

# Non-Symmetric Bilateral Three Headed-Biceps Brachii

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Received: 15 Nov. 2018; Accepted: 28 Dec. 2018

**Abstract-** Anatomical muscles' variation may face clinician and surgeon with some dilemmas. Obviously, reporting a rare case of variations could explore some unexplained and unexpected clinical symptoms. Bilateral three head biceps, which had a supernumerary head with different origins in both right and left arms, is reported in this case report article. The crucial importance of arm muscles variations' is because of their adjacent location to brachial nerve plexus and brachial vessels. Every single alteration in the direction of anatomical elements could result in pressure on nerve or vessels with clinical symptoms. Taken together, investigation and popularization of variations make a well-knowledged background for clinicians and surgeons.

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*Acta Med Iran* 2019;57(5):338-340.

**Keywords:** Biceps Brachii; Variation; Anatomy; Dissection

## Introduction

Biceps brachii is known as one of the alterable muscles in the human body due to its different heads or morphology (1). Actually, biceps brachii is defined as two-headed muscle, a long head originates from supraglenoid tubercle and a short head aroused from the tip of the coracoid process of the scapula. It is classified among flexor group of muscles in the arm. It can act on both shoulder and elbow joints. The two heads combine together in the upper half of the arm, then the bulk of the biceps muscle ends as a flattened tendon which inserts into a posterior rough part of the radial tuberosity. C<sub>5</sub> and C<sub>6</sub> spinal cord segment continue as the musculocutaneous nerve, which innervates biceps brachii (2,3). It is well documented that a supernumerary head of biceps brachii may stretch from superomedial part of the brachialis to the bicipital aponeurosis and in 10% of cases, its fibers extend to the medial side of the tendon (4). This delicate point may cause a distraction for the surgeon in the operation room because it may lead to compression of neurovascular structures in the upper limb (5). So the aim of the present case was to emphasize the importance of such variation in clinical and academic purpose. In the current case, we report bilateral three head biceps, which had a supernumerary head with different origin in both right and left arms.

## Case Report

During routine dissection of the upper limb for undergraduate students, we found bilateral variation in the arms of an adult male cadaver that fixed in formalin. Dissection of the upper limb was performed to exhibit the full length of biceps muscle according to the instructions by Cunningham's manual of practical anatomy (6). Interestingly, a supernumerary head of biceps brachii was discovered bilaterally, but it was not symmetric in both right and left arms. Both long and short heads had their normal origins and insertions, but the third head had a different condition on both sides. In right arm, flat fibers of third head originated from the anteromedial surface of the humerus between the insertion of the coracobrachialis and the origin of the brachialis. The belly of the third head attached to the infero-medial side of biceps brachii (Figure 1). In the left arm, the supernumerary head of biceps brachii muscle originated from the antero-superior surface of the humerus between lesser tubercle of humerus, coracobrachialis, and brachialis muscles. Then this third head continued infero-medial to the bulk of biceps brachii. Hence, the brachial artery and median nerve lied medial to the supernumerary head bilaterally (Figure 2). Musculocutaneous nerve originated from the lateral cord of the brachial plexus, after piercing coracobrachialis muscle, it distributed to several branches to innervated heads of biceps (Figure 3).

S.H.B= Short Head of Biceps brachii, L.H.B= Long Head of Biceps brachii, T.H.B= Third Head of Biceps brachii, T.B= Tendon of biceps brachii, A.B= Aponeurosis of biceps brachii.

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Figure 1. Triple headed right biceps brachii muscle



Figure 2. Triple headed left biceps brachii muscle



Figure 3. Triple headed biceps brachii muscle and Musculocutaneous nerve

S.H.B= Short Head of Biceps brachii, L.H.B= Long

Head of Biceps brachii, T.H.B= Third Head of Biceps brachii, C.B= CoracoBrachialis, M.C.N= MusculoCutaneous Nerve, and its branches.

## Discussion

According to historical research in human anatomy, muscles are associated with a wide range of variations. These variations include absence of a muscle, supernumerary muscle, muscles with unusual course, or unusual origin and insertion, and accessory muscle (7). In a cadaveric dissection, supernumerary or accessory heads of biceps brachii have been frequently observed (8), which can be seen with or without variations of musculocutaneous nerve (9), and additional heads of biceps brachii can be existed in three- or four-headed variant. It was supposed that the presence of third head of biceps brachii may impress branching pattern of musculocutaneous nerve (5). The supernumerary heads of biceps brachii has several different conditions. One of the supernumerary heads originated from the humerus in the region between the lesser tubercle, and the coracobrachialis and brachialis (7). Another supernumerary head originated from the humerus distal to the insertion of the coracobrachialis. The last supernumerary head originated from the lateral side of the biceps brachii and from the medial side of the deltoid and its insertion region (4). In addition to the above-mentioned classification, the rare varieties such as acromial, labral, and pectoral heads have been observed (10). Incidence of unilateral three- or four-headed biceps brachii is usual than bilateral three- or four-headed (11) which is similar to current report.

Marwan f *et al.*, reported that a unilateral three-headed biceps brachii was found in the right arm of adult male cadaver, which was originated from the anteromedial surface of humerus. In fact, their dissection confirmed our case about right arm (12). In the other study, PP Poudel *et al.*, observed three-headed biceps which had usual short and long heads of muscle with their normal attachment, and the third head had origin and insertion similar to our case in the right side. But on the contrary of our finding, it was just unilateral (13).

The biceps can be important due to its powerful action as flexor and supinator muscle, so it was observed that an additional biceps head, may increase the power of flexion and the supination component (14).

Exploring for anatomical variations, demonstrated in several cases, is worthwhile to determine unusual clinical signs and symptoms or even it makes clear confusing variation for a surgeon during surgical procedures.

## Acknowledgments

The authors of this paper wish to appreciate for who donate their body to promote the education and research.

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