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A Morphological study of variations in the shape of suprascapular notch in dry human scapula

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Abstract
Introduction: *The suprascapular notch is a regular feature of the superior border of the scapula, medial to the root of the coracoid process. This suprascapular notch is converted into a foramen by the attachment of the superior transverse scapular ligament to its edges. The suprascapular nerve passes through this foramen while the suprascapular vessels pass above the ligament. The suprascapular nerve could be compressed due to variations in the shape of the suprascapular notch. The aim of this study is to evaluate the variations in the shape of the suprascapular notch and to compare it with the findings of the previous studies.*
Materials and Methods: *The present study was conducted on 180 dry human scapulae of unknown age & sex obtained from the Institute of Anatomy, Madurai Medical College, Madurai. All the scapulae were examined macroscopically, first, for the presence or absence of the suprascapular notch and second, for the shape of the notch. The data were recorded and compared with the previous studies.*
Observation: *In this study we found that majority of the scapulae 94 (52.22%) had U-shaped suprascapular notch followed by 42 (23.33%) scapulae with J-shaped notch. V-shaped notch not found. In 16 (8.88%) scapulae no notch was present. In 24 (13.33%) scapulae, there was only a slight indentation at the site of the suprascapular notch. Complete ossification of the superior transverse scapular ligament was observed in 4 (2.22%) scapulae.*
Conclusion: *The knowledge of variations in shape of the suprascapular notch will be helpful for orthopaedicians and neurologists in suspecting suprascapular nerve entrapment due to these anatomical variations.*
Keywords: *Suprascapular notch (SSN), Superior transverse scapular ligament (STSL), Suprascapular nerve entrapment syndrome.*

Introduction

The scapula is a flat triangular piece of bone that lies on the poster lateral aspect of the thoracic cage and extend vertically from the second to the seventh rib. It has three borders (superior, medial, and lateral) and three angles (superior, inferior, and lateral). The superior border extends from the superior angle to the lateral angle. It is the thinnest and the shortest of the three borders. Near the root of the coracoid process, the superior border presents a notch called the suprascapular notch. This notch is converted into a foramen, called the suprascapular foramen, by the attachment of the superior transverse scapular ligament to its edges[1]. After arising from the upper trunk of the brachial plexus, the suprascapular nerve passes through

this foramen and supplies the supraspinatus muscle and then descends lateral to the spine of the scapula along with the suprascapular vessels to supply the infraspinatus muscle. It also gives a twig to the shoulder joint[2]. According to Khan,[3] the suprascapular notch is frequently bridged by bone. Overhead abduction of the shoulder joint exert traction on the suprascapular nerve present in the vicinity and leads to its compression. Studies revealed that the shape of the suprascapular notch is variable. It could be U-shaped or J-shaped or V-shaped or could be represented by a slight indentation only, or it could be absent, or it could be converted into a foramen by complete ossification of the superior transverse scapular ligament[4-9]. As the suprascapular nerve passes through the suprascapular foramen, it could be compressed due to variations in the shape of the suprascapular notch. The aim of this study is to evaluate the variations in the shape of the suprascapular notch and to compare it with the findings of the previous studies.

Materials and Methods

The present study was conducted on 180 dry human scapulae of unknown age & sex obtained from the Institute of Anatomy, Madurai Medical College, Madurai. All the scapulae were examined macroscopically, first, for the presence or absence of the suprascapular notch and second, for the shape of the notch. The data were recorded and compared with the previous studies. Scapulae with damaged superior border were excluded from the study.

Observation

In this study we found that majority of the scapulae 94 (52.22%) had U-shaped suprascapular notch followed by 42 (23.33%) scapulae with J-shaped notch. V-shaped notch not found. In16 (8.88%) scapulaeno notch was present. In 24 (13.33%) scapulae, there was only a slight indentation at the site of the suprascapular notch. Complete ossification of the superior transverse scapular ligament was observed in 4 (2.22%) scapulae.

The results of our study shown in Table 1

Table 1: Showing the types of suprascapular notch

Shape of notch	Number of scapulae with percentage
U-shaped	94 – 52.22%
V-shaped	0
J-shaped	42 – 23.33%
Slight indentation	24 -13.33%
Absent notch	16 – 8.88%
Complete ossification of suprascapular ligament	4 – 2.22%

We compared our data with that of other authorsin Table 2

Table 2: Comparison of various studies on the types of the suprascapular notch

Author	Shape of suprascapular notch (%)					
	U	V	J	Slight indentation	Absent notch	Completely ossified superior transverse ligament
Iqbal et al.	13.2	20	22	33.5	22.5	-
Nagaraj et al.	26.92	1.92	43.26	2.88	23	2.88
Rubi et al	40.31	7.75	21.31	26	17.44	3.1
Nandkishor et al.	53.04	12.15	28.73	1.66	1.1	3.3
Vedha et al.	53.2	5.6	5.2	-	21.2	9.6
Present study	52.2	-	23.3	13.3	8.8	2.2

Fig 1: Deep U Shaped Notch

Fig 2: Shallow U Shaped Notch

Fig 3: J Shaped Notch

Fig 4: Slight Indentation

Fig 5: Absence Of Notch

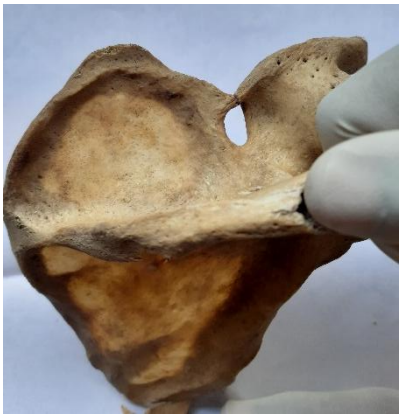

Fig 6: Suprascapular Foramen

Discussion

The suprascapular notch classified into three distinct types[5]:

1) U-shaped suprascapular notch, defined as having almost parallel sides with a round base.

2) J-shaped suprascapular notch defined as one limb is longer with curved base.

3) V-shaped suprascapular notch defined as having medial and lateral sides which converged towards a narrow base.

The suprascapular nerve entrapment is more common with a narrow V-shaped notch. A reduction in the height of the suprascapular foramen may predispose to entrapment of the

suprascapular nerve and thus cause entrapment neuropathy.

Soni[8] et al. have further included four more types in their classification. They are - indentation, absent notch, partial ossification of the suprascapular ligament, and complete ossification of the suprascapular ligament.

Rengachary[9]et al. classified the suprascapular notch into six types based on inferior shape of the suprascapular notch as well as the degree of ossification of the superior transverse scapular ligament.

Conclusion

The knowledge of variations in shape of the suprascapular notch will be helpful for orthopaedicians and neurologists in suspecting suprascapular nerve entrapment due to these anatomical variations.

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