

# Bilateral absence of musculocutaneous nerve – a case report

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## Abstract

During routine undergraduate dissection in Anatomy department, bilateral variations were found in the anterior compartment of the arm in male cadaver of approximately 58 years age. The musculocutaneous nerve was absent on both sides. The muscles in the anterior compartment of the arm except coracobrachialis, which are normally supplied by musculocutaneous nerve, were receiving fibers from lateral side of median nerve. Coracobrachialis was supplied by thin nerve arising directly from lateral chord. We will be reporting this case with its clinical significance.

**Keywords:** Bilateral variations, Brachial plexus, Musculocutaneous nerve, Median nerve.

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## INTRODUCTION

Anatomical variations are frequently reported in relation to brachial plexus. The prevalence of variation ranges from 12.8 up to 53%.<sup>1</sup> Knowledge of variations is important to anatomist, radiologist, anesthesiologists and surgeons. The musculocutaneous nerve is a branch of the lateral cord of the brachial plexus. It pierces the coracobrachialis muscle, supplies it and enters the front of the arm to supply the biceps brachii and brachialis muscles. Additionally, this nerve supplies the lateral margin of the skin of the forearm through lateral cutaneous nerve of forearm. While the median nerve is usually formed just lateral to the third part of the axillary artery by the union of its medial and lateral roots coming

from medial and lateral cords of the brachial plexus respectively. The median nerve then descends down in the front of the arm and crosses superficial to the brachial artery from lateral to medial side. It enters the cubital fossa along with the brachial artery. Normally it does not supply any muscles of the arm. We saw the absence of musculocutaneous nerve with variation in the branches of median nerve.

## MATERIAL AND METHOD

Conventional dissection technique.

## OBSERVATIONS AND RESULTS

During routine undergraduate dissection in Anatomy department, bilateral variations were found in the anterior compartment of the arm in male cadaver of approximately 58 years age. The musculocutaneous nerve was absent on both sides. The muscles in the anterior compartment of the arm except coracobrachialis, which are normally supplied by musculocutaneous nerve, were receiving fibers from lateral side of median nerve. Coracobrachialis was supplied by thin nerve arising directly from lateral chord. The distance from coracoid process to the point of emergence of motor branch to the muscles of arm from median nerve and earliest branch piercing the muscle are tabulated below:

**Distance from coracoids process, keeping the upper limb at 90 degree abducted position**

Name of muscle	Source of nerve supply	Point of emergence of motor branch to the muscle (mm)		Point where the nerve pierces the muscle(mm)	
		Right	Left	Right	Left
Coracobrachialis	Lateral cord	45	42	46	44
Biceps Brachii	Lateral side of median nerve	164	114	168	172
Brachialis		181	178	248	234



**Image 1:** Left upper limb



**Image 2:** Right upper limb

The branch of median nerve supplying Brachialis muscle divides into two branches. Upper branch supplies Brachialis as mentioned in the table while lower branch pierces the deep fascia lateral to the tendon of the biceps brachii at 322mm (Rt) and 308 mm (Lt) from coracoid process and continued along the lateral border of the forearm to become lateral cutaneous nerve of the forearm (photograph). The first branch of the lateral cord, the lateral pectoral nerve was given normally bilaterally just below the outer border of the first rib to supply the pectoralis major muscle. Bilaterally the relations of all the three cords of the brachial plexus with the second part of the axillary artery and the further course, branching and termination of the median nerve in the forearm and hand follow the normal usual pattern. No other vascular or muscular variation is observed in both the upper limbs.

**DISCUSSION**

The very idea of forming the brachial plexus was to have a common source from a given spinal nerve and different areas of distribution of the limbs.<sup>2</sup> So, it is not uncommon to find variation in nerves of the limbs in which there is partial interchange of nerve roots or complete replacement of nerves having common roots. There is little data in the literature on the prevalence of absence of musculocutaneous nerve. Its prevalence ranging from 1.7 to 15 %.<sup>3</sup> These anatomical variations can be explained with the help of the embryological development of the upper limb. The muscles into the limb bud are formed from mesenchyme, migrated from the dorsolateral part of the somites and at the same time, the mesenchyme is penetrated by the ventral primary rami of the appropriate spinal nerves, located opposite to the bud. Lack of coordination between these two processes may lead to variations.<sup>1</sup> and <sup>4</sup> Variations and abnormal distribution of

nerves of the arm have been reported in many articles. Some of them have also reported absence of musculocutaneous nerve with supply of muscle of arm by Median nerve.<sup>5, 6, 7</sup>

Absence of musculocutaneous nerve was noted by Le Minor (1992) who described five types of variations:

- ❖ Type I: There is no communication between median and musculotaneous nerve.
- ❖ Type II: The fibers of the medial root of median nerve pass through the musculocutaneous nerve and join the median nerve in the middle of the arm.
- ❖ Type III: The lateral root fibers of median nerve from lateral cord pass through the musculocutaneous nerve and after some distance, leave it to from main trunk of the median nerve.
- ❖ Type IV: The fibers of musculocutaneous join the lateral root of median nerve and after some distance the musculocutaneous nerve arises from the median nerve.
- ❖ Type V: The musculocutaneous nerve is absent and the entire fibers of musculocutaneous nerve pass through lateral root and fibers to the muscles supplied by musculocutaneous nerve branch out directly from median nerve.

The variation in present case coincides with Type V variation of Le Minor.<sup>8</sup>

Anatomical variations of peripheral nerve constitute potentially important clinical and surgical issue. Precise knowledge of variation of median and musculocutaneous nerve may prove valuable to

- Anaesthetists, as variant nerve is likely to be injured by inappropriately applied retractors or on a blindly attempted brachial plexus block.

- Orthopedicians and Surgeons, for traumatology of arm as well as in plastic & reconstructive repair operations , while performing neurotization of brachial plexus injury or shoulder arthroscopy etc, so that these structures can be identified and protected.
- Neurosurgeons, in diagnosing & treating post traumatic peripheral neuropathies and reconstructive nerve grafting following brachial plexus injuries, as injury to the median nerve in the axilla or arm would, in this case, have caused unexpected paresis or paralysis of flexors of elbow and hyposthesis of lateral surface of forearm, in addition to classical signs that are already well known.<sup>9,6,7</sup>

## CONCLUSION

In this case, there was bilateral absence of musculocutaneous nerve. Variation in branching pattern of brachial plexus in which there is partial interchanges of nerve roots or complete replacement of nerves having common roots are frequent. Anatomical knowledge of these variations of peripheral nerve is important academically as well as for clinical and surgical issue.

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