

Revisiting the Median Nerve: Clinical Significance of Anatomical Variability in the Axilla and Arm

MB Samarawickrama

The anatomy of brachial plexus has long been regarded as a cornerstone of medical education and clinical practice. Yet, increasing anatomical and surgical evidence continues to challenge the notion of a “standard” pattern, particularly regarding the formation of the median nerve. One of my studies published in International Journal of Morphology provides important insights into this variability, emphasizing its relevance in both anatomical science and clinical application (1).

The median nerve, classically described as being formed by the union of lateral and medial roots anterior or lateral to the third part of the axillary artery, demonstrates considerable variation in its formation, morphology, and vascular relationships. While such variations have been sporadically reported in the literature, systematic studies especially in South Asian populations remain limited. This work addresses that gap by offering data derived from Sri Lankan cadaveric specimens, thereby contributing valuable regional anatomical evidence.

One of the most striking findings of the study is the high prevalence (33.67%) of anatomical

variations in median nerve formation. This figure reinforces the growing recognition that anatomical “variants” may be more common than traditionally assumed. The identification of both numerical and morphological root variations, including rare configurations such as absent roots and accessory neural channels, highlights the complexity of brachial plexus organization. Notably, the predominance of variations involving the lateral root suggests a developmental susceptibility that warrants further embryological exploration.

Equally important are the variations in the relationship between the median nerve and adjacent arterial structures. The finding that nearly one-fifth of specimens exhibited atypical arterial relations has direct clinical implications. Surgeons operating in the axilla and arm, particularly during procedures involving vascular repair, trauma management, or tumor excision, must be cognizant of these deviations to avoid iatrogenic nerve injury. Similarly, anesthesiologists performing regional nerve blocks and radiologists interpreting imaging studies should consider such variations to prevent diagnostic or procedural errors.

DOI: <https://doi.org/10.4038/slaj.v10i1.323>

Sri Lanka Anatomy Journal 2026; 10(I): 1-2

email: samaramb@gmail.com

 <https://orcid.org/0009000317981642>

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The description of previously unreported anomalies further strengthens the significance of this study. These rare patterns not only expand the anatomical knowledge base but also serve as a reminder that unexpected configurations may be encountered in clinical practice. In an era of increasing reliance on minimally invasive and image-guided interventions, precise anatomical understanding is more critical than ever.

From an educational perspective, these findings underscore the need to move beyond rigid anatomical descriptions in teaching curricula. Incorporating variability into anatomical training can better prepare medical students and trainees for real-world clinical scenarios, where deviations from textbook norms are not uncommon.

Looking forward, there is a clear need for larger, multicenter studies that integrate anatomical, radiological, and clinical data to develop comprehensive classification systems for median nerve variations. Such efforts

would facilitate standardized reporting and improve communication across disciplines. Additionally, correlating anatomical variations with clinical outcomes could further enhance their practical relevance.

In conclusion, this study provides timely and important contributions to the understanding of median nerve anatomy. By highlighting the frequency and diversity of its variations, it reinforces the principle that anatomical knowledge must remain dynamic and clinically oriented. Recognizing and anticipating these variations is essential for improving surgical safety, diagnostic accuracy, and overall patient care.

References

1. MB Samarawickrama. A study of anatomical variations of median nerve formation and its relation to the arteries in the axilla and arm. *Int. J. Morphol.*, 35(2):698-704, 2017