

## MORPHOLOGICAL ANALYSIS OF SUPRA SCAPULAR NOTCH

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### ABSTRACT

**Background:** Suprascapular notch (SSN) is present at the lateral end of the superior border of the scapula. It is bridged by the suprascapular ligament. Suprascapular nerve passes inferior to the ligament and suprascapular vessels passed above the suprascapular ligament. Entrapment neuropathy is common due to entrapment of the suprascapular nerve here.

**Keywords:** Morphology of suprascapular notch, Rengachary classification, Natsis's

classification

### INTRODUCTION

The Suprascapular notch (SSN) is one of the most clinically important sites included in bony features of the scapula, which is nothing but a depression present on the superior border of scapula just medial to root of coracoid process<sup>1</sup>. In living life Suprascapular notch is bridged by suprascapular ligament which converting the notch into a foramen. The suprascapular nerve passes through the foramen and the suprascapular vessels above the ligament. After passing through the notch, the nerve enters the supraspinous fossa, where it supplying supraspinatus muscle, curves round the lateral border of the spine of the scapula from the spino glenoid notch with the suprascapular vessels to reach the infraspinous fossa, where it gives two branches to infraspinatus and articular branches to the shoulder and acromio-clavicular joints<sup>2</sup> lying nearby. Most suprascapular nerve entrapments occur at the suprascapular notch as a result of compression by the overlying suprascapular ligament<sup>3</sup>, or its ossification.

Suprascapular nerve entrapment neuropathy<sup>4</sup> causes a huge problems to the individuals due to entrapment of the suprascapular nerve here leading to pain, weakness, wasting of the supraspinatus and infraspinatus muscles. The clinical symptoms are been more frequently seen in those doing more over head activities with their hands such as Volley ball players, shotput players etc.

### AIM

To study the morphology of suprascapular notch among 150 dry scapulae.

### MATERIALS AND METHOD

150 adult dry human scapulae irrespective of sex were collected in the Dept. of Anatomy of various medical colleges of Kolkata. Among 150 scapulae 70 were right sided & 80 left sided. Various shapes of scapular notches were noted & classified into 6 types based on Rengachary classification<sup>5,6</sup> i.e. NOTCH TYPE DESCRIPTION

Type I - Wide depression of the entire superior border of the scapula.

Type II Blunted V-shaped notch occupying the middle one-third of the superior border of the scapula.

Type III U-shaped notch in the superior border of the scapula with symmetrical, parallel lateral borders.

Type IV A small, V-shaped narrow groove in the superior border of the scapula.

Type V U-shaped notch in the superior border of the scapula with partial ossification of the medial aspect of the transverse scapular ligament. The diameter of the notch along the superior border is narrow as a result.

Type VI Complete ossification of the transverse scapular ligament creating a foramen.

The collected data also classified as per Natsis's classification<sup>7</sup> based on the vertical and the transverse diameters of the SSN suggested a clear distinction of the notch types. This simple classification included all the anatomical variations of the SSN. Using this method, the clinician will be able to define easily and quickly the notch type on a plain radiograph, and perhaps be able to correlate suprascapular nerve entrapment.

Five types of SSN were observed:

Type I- without a discrete notch.

Type II- a notch that was longest in its transverse diameter.

Type III- a notch that was longest in its vertical diameter.

Type IV- a bony foramen.

Type V- a notch and a bony foramen.

For the vertical diameter, we took the maximal diameter of the notch perpendicular to the imaginary line that joins the two superior corners of the notch. For the transverse diameter, we took the diameter perpendicular to the midpoint of the vertical diameter.



Figure 1 : Suprascapular notches according to Rengachary classification



Figure 2: Suprascapular Notches according to Natsis's classification

**STATISTICAL METHOD**

Obtained data is analyzed for non-parametric t test (Mann whitney U test). Results are considered statistically significant when  $p < 0.05$ .

**RESULTS**

In the present study all 6 types of suprascapular notches (Rengachary classification) and 5 types of scapular notches as per Natsis's classification were found of 150 scapula.

As per Rengachary classification most common type of SSN observed is

Type II- 46, (Rt-19,Lt-27) i.e.30.67%, of the total count including both in right and left scapula which is statistically significant ( $P < 0.05$ ).

The least common type was type V -7(Rt-3,Lt-4),i.e. 4.67% of the total count including both in right and left scapula.

Second common type is Type I-41(Rt-20,Lt-21), 27.33% of the total count followed by

Type III-29(Rt-17,Lt-12), 19.33% (of the total count) and

Type IV-17(Rt-7,Lt-10),11.33% (of the total count).

The incidence of ossified suprascapular ligament i.e. type VI-10(Rt-4,Lt-6),6.67% is significant.

As per Natsis's classification in our study we have got as follows :-

Type I- without a discrete notch, 14(Rt-6,Lt-8), 9.33% (of the total count)

Type II- a notch that was longest in its transverse diameter, 61(Rt-30,Lt-31), 40.66% ,of the total

Type III- a notch that was longest in its vertical diameter. 58(Rt-27,Lt-31), 38.67% of the total

Type IV- a bony foramen. 10(Rt-4,Lt-6), 6.67% (of the total count)

Type V- a notch and a bony foramen. 7(Rt-3,Lt-4), 4.67% (of the total count)

TYPE OF SSN	RIGHT SIDE	LEFT SIDE	TOTAL	PERCENTAGE
TYPE I	19	27	46	30.67
TYPE II	20	21	41	27.33
TYPE III	17	12	29	19.33
TYPE IV	7	10	17	11.33
TYPE V	3	4	7	4.67
TYPE VI	4	6	10	6.67
TOTAL	70	80	150	100

**Table 1:** Showing no. of right and left scapulae with different type of SSN as per Rengachary classification

	RIGHT SIDE	LEFT SIDE
Number of values	7	7
Minimum	3	2
25% Percentile	3	4
Median	7	10
75% Percentile	17	19
Maximum	19	27
Mean	10	11.43

Std. Deviation	7.326	8.904
Std. Error	2.769	3.365
Lower 95% CI	3.225	3.193
Upper 95% CI	16.78	19.66

**Table 2:** Showing Column statistics of the obtained data of scapulae with different type of SSN as per Rengachary classification.

## DISCUSSION

Several studies have been done to describe the morphology of SSN by various authors in different population. Among six types of scapular notches found in the study most common type of SSN is Type II – 30.33%. The least common type is type V (4.67%) which is quite high compared to other studied in the table. SSN was absent in 3.33% scapulae as per Rengachary classification. In our study P Value of Type II of left side samples found to be marginally significant.

The data is not statistical significant due to less number of samples.

Suprascapular nerve entrapment is treated by conservative methods or surgical decompression of the nerve where it is entrapped. An arthroscopic approach is a more sophisticated way of treating the condition but an important point of concern here is presence of completely (type VI) or partially ossified suprascapular ligament (type V SSN). The identification of the bony bridge is critically important, because in these cases apart from dissecting the ligament the bony bridge must also be excised during the procedure for better post-operative outcome.

Moreover, the morphology of SSN is not only important while addressing nerve entrapment but also in avoiding an iatrogenic injury of the scapular nerve during arthroscopic Bankart procedures and other open procedures requiring dissection of the posterior glenoid neck.

## CONCLUSION

To conclude, the thorough knowledge of variations in the morphology of SSN is a very important issue while diagnosing and treating suprascapular nerve entrapment. The present study is an attempt to describe the different types of suprascapular notch with statistical significance.

## ETHICS

As the study was carried out on dry bone specimen in the Department of Anatomy, examination of any organ or, structure

for academic purpose is permitted, according to the prevailing laws of the land. Hence no further consent is necessary for the preview of the study.

The investigator will use the data generated only for the study for further reviews on medical, educational & statistical purposes. The records obtained from bones will be a confidential matter. The records will be allowed to be viewed by the requesting party upon clearance from the investigator and respective authorities.

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