

A rare case of the beginning of the median and musculocutaneous nerves in the arm

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Variations in the median and musculocutaneous nerves in the arm are quite common. According to Prasad and Chaudhary,¹ they can be observed in approximately 33% of cases. The communications between the 2 nerves in the arm were described in the 19th century. To add to this long list of variations in these nerves, we are reporting a rare case of origins of both these nerves in the arm, and a case of elongated lateral cord of the brachial plexus.

Normally, the median nerve arises in the axilla, by the union of the medial and lateral roots from the respective cords of the brachial plexus. The musculocutaneous nerve is one of the terminal branches of the lateral cord of the brachial plexus along with the lateral root of the median nerve given in the axilla. It enters the front of the arm after piercing the coracobrachialis muscle.

During routine dissections for the first MBBS students of Melaka Manipal Medical College, Manipal, a case of unusual origins of the median and musculocutaneous nerves was encountered. The limb belonged to the left side of an approximately 50-year-old male cadaver. It was observed that, the median nerve began in the anterior compartment of the arm, approximately 2 cm below the lower border of the teres major by the union of the medial root of the median nerve and the lateral root of the median nerve. The medial root originated from the medial cord of the brachial plexus, medial to the 3rd part of the axillary artery. The lateral root was very short and began in the arm, from the lateral cord. The lateral cord was quite long. It began in the proximal part of the axilla and extended onto the arm, where it ended by dividing into the lateral root of the median nerve and musculocutaneous nerve. In the present case, the musculocutaneous nerve, which normally begins in the axilla, arose from the arm. It is also interesting to note that, because of its low origin, the musculocutaneous nerve was not piercing and supplying the coracobrachialis. The coracobrachialis was supplied by the elongated lateral cord, which was extending into the arm. Further course and distribution of these nerves were similar to normal ones (**Figure 1**).

As mentioned earlier, the variations of the median and musculocutaneous nerves are quite common. The communication between the median nerve and

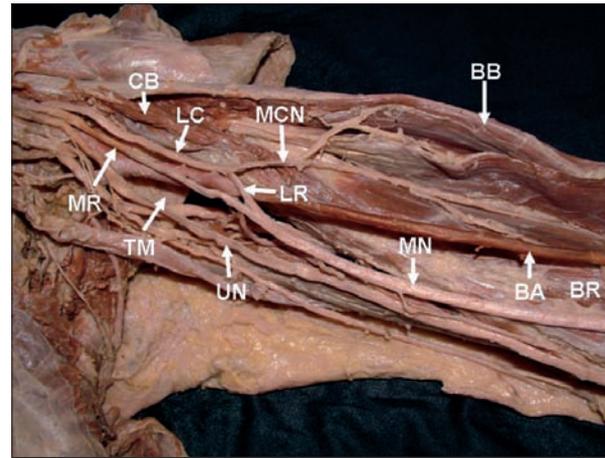


Figure 1 - Showing the beginning of the median (MN) and musculocutaneous (MCN) nerves in the anterior compartment of the arm. MR - medial root, LR - lateral root, LC - lateral cord, UN - ulnar nerve, CB - coracobrachialis, BR - brachialis, BB - biceps brachii, BA - brachial artery, TM - teres major.

musculocutaneous nerve is by far the most common and frequent of all the variations that are observed among the branches of the brachial plexus. When present, it varies considerably in respect of its origin and union with the median nerve.¹ However, variation in the formation of the median nerve is not common. Uzun and Seeling² observed a case where it arose in the axilla from 4 roots, 3 from the lateral cord, and one from the medial cord. Saeed and Rufai³ observed a case of median nerve formation by the union of 3 roots, 2 from the lateral cord, and one from the medial cord. As far as variations in the origin of the musculocutaneous nerve are concerned, eL-Nagger⁴ observed only one case of low origin of the musculocutaneous nerve out of 36 limbs dissected, where it arose from the lateral root of the median nerve. Le Minor⁵ reported a more interesting variation, where, the lateral cord of the brachial plexus pierced the coracobrachialis muscle, gave muscular branches to it and the biceps brachii, and then divided at the middle of the arm into 2 terminal branches. The first one somewhat resembled the musculocutaneous nerve by giving branches to the brachialis, and continuing as the lateral cutaneous nerve of the forearm. The second one corresponded to the lateral root of the median nerve, which joined the medial root to form the proper median nerve.

Variations of the musculocutaneous and median nerves can be classified into 5 types. In type 1, there is no communication between the median and musculocutaneous nerves. In type 2, the fibers of the medial root of the median nerve pass through the musculocutaneous nerve and join the median nerve in the middle of the arm. In type 3, the lateral

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root of the median nerve, from the lateral cord runs in the musculocutaneous nerve and leaves it after a distance, to join the main trunk of the median nerve. In type 4, the musculocutaneous nerve fibers join the lateral root of the median nerve, and after some distance, the musculocutaneous nerve arises from the median nerve. In type 5, the musculocutaneous nerve is absent. The entire fibers of the musculocutaneous nerve pass within the median nerve along its course. However, authors thereafter have reported variations other than these 5 types. Similarly, our finding also does not match accurately with any of these types. Though it somewhat resembles type 3, it is different in the following ways. 1. Neither the musculocutaneous nerve nor the lateral cord pierces the coracobrachialis. 2. The median nerve is formed in the arm, not in the axilla. 3. The musculocutaneous nerve begins in the arm, not in the axilla. 4. The lateral cord is relatively longer, and it does not end in the axilla, but extends onto the arm. 5. The lateral cord supplies the coracobrachialis.

The variations in the origin, course and distribution of the median and musculocutaneous nerves are of clinical importance. For clinical investigation and the surgical treatment of peripheral nerve injury, a more precise knowledge than that found in the classical anatomy texts is necessary. The variations reported in this paper should be considered in patients presenting with weakness of forearm flexion and supination associated with symptoms of high median nerve paralysis. Such variations are important in posttraumatic evaluation and exploratory interventions of the arm for peripheral nerve repair. In patients with such variations, after a trauma to the arm, signs of median and musculocutaneous nerve injury could be observed when the lateral cord is damaged in the arm. For a successful result, surgeons have to be aware of such variations and they have to look for their presence. If a surgeon is unaware of such variations, there are possibilities of unexpected

nerve damage during flap dissections. In cases as reported in this paper, where the lateral cord of the brachial plexus follows a course that is almost similar to the normal musculocutaneous nerve, it will result in double nerve injury. Knowledge of such variation is also important in nerve lesions and its distinctive diagnosis. For example, in the present case, trauma in the axilla, causing a lesion of the medial root of the median nerve may not affect the structures supplied by the lateral root because of its late union with the medial root.

To conclude, variations in the median and musculocutaneous nerves are common. However, we report the beginning of these nerves in the arm. It is essential for the surgeons and clinicians to be aware of such variations.

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