

# Prevalence Of Variations In The Formation Of Median Nerve In Eastern Uttar Pradesh Population

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## Abstract:

**Introduction:** In clinical practice, it is crucial to identify variations in the median nerve including unusual branching patterns or unexpected connections as these factors can affect surgical results and lead to distinct nerve compression problems.

**Aims and Objectives:** To investigate the median nerve in cadavers of varying ages and genders.

**Material and Method:** This study involved the examination of 24 upper limbs from 12 formalin-preserved cadavers in the dissection hall of the Anatomy Department at Motilal Nehru Medical College, Prayagraj. Among the 12 cadavers, 10 were male and 2 were female. The dissection followed the protocols outlined in Cunningham's Manual of Practical Anatomy. The ages of the cadavers ranged from 50 to 70 years and all specimens were devoid of any significant abnormalities, trauma or prior surgical interventions in the upper limb and neck areas. Following the dissection observations and measurements were recorded and photographs were captured.

**Result:** We examined the origin and variations of the median nerve in 24 upper limbs from 12 cadavers. Among these limbs, 19 specimens (79.16%) exhibited the typical formation of the median nerve, originating from two roots. In contrast, five specimens displayed origins from more than two roots; specifically, four cases had one additional root (16.67%), while one specimen had two additional roots (4.1%). All additional roots were found to arise from the lateral cord. These variations were noted to be unilateral in three cadavers and bilateral in one.

**Conclusion:** Median nerve variations are highly beneficial for surgeons conducting procedures in the axillary region as well as for anaesthesiologists and radiologists performing related interventions. This study indicates that the formation of the median nerve in the axillary area is more pronounced than in the brachial region, with a higher prevalence observed in male cadavers. Additionally, entrapment syndromes are more frequently associated with an additional root of the median nerve and symptoms such as sensory loss, pain, insomnia and paresis are critical for the differential diagnosis of unexplained clinical conditions.

**Key Word:** Median nerve, Lateral cord, Medial cord.

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Date of Submission: 17-02-2025

Date of Acceptance: 27-02-2025

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## I. Introduction

Median nerve is the major nerve supply of forearm muscles and thenar region of hand. It is usually formed by a medial root from medial cord and a lateral root from lateral cord, which are derived from ventral divisions of ventral rami of C5-T1 spinal nerve roots. [1,2]

Median nerve formation by two roots has been reported from 48 to 88.5%. Formation by three or four roots has also been reported. The additional roots usually arise from lateral cord of brachial plexus. It may also arise from medial cord or musculocutaneous nerve. [3]

Variations of median nerve is useful for onco-surgeon in management of tumour in axilla and knowledge of these variations is also useful in relation to axillary artery, brachial artery and brachial plexus for surgeons in axillary surgery, for anaesthetics and orthopaedics in nerve block and for radiologist to perform radiological procedure.

The additional neural communication in the formation of this nerve may lead to confusion in clinical and electrodiagnostic findings. The knowledge of anatomical variation in the formation of median nerve is useful in their clinical application like regional anaesthetic block, axillary dissection in elective surgery, trauma involving trunks and cords of brachial plexus, nerve transpositions and in vascular surgeries. [4,5]

In our study we are discussing the variations in the formation and number of additional roots in the median nerve which may be useful for general surgeon and orthopaedic surgeon during surgeries of this region.

## II. Material And Method

The present study was conducted on 24 upper limbs of 12 formalin preserved cadavers in the dissection hall of Anatomy Department, Motilal Nehru Medical College Prayagraj. Out of 12 cadavers 10 were male and 2 were females. The dissection was done by using guidelines given in Cunningham’s Manual of practical anatomy. The age of cadaver varied from 50 to 70 years and were free from any gross abnormality, trauma or surgery of upper limb and neck region.

After dissection, observation and measurements were done and photographs were taken. The data was collected, tabulated in MS Excel and statistically analysed by using SPSS software version 26 free trial. Unpaired t test was performed where the p value less than 0.05 was considered statistically significant at 5% level of significance.

## III. Result

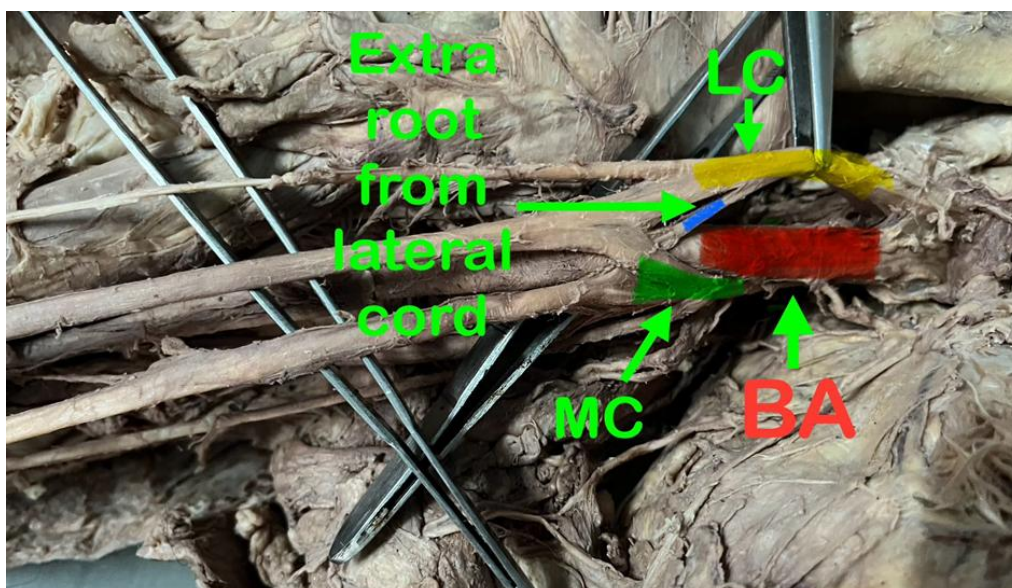
We observed median nerve origin and its variations in 24 upper limbs of 12 cadavers. Out of 24 upper limbs, in 19 specimens median nerve originated from 2 roots (79.16%), representing the usual formation of median nerve. In 5 specimens median nerve originated from more than 2 roots (as in fig. 1 and 2), out of which 1 additional root was observed in 4 cases (16.67%) and 2 additional roots in 1 specimen (4.1%). All the additional roots were originating from lateral cord. These variations were unilateral in 3 cadavers and bilateral in 1 cadaver.

The formation of median nerve usually occurs in axillary region. In our study we observed that in 21 specimens (87.5%) median nerve originated in axillary region where the mean value of length of lateral root of lateral cord from its origin to joining with medial root of medial cord was  $1.83 \pm 0.77$  cm and mean value of length of medial root of medial cord from its origin to joining with lateral root of lateral cord was  $1.25 \pm 1.16$  cm.

We also observed the origin of median nerve in brachial region in 3 specimens ((12.5%). In these cases, the mean value of length of lateral root of lateral cord was  $7.67 \pm 1.02$  cm and mean value of length of medial root of medial cord from its origin to joining with lateral root of lateral cord was  $7.33 \pm 1.027$  cm, which was longer than usual length of both the roots.

Variable	n	%
Total number of specimens	24	100
Gender	Male	83.33
	Female	16.67
Area of origin	Axillary Region	87.5
	Brachial Region	12.5
No. of roots	2	80
	3	16
	4	4
Anatomical variation according to side of the body	Unilateral	12
	Bilateral	4
Origin of the additional variation root	Lateral cord	20
	Medial cord	0

**Table: Anatomical variations in formation of median nerve**



**Fig. 1: Extra root from lateral cord of brachial plexus**

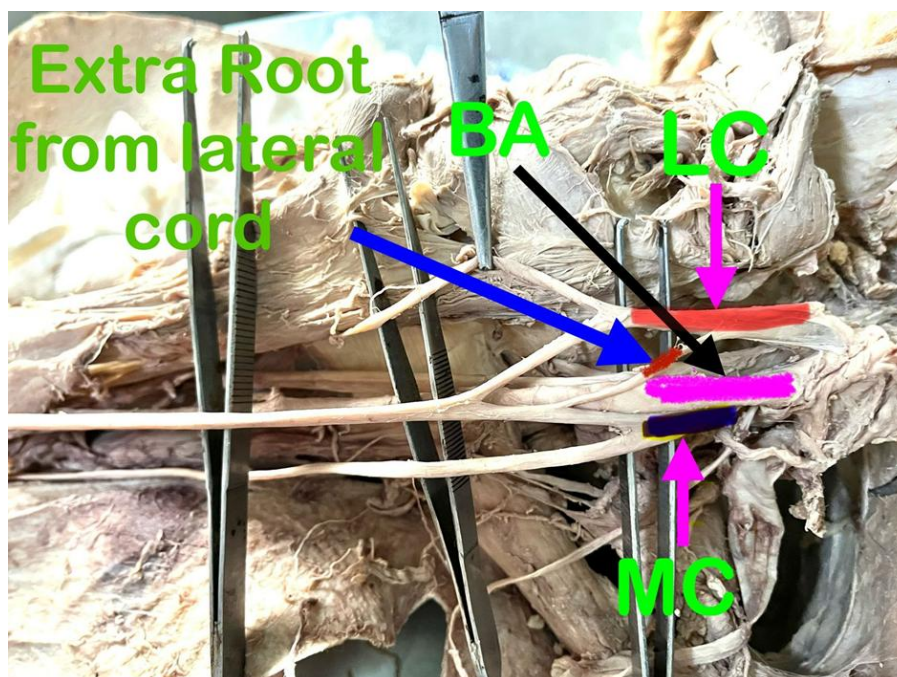


Fig. 2: Extra root from lateral cord of brachial plexus

#### IV. Discussion

In our present study we observed that additional root variations were present in only male cadavers and we documented number of roots involved in the formation of median nerve. Out of 24 upper limbs, 5 (20.8%) limbs show presence of additional root. Which is similar to Encarnacion M et al study (20.2%), greater than Reiset et al (8%), Patil et al (10%) and Chitra PS et al and less than Agarwal et al (24.1%) and Kumari et al. [3,6,7,8,9]

We found that in 4 upper limbs median nerve was formed by 3 roots. In all the 4 specimens the additional root arises from lateral cord. Prevalence of 1 additional root in the formation of median nerve in our study (16.67%) is less than Encarnacion M et al (20.2%), Patil et al (10%), Kumari et al (26.4%) and greater than Reiset et al (8%), Chitra P et al (2.7%). [3,6,9,7]

In our study no additional root arises from medial cord, while Patil et al observed in 10 % specimens additional root arises from medial cord.

In 4.1% specimens, we observed that median nerve was formed by 4 roots. Both the additional roots arise from lateral cord, which is greater than Encarnacion M et al (2.4%), Kumari K et al (1.8%) and Chitra et al (1.38%). [3,9,7]

In our study we observed that 21 median nerves were formed in axillary region whereas 3 median nerves (12.5%) where the length of lateral root and medial roots of median nerve was comparatively longer were formed in the brachial region (12.5%), whereas Encarnacion M et al reported 7.1%, and Samarawickrama et al reported 10% in brachial region. [3,10]

We observed that out of 5 additional roots 2 were present in same cadaver (Bilateral) (4%) which is lesser than Encarnacion M et al (19%) and greater than Chitra P et al (2.7%). Three additional roots were unilateral in origin (12.5%) which is greater than Encarnacion M et al (7.1%). [3,7]

#### V. Conclusion

Median nerve variation is very useful for surgeon for axillary region surgery, for anaesthetic and radiologist to perform procedure. In The present study median nerve formation in axillary region is greater in comparison to brachial region and found more in male cadaver. Entrapment syndromes are more likely to be involved with extra root of median nerve and symptoms like sensory loss, pain, wakefulness and paresis is used in differential diagnosis of unexplained clinical condition.

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