezy MA. Study of Variations in the Origin of Biceps Brachii Muscle in Kerala. *Inter J Sci Res Pub* 2012; 2(8):1-4.
- [12]. Natsis K, Vlasis K, Tsakotos G, Totlis T, Koebke J. A case of a supernumerary third head of the biceps brachii muscle - clinical significance. *Aristotle Univer Med J* 2010; 37(2):39-41.

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