Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 12, 2025

Variations in Morphological Study of Suprascapular Notch

1. Shiv Kumar*
(Corresponding author email id shivkuntal432@gmail.com)
P.G. Student, Rama University, Kanpur
2. Areeba Nasar
Associate Professor, Anatomy Department, Rama University, Kanpur
3. Vandana Tewari
Professor & Head, Anatomy Department, Rama University, Kanpur

Abstract

Introduction: The suprascapular notch is a **clinically significant anatomical structure** that exhibits considerable morphological variability, influencing the course and vulnerability of the suprascapular nerve. Variations in the shape and ossification of the superior transverse scapular ligament are recognized contributors to suprascapular nerve entrapment syndrome (1, 2015).

Aim & Objective: The present study aimed to evaluate the **morphological variations of the suprascapular notch** in dry human scapulae and assess their side-wise distribution.

Material & Method: This cross-sectional osteological study was conducted on 80 dried adult human scapulae of unknown sex and age obtained from the Department of Anatomy, Rama Medical College and Hospital & Research Centre, Kanpur. Each scapula was examined grossly and classified according to the modified Rengachary classification (2, 1979).

Result: The frequency and percentage distribution of various notch types were documented and analyzed. Type III (U-shaped) suprascapular notch was the most common morphology observed, followed by Type II and Type V variations. Type IV and Type VI were the least frequently encountered forms. A right-sided predominance of suprascapular notch variations was noted.

Discussion & Conclusion: The findings of this study highlight the **population-specific anatomical patterns** of the suprascapular notch and emphasize their relevance in clinical practice. Knowledge of these variations is essential for orthopedic surgeons, neurosurgeons, and anatomists to minimize iatrogenic injury during surgical and arthroscopic interventions involving the shoulder region. The study contributes valuable baseline data for anatomical reference and supports the importance of preoperative awareness of suprascapular notch morphology to improve diagnostic accuracy and surgical outcomes.

Keywords: *Suprascapular notch, Scapula, Morphological variation, Suprascapular nerve, Anatomy*

Introduction

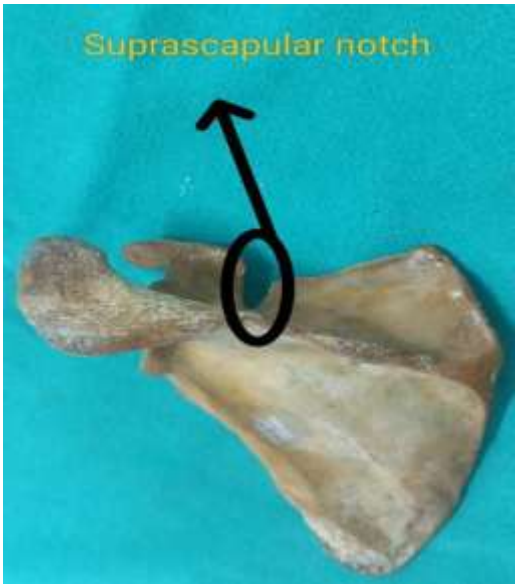
The scapula, commonly known as the shoulder blade, is a flat triangular bone located on the posterolateral aspect of the thoracic cage, extending from the second to the seventh ribs (1, 2015). It serves as a crucial component of the shoulder girdle, providing attachment to multiple muscles and facilitating a wide range of upper limb movements. Anatomically, the scapula presents two surfaces,

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 12, 2025

three borders, and three angles. The superior border, being the shortest and thinnest, contains the suprascapular notch near the root of the coracoid process (3, 2022). The suprascapular notch is bridged by the superior transverse scapular ligament, beneath which the suprascapular nerve passes, while the accompanying vessels usually traverse above the ligament (4, 2018). Variations in the morphology of the suprascapular notch and ossification of the ligament may alter the available space for the nerve, predisposing it to compression (6, 2024). Suprascapular nerve entrapment syndrome presents clinically with shoulder pain, weakness, and atrophy of the supraspinatus and infraspinatus muscles (7, 2023). Such symptoms may mimic other shoulder pathologies, often leading to misdiagnosis. Morphological differences in the suprascapular notch, including its shape, depth, and width, have been identified as important risk factors for nerve entrapment (9, 2013). Additionally, side dominance and population-specific anatomical traits may influence the incidence of this condition (10, 2015). Understanding these variations is particularly relevant during arthroscopic and open surgical procedures involving the posterior glenoid neck, where inadvertent injury to the suprascapular nerve can occur (8, 2022). Hence, detailed anatomical studies focusing on suprascapular notch morphology are essential to enhance surgical safety and improve clinical outcomes (11, 2017). The present study was undertaken to document the morphological spectrum of the suprascapular notch in a North Indian population and compare the findings with existing literature.

Photograph no.1 showing suprascapular notch on the costal surface of scapula.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 12, 2025

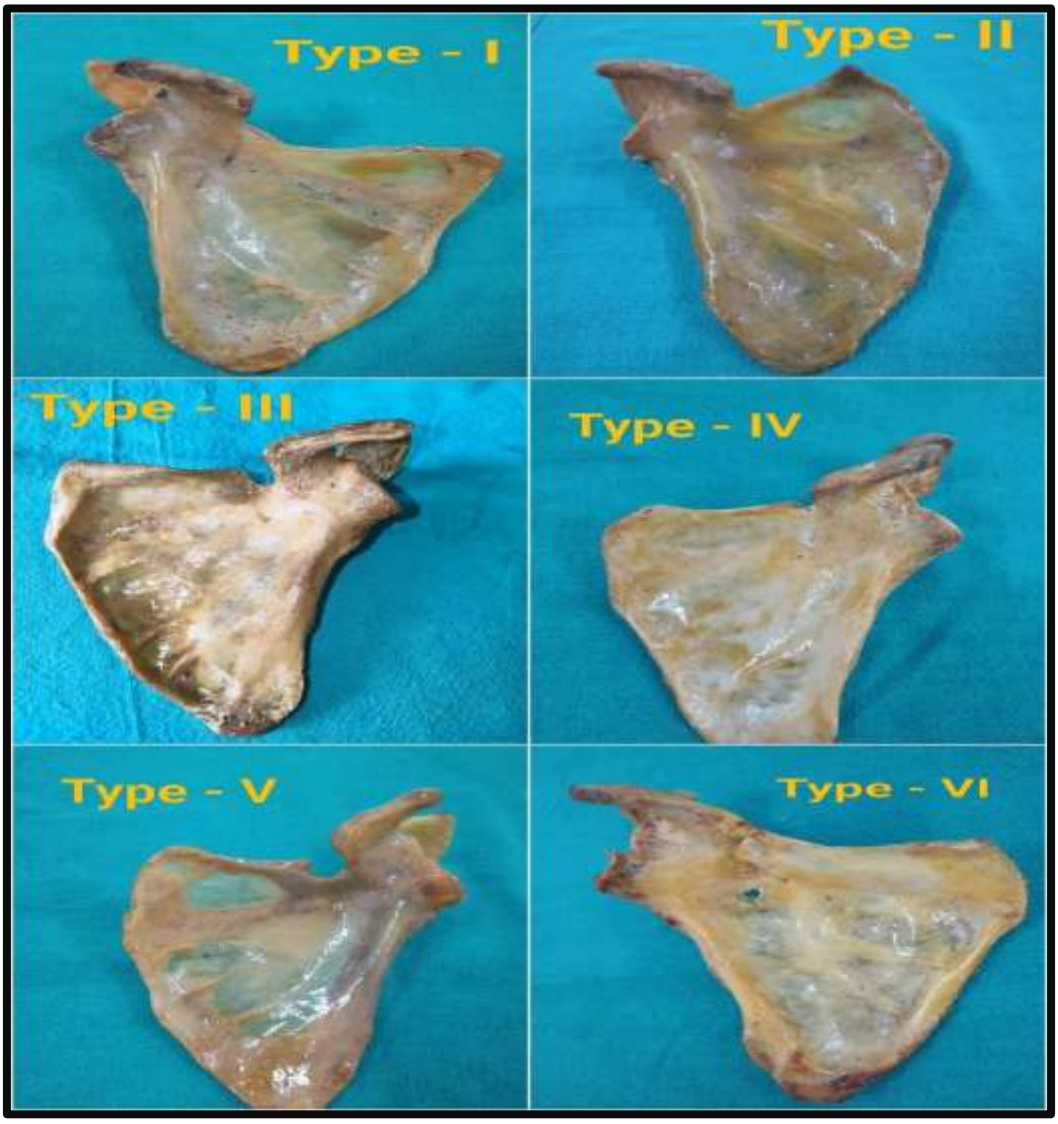


Photograph no.2 showing the suprascapular notch on dorsal surface of scapula.

Materials and Methods

This cross-sectional descriptive study was conducted on 80 dried adult human scapulae of unknown age and sex obtained from the Department of Anatomy, Rama Medical College and Hospital & Research Centre, Mandhana, Kanpur. The duration of the study was 12 months. Scapulae with damaged, deformed, or eroded superior borders were excluded. Ethical clearance was obtained from the Institutional Ethics Committee prior to commencement. Each scapula was cleaned, numbered, and examined for side determination. Gross examination was performed to assess the shape of the suprascapular notch. The notches were classified according to the modified Rengachary classification (2, 1979), which includes six types: Type I (absence of notch), Type II (blunted V-shaped), Type III (U-shaped), Type IV (small V-shaped), Type V (partially ossified ligament), and Type VI (complete ossification forming a foramen). Observations were recorded systematically, and data were tabulated. Descriptive statistical analysis was performed to calculate frequencies and percentages. Results were compared with previous anatomical studies to establish clinical relevance (12, 2017).

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 12, 2025



Photograph no.3 showing the different types of suprascapular notch according to their morphology.

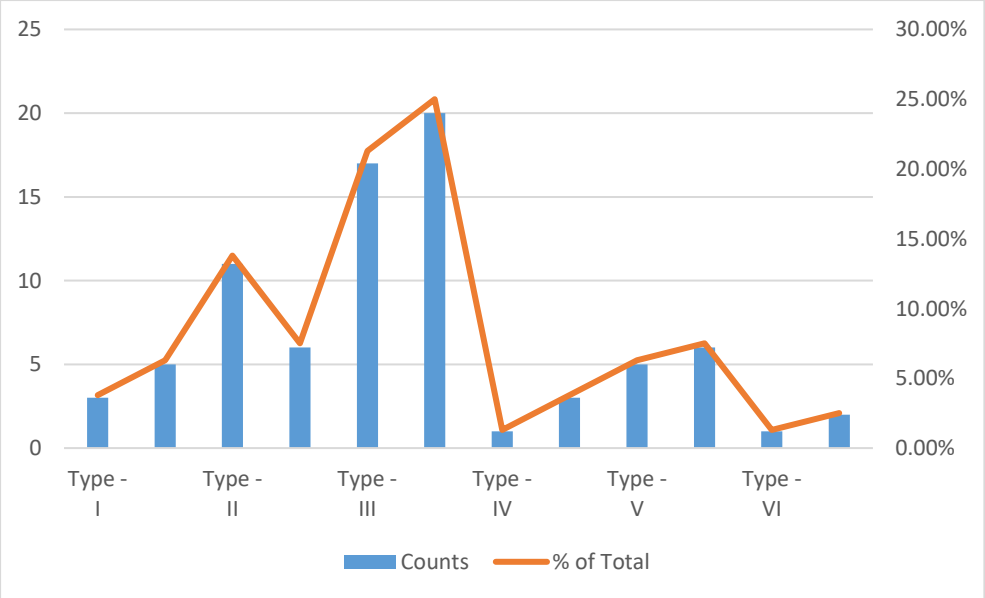
Results

Out of 80 dry scapulae examined, Type III suprascapular notch was the most frequently observed morphology, accounting for 37 specimens (46.3%). Type II was identified in 17 scapulae (21.3%), while Type V was noted in 11 specimens (13.8%). Type I morphology was observed in 8 scapulae (10.1%). The least common variants were Type IV and Type VI, observed in 4 (5.1%) and 3 (3.8%) scapulae respectively. A right-sided predominance of suprascapular notch variations was noted, particularly for Type III morphology. These findings demonstrate a **significant variability** in suprascapular notch anatomy within the studied population (14, 2020).

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 12, 2025

Table No. 1 and Figure No. 1 Showing the frequency distribution of Dry Scapulae Acc. To morphology of Suprascapular notch.

Acc. To morphology	Side	Counts (n = 80)	Total Percentage
Type – I	Left	3	3.8%
	Right	5	6.3%
Type - II	Left	11	13.8%
	Right	6	7.5%
Type - III	Left	17	21.3%
	Right	20	25.0%
Type - IV	Left	1	1.3%
	Right	3	3.8%
Type - V	Left	5	6.3%
	Right	6	7.5%
Type - VI	Left	1	1.3%
	Right	2	2.5%



ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 12, 2025

Figure 1. Graphical representation of the frequencies of dry scapulae (according to morphology)

Discussion

Morphological variations of the suprascapular notch have important **clinical and surgical implications**, particularly in relation to suprascapular nerve entrapment syndrome. The predominance of Type III morphology observed in the present study is consistent with findings reported by several authors across different populations (9, 2013; 15, 2021). Narrow or ossified notches are known to increase the risk of nerve compression. Awareness of such variations assists clinicians in accurate diagnosis and safe surgical planning (19, 1979).

Conclusion

The present study highlights the **morphological diversity of the suprascapular notch** in a North Indian population. Type III notch was the most common variant, with a noticeable right-sided predominance. These findings provide valuable anatomical data that can aid clinicians and surgeons in minimizing complications related to suprascapular nerve injury during diagnostic and operative procedures.

References

1. Gopal K, Choudhary AK, Agarwal J, Kumar V. Variations in suprascapular notch morphology and its clinical importance. Int J Res Med Sci. 2015;3(1):301–306.
2. Rengachary SS, Neff JP, Singer PA, Brackett CE. Suprascapular entrapment neuropathy. Neurosurgery. 1979;5(4):441–446.
3. Gray H. Gray's Anatomy. 42nd ed. Elsevier; 2022.
4. Swaroop N, Shashanka MJ, Mamatha Y. Morphometric study of suprascapular notch. Indian J Anat. 2018;7(4):345–350.
5. Kumar A, Mahato M. Morphological variations of suprascapular notch and surgical implications. Int J Anat Res. 2024;13(2):112–118.
6. Vahini P, Senthamizhselvi R, Raj S. Morphometric study of suprascapular notch. Int J Acad Med Pharm. 2024;6(1):1727–1731.
7. Nasr AY. Morphological types of suprascapular notch. Anat Cell Biol. 2023;56(4):482–493.
8. Paul AD, Nidhi S, Avadhani R. Morphometric measurements of scapula. Int J Anat Var. 2022;15(9):219–222.
9. Sangam MR, Devi SS, Krupadanam K. Morphology of suprascapular notch. J Clin Diagn Res. 2013;7(2):189–192.
10. Manikum C, Rennie C, Naidu ECS. Morphological study of suprascapular notch. Int J Morphol. 2015;33(4):1365–1370.
11. Reddy GMK, Siddaramulu C. Morphological variations of suprascapular notch. Int J Contemp Med Res. 2017;4(2):361–363.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 12, 2025

12. Philip SE, Dakshayani KR. Morphometric study of suprascapular notch. Int J Anat Res. 2017;5(2):3766–3770.
13. Saikia R, Baishya RJ, Deka B. Shape variations of suprascapular notch. Int J Sci Stud. 2017;5(1):187–190.
14. Nayak TV, Gujar SM. Morphology of suprascapular notch. Natl J Clin Anat. 2020;9(2):72–74.
15. Kundu B, Saha PK, Mistry BI. Morphological variation of suprascapular notch. Int J Anat Radiol Surg. 2021;10:45–49.
16. Das C, Pradhan S, Kumari BS, Panda DK. Morphological variations of the suprascapular notch and its clinical correlation with suprascapular nerve entrapment syndrome. JCHR (2024) 14(1), 665-670.
17. Kollipara GSM et al. Morphological variations of the suprascapular notch and its clinical correlation with suprascapular nerve entrapment syndrome. Indian journal of clinical anatomy and physiology 2023;10(3):157–161.
18. Talokar S A, Wahane A M, Dange R N. Morphometric Study of Suprascapular Notch in Dry Adult Scapula. International Journal of Toxicological and Pharmacological Research 2023; 13(10); 161-166.
19. Rengachary SS, Neff JP, Singer PA, Brackett CE. Suprascapular entrapment neuropathy: a clinical, anatomical, and comparative study: part 1: clinical study. Neurosurgery. 1979