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# Unilateral Absence of the Musculocutaneous Nerve - A Case Report

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## ABSTRACT

The musculocutaneous nerve, which derives from the brachial plexus's lateral cord and gets fibers from C5, C6, and C7, innervates the muscles of the anterior compartment of the arm. The nerve travels between the brachialis and biceps brachii, piercing the Coracobrachialis muscle. A male cadaver's left upper limb was routinely dissected, and it was noted that the median nerve's branches supplied the muscles in the left arm's anterior compartment whereas the musculocutaneous nerve was absent. Understanding musculocutaneous nerve variations is essential for surgical interventions.

**Key words:** Brachial plexus, Anatomical Variations, Median Nerve, Musculocutaneous Nerve.

## INTRODUCTION

The ventral rami of the C5–T1 nerve roots comprise the brachial plexus. It is made up of branches, cords, divisions, roots, and trunks. There are three cords: the posterior, lateral, and medial. The fibers from C5, C6, and C7 are transmitted by the musculocutaneous nerve (MCN), which is derived from the lateral cord. The nerve runs across the third segment of the axillary artery and pierces the coracobrachialis muscle. After supplying the Brachialis, Biceps Brachii, and Coracobrachialis, it terminates as the lateral cutaneous nerve of the forearm.<sup>[1]</sup>

After passing through the coracobrachialis, the nerve continues below the elbow to pierce the deep fascia

lateral to the tendon of the biceps brachii. From there, it continues downward as the Lateral cutaneous Nerve of the Forearm, supplying the skin of the Antero-Lateral Region of the Forearm, extending as far distally as the base of Thenar Eminence.<sup>[1]</sup>

The median nerve has two roots medial root and lateral root which unite after passing in front of the third segment of the axillary artery. Fibers from C8 and T1 are conveyed by the Lateral Root, which is derived from the Lateral Cord; fibers from C5, C6, and C7 are conveyed by the Medial Root, which is derived from the Medial Cord. The median nerve, which enters the forearm between the two heads of the pronator teres, is the most medial portion of the cubital fossa. It is located medial to the tendon of the biceps brachii. The arm's median nerve gives no branches in the arm. It supplies the muscles of the thenar eminence (except from the adductor pollicis), and the flexor compartment of the forearm (apart from the Flexor carpi ulnaris) and lateral two lumbricals.<sup>[1]</sup>

Anatomical variations in the brachial plexus are relatively common. Although MCN absence has been previously reported, its precise frequency is unknown. This study describes a situation in which the MCN was absent and the MN supplied the MCN's innervation region.

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## CASE REPORT

In the Rachana Sharira department of AMC, Nagarur, India, a routine dissection of an adult male formalin-fixed cadaver of approximately 47 years of age, revealed the current variant. Following the instructions in Cunningham's Manual of Practical Anatomy, the upper limbs and thorax were dissected. As left infraclavicular part was dissected, it was noted that the lateral cord from the brachial plexus continues as the lateral root of the median nerve. The musculocutaneous nerve did not appear to emerge from the lateral cord. Lateral pectoral nerve arises from lateral cord as usual. The main trunk of MN was produced by the fusion of the medial and lateral roots of the median nerve before the third segment of the axillary artery. The lateral cord supplied a branch to the coracobrachialis muscle in the absence of the musculocutaneous nerve. A branch of MN innervates the Biceps Brachii, while another twig supplies the brachialis muscle. The other branch of MN ends as the lateral cutaneous nerve of the forearm when it reaches the lower arm.

The MN main trunk entered the cubital fossa, located medial to the brachial artery. In the right arm of the cadaver, the musculocutaneous nerve had normal anatomical origin, course, and distribution

## DISCUSSION

The anatomical variation of MCN is not less prevalent.<sup>[2]</sup> The cause for anatomical variations in the peripheral nerves is quiet not well explicated. It has been explained in fifth week of development, the paraxial mesoderm gives rise to the muscles of the upper limb. The mesenchyme is where the spinal nerve fibers grow toward. Any change in the signaling between them could result in significant differences in the nerve conduit.<sup>[3]</sup>

The lateral cord of the brachial plexus provides the lateral root of the median nerve, however the musculocutaneous nerve was not observed emerging from the lateral cord in the left arm in the current study. As normal, the lateral cord gives rise to the

lateral pectoral nerve. The medial and lateral roots of MN united in front of the third segment of the axillary artery to form the MN main trunk. The lateral cord supplied a branch to the coracobrachialis muscle.

A branch from MN innervates Biceps Brachii & another branch from MN gives a twig to brachialis muscle & on reaching lower part of arm this branch from MN terminates as the lateral cutaneous nerve of the fore arm. The absence of MCN in this instance is most likely the result of all the ventral twigs originating from the brachial plexus's lateral cord failing to aggregate. All of the segmental branches enter through the median nerve and pass through its lateral root in place of the MCN. The nerves that supply the limb bud muscles grow concurrently with the muscles themselves, originating from the MN.<sup>[4]</sup>

It was reported by Le Minor, Gumsburun and Adiguel, Sud, Song et al., and Nakatani et al. that the musculocutaneous nerve was not visible in few cadavers they studied. The current variation is similar to the Sud case report, where the flexor compartment of the arm muscles received their nerve supply from the median nerve in the absence of the MCN.<sup>[5-9]</sup>

Out of the sixty limbs that Beheiry et al. dissected, only one (1.7%) had the musculocutaneous nerve absent.<sup>[10]</sup> After dissecting 24 arms, Prasada Rao and Chaudhary discovered that 8% of them had no MCN.<sup>[11]</sup>

Joshi et al observed that the musculocutaneous nerve was absent in 5.5% of the cadavers in his study.<sup>[12]</sup> When MCN was absent nerve fibres for flexors of arm were coming from the median nerve.<sup>[13]</sup>

In the case if a median nerve substituted for musculocutaneous nerve, lesion at proximal median nerve may lead to palsy of flexion and adduction of arm, flexion and supination of forearm, loss of somesthetic sense in the skin of lateral portion of the forearm, in addition to motor loss along the median nerve distribution. Compression neuropathy is more commonly associated with variant nerves. Hence it is necessary to have awareness of such variations to identify certain clinical manifestations with the involved nerve.<sup>[14]</sup>

## CONCLUSION

The current case report is noteworthy from an embryological and medical perspective. Understanding these anatomical variations can aid in diagnosing and treating diseases and injuries of the upper limb region.

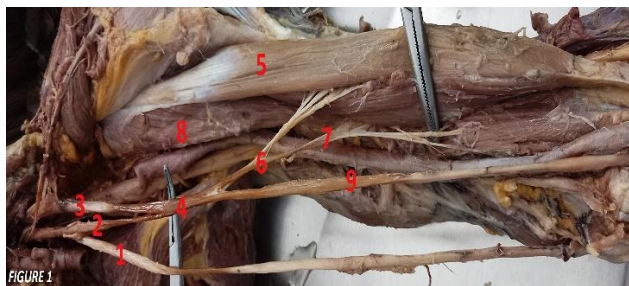


FIGURE 1  
1. ULNAR N 2,3 LATERAL & MEDIAL ROOT OF MEDIAN N 4. MN 5. BICEPS BRACHII 6. BRANCHES FROM MN TO BICEPS BRACHII 7. BRANCHES FROM MN TO BRACHIALIS 8. CORACOBRAHIALIS 9. MEDIAN NERVE ENTERING CUBITAL FOSSA

**Figure 1: Showing Left arm with the anatomical variation in the branches of brachial plexus.**



FIGURE 2  
1. MUSCULOCUTANEOUS NERVE PIERCING CORACOBRAHIALIS 2,3 LATERAL & MEDIAL ROOT OF MEDIAN NERVE 4. ULNAR NERVE 5. AXILLARY ARTERY

**Figure 2: Showing right arm with Normal anatomical structures.**



FIGURE 3  
1. BICEPS BRACHII 2. MEDIAN NERVE 3. BRANCH FROM MN TO BICEPS BRACHII 4. BRANCHES FROM MN TO CORACOBRAHIALIS 5. MN ENTERING CUBITAL FOSSA 6. BRACHIAL A 7. RADIAL N 8. LATERAL CUTANEOUS NERVE OF FOREARM 9. ULNAR N 10. BRACHIALIS

**Figure 3: Showing Left arm with the anatomical variation in the branches of brachial plexus painted yellow.**

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