

Variations in the Shape of the Suprascapular Notch in Dry Human Scapula: An Anatomical Study

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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. Usually, this 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.

Materials and Methods: The study was conducted on 258 dry human scapula (131 right and 127 left) obtained from the Department of Anatomy, Jorhat Medical College, Jorhat and Department of Anatomy, Assam Medical College, Dibrugarh, Assam. The scapulae were examined macroscopically for their shape and data recorded.

Result: It was found that the suprascapular notch presents with various shapes such as U, V, J, and slight indentation. Even it could be absent in a scapula and this could be a reason behind the suprascapular nerve entrapment syndrome. In this study, we found U-shaped notch in 104 (40.31%) scapulae, V-shaped notch in 20 (7.75%), and J-shaped notch in 55 (21.31%) scapulae. 45 (17.44%) scapulae were without any notch. In 26 (10.07%) scapula there was only a slight indentation at the site of the suprascapular notch. In 8 (3.1%) scapula, the superior transverse scapular ligament was completely ossified, and the notch was converted into a foramen.

Conclusion: Knowledge about various shapes of the suprascapular notch will definitely help the clinicians while dealing with patients coming with signs and symptoms of suprascapular nerve entrapment syndrome. The suprascapular nerve is commonly compressed when the notch is V-shaped or is absent in a scapula.

Key words: Coracoid process, Entrapment syndrome, Indentation, Scapula, Suprascapular notch, Suprascapular foramen, Superior transverse scapular ligament

INTRODUCTION

The scapula is a flat triangular piece of bone that lies on the posterolateral 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 reveal 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

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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 in the population of Assam and to compare it with the findings of the previous studies carried out worldwide.

MATERIALS AND METHODS

This study was conducted on 258 dry human scapulae collected from the Department of Anatomy, Jorhat Medical College, Jorhat and the Department of Anatomy, Assam Medical College, Dibrugarh, Assam. We also procured scapula from the 1st year medical students. 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.

Inclusion and Exclusion Criteria

Scapulae with damaged superior border were excluded from the study.

RESULTS

In this study was conducted on 258 dry human scapula, we found that majority of the scapulae 104 (40.31%) had U-shaped suprascapular notch followed by 55 (21.31%) scapulae with J-shaped notch. V-shaped notch was present in 20 (7.75%) scapulae. 45 (17.44%) scapula was without any notch. In 26 (10.07%) scapula, there was only a slight indentation at the site of the suprascapular notch. Complete ossification of the superior transverse scapular ligament was observed in 8 (3.1%) scapula (Figures 1-6).

DISCUSSION

Review of literature suggests that many studies had been conducted in the past regarding the variations in the shape of the suprascapular notch. 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. Iqbal *et al.*,⁶ Nagaraj *et al.*,⁷ and Soni *et al.*⁸ and many other authors have classified the suprascapular notch into various types on the basis of its shape as U, V, and J. Soni *et al.* have further included four more conditions in their classification. They are - indentation, absent



Figure 1: Scapula with U-shaped notch



Figure 2: Scapula with J-shaped notch



Figure 3: Scapula with V-shaped notch

notch, partial ossification of the suprascapular ligament, and complete ossification of the suprascapular ligament. Rengachary *et al.*⁹ classified the suprascapular notch into six types based on the inferior shape of the suprascapular



Figure 4: Scapula with absent notch



Figure 5: Scapula with slight indentation

notch as well as the degree of ossification of the superior transverse scapular ligament. In this study, we have mainly followed the classification used by Nagaraj *et al.* to record our data (Table 1).

Next, we compared our data with that of others (Table 2). We found that the most common shape of the suprascapular notch was U shape (40.31%). Our finding corresponds with the findings of Vandana,¹⁰ Patel *et al.*,¹¹ and Chhabra *et al.*¹² who too found the U-shaped notch to be more common than other shapes in their studies. We found the J-shaped suprascapular notch to be 21.31% which is similar to the reports of Iqbal *et al.* and Soni *et al.* The V-shaped notch in our study was 7.75% only and this coincides with the findings of Soni *et al.* and Patel *et al.* In 10.07% of our specimens, we found only a slight indentation at the site where there should have been a well-defined suprascapular notch. On comparing, we found that our value is much higher than the findings of Nagaraj (2.88%), Vandana (4.5%),¹⁰ and Soni *et al.* (3%) but less than as reported by Iqbal *et al.* (33.5%). We found complete ossification of the transverse scapular ligament in 3.1% scapula. Our finding correlates with the reports of Soni *et al.* (3%), Patel (3.75%), Sinkeet *et al.* (2.9%), and Nagaraj (2.88%). We found the absence of the suprascapular notch on the superior border of the scapula in 17.44% cases. Our finding is very close to the reports of Kannan (20%), Iqbal (22.5%), Sinkeet *et al.* (22.2%), and Nagaraj (23%).

Table 1: Showing the types of suprascapular notch

Shape of notch	Number of scapula (%)
U-shaped	104 (40.31)
V-shaped	20 (7.75)
J-shaped	55 (21.31)
Slight indentation	26 (10.07)
Absent notch	45 (17.44)
Complete ossification of suprascapular ligament	8 (3.1)

CONCLUSION

Knowledge of anatomical variations in the shape of the suprascapular notch should be kept in mind while dealing with patients coming with sign and symptoms of suprascapular nerve entrapment syndrome. This study is a humble effort to contribute to the minimum data available regarding suprascapular notch variation in the population of Northeast India.

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

Author	Year	Shape of suprascapular notch (%)					
		U	V	J	Slight indentation	Completely ossified superior transverse ligament	Absent notch
Iqbal <i>et al.</i> ⁶	2010	13.2	20	22	33.5	-	22.5
Sinkeet <i>et al.</i> ¹³	2010	29.6	5.18	-	-	2.9	22.2
Soni <i>et al.</i> ⁸	2012	58	7	27	3	3	2
Vasudha <i>et al.</i> ¹⁴	2013	12.16	-	19.13	7.82	6	6.08
Vandana ¹⁰	2013	35	5.2	34.3	4.5	12.5	4.5
Patel <i>et al.</i> ¹¹	2013	47.50	7.50	35	Nil	-3.75	6.25
Kannan <i>et al.</i> ¹⁵	2014	52	14	-	-	10	20
Nagaraj <i>et al.</i> ⁷	2014	26.92	1.92	43.26	2.88	2.88	23
Chhabra <i>et al.</i> ¹²	2016	46	24.6	15.9	-	-2.4	0.79
Present study	2017	40.31	7.75	21.31	10.07	3.1	17.44

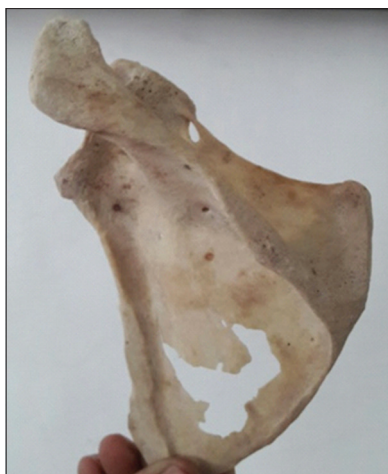


Figure 6: Scapula with ossified suprascapular ligament

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