

Morphological Variations of the Human Suprascapular Notch in the Rayalseema Zone of South India and its Surgical Implications

G. Manoj Kumar Reddy¹, C. Siddaramulu²

ABSTRACT

Introduction: Suprascapular notch is present at the lateral end of the upper border of the scapula close to the root of the coracoid process. Six different morphological variations have been described for the notch in the literature. Aim of the study: To, describe the morphological variations of the suprascapular notch in the population of the Rayalseema zone of south India.

Material and methods: The study was conducted on 106 dried human scapulae, from the collections in the Department of Anatomy, KMC, Kurnool and RIMS, Kadapa.

Results: In the present study, U- Shaped suprascapular notch, has the highest incidence of 44.3% followed by V- Shaped Notch, with an incidence of 41.5%, Absent suprascapular notch has an incidence of 6.6%. Suprascapular ligament resulting in the formation of incomplete Suprascapular foramen has an incidence of 4.7% and Complete Suprascapular foramen has an incidence of 2.8%.

Conclusion: Good understanding of these variations is important for orthopedic surgeons, radiologists and clinicians in understanding, evaluating and operating on the patients with unexplained pain and limitations in the movements of shoulder joint.

Keywords: Suprascapular Notch, Suprascapular Foramen, Suprascapular Entrapment Neuropathy.

irrespective of the sex were used for the study. The scapulae used in the study are obtained from the collections in the Department of Anatomy, Kurnool Medical College, Kurnool and RIMS Medical College, Kadapa. The study was conducted over a period of six months.

The morphological variations of the suprascapular notch were studied in the following method; the right and left side scapulae were grouped separately; the scapulae were studied for the presence or absence of suprascapular notch and suprascapular foramen. The scapulae with the absence of the suprascapular notch were grouped as having Type-I suprascapular notch. The scapulae with the presence of the suprascapular notch were observed by gross examination for the shape of the notch (V-shaped or U-shaped) and were named accordingly as Type II and Type III suprascapular notch. The scapulae with suprascapular foramen are again grouped into those having incomplete suprascapular foramen, named as, Type-V suprascapular notch and those having complete suprascapular foramen, Type-VI suprascapular notch.

STATISTICAL ANALYSIS

Descriptive statistics like mean and percentages were used for the analysis in the present study using Microsoft office 2007.

RESULTS

Five different variations (Type I, II, III, V and VI) were found in the suprascapular notch (Figure-1). The observations made were tabulated in the Table-1.

In the present study Suprascapular notch of Type III (Typically "U" shaped with almost parallel margins) has been found in 44 number of specimens, Type II (Typically "V" shaped with both margins converging towards the base) has been found in 44 number of specimens, Type I (Notch is absent. Superior border forms a wide depression from medial angle to Coracoid process) has been found in 7 specimens, Type V (Notch with partially ossified ligament), has been found only in 5 specimens Type VI (Suprascapular foramen) has been found only in 3 specimens Suprascapular notch of Type IV (Notch is very small and a shallow groove is frequently found adjacent to the notch for suprascapular nerve) could not be identified in the present study. Table-2 shows the variations in the morphology of the

INTRODUCTION

The scapula is a large triangular flat bone, present on the posterolateral aspect of the chest wall, covering parts of the second to seventh ribs. It has costal and dorsal surfaces, superior, lateral and medial borders, inferior, superior and lateral angles. The superior border at its anterolateral end is separated from the root of the coracoid process by the suprascapular notch. The superior transverse scapular (suprascapular) ligament converts the scapular notch into a foramen, the ligament may sometimes get ossified converting the notch into foramen. The suprascapular nerve passes through the fossa where as the suprascapular vessels passes above the ligament.¹

Six different morphological variations have been described for the notch.² Type I: Notch is absent. Superior border forms a wide depression from medial angle to Coracoid process. Type II: Typically "V" shaped with both margins converging towards the base. Type III: Typically "U" shaped with almost parallel margins. Type IV: Notch is very small and a shallow groove is frequently found adjacent to the notch for suprascapular nerve. Type V: Notch with partially ossified ligament. Type VI: Notch with completely ossified ligament converting it into a foramen. Study aimed to evaluate the above described morphological variations of suprascapular notch in the population of the Rayalseema zone of south India.

MATERIAL AND METHODS

A total number of 106 (50 Rt and 56 Lt) dried human scapulae

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suprascapular notch

The graphical representation of the variations in the morphology of the suprascapular notch described in the present study is described in Graph-1.

In the present study, Type III (U- Shaped suprascapular notch), has the highest incidence of 44.3% followed by Type II (V-Shaped Notch), with an incidence of 41.5%, Type I (Absent Notch), 6.6%. Suprascapular ligament resulting in the formation of Type V (Incomplete Suprascapular foramen) has an incidence of 4.7% and Type VI (Complete Suprascapular foramen) has an incidence of 2.8%. Type IV (Very small notch, with a separate

adjacent groove for suprascapular nerve) could not be identified.

DISCUSSION

The results of the present study compared with those of the previous studies, are shown in Table-3.

In the present study, the incidence of morphological variations in the suprascapular notch is Type III>Type II>Type I>Type V> Type VI> Type IV, this finding is similar to the findings described by Rengachary (1979)² and very close to the findings of Sinkeet (2010)⁴ and Manmeet kour (2016).¹¹

In the present study, Type III suprascapular notch, has the

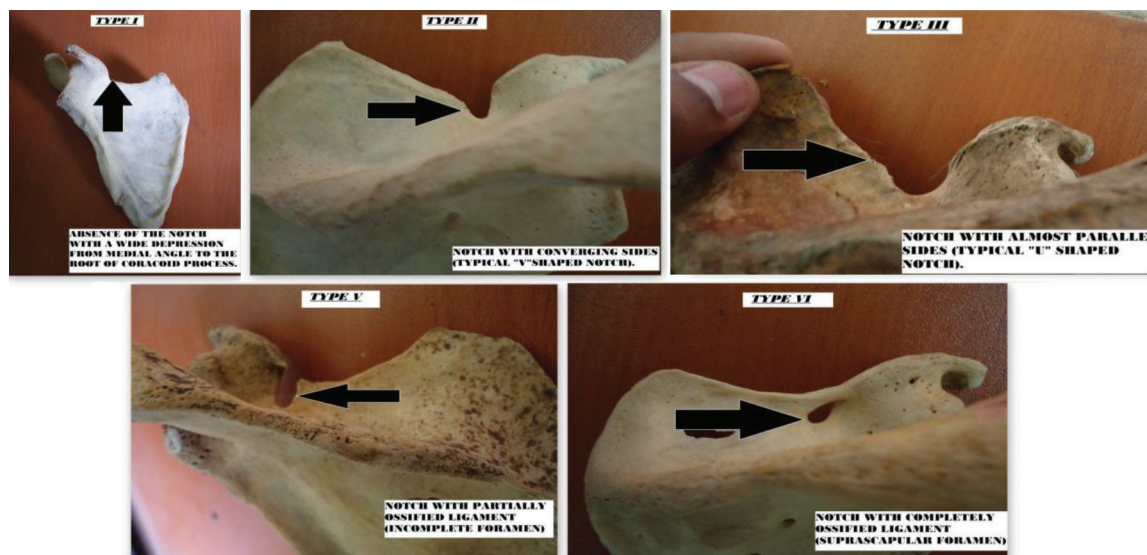


Figure-1: Morphological variations of the suprascapular notch

Morphology of the suprascapular notch	Number of specimens		
	Right side	Left side	Both sides
Type I	03	04	07
Type II	21	23	44
Type III	23	24	47
Type IV	00	00	00
Type V	02	03	5
Type VI	01	02	3
Total No. of specimens	50	56	106

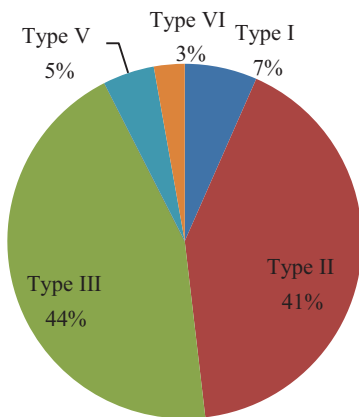
Table-1: Observations made in morphology of the suprascapular notch

Morphology of the suprascapular notch	No. of specimens	Percentage
Type III (U- Shaped Notch)	47	44.3%
Type II (V- Shaped Notch)	44	41.5%
Type I (Absent Notch)	07	6.6%
Type V (Incomplete Suprascapular foramen)	05	4.7%
Type VI (Complete Suprascapular foramen)	03	2.8%
Type IV (Very small notch)	00	-

Table-2: Incidence of variations in the morphology of the suprascapular notch

	Type III (U- Shaped Notch)	Type II (V- Shaped Notch)	Type I (Absent Notch)	Type V (Incomplete Suprascapular foramen)	Type VI (Complete Suprascapular foramen)	Type IV (Very small notch)
Present study (2017)	44.3%	41.5%	6.6%	4.7%	2.8%	--
Rengachary et al (1979) ²	48%	31%	8%	6%	4%	3%
Ticker et al (1998) ³	77%	23%	--	--	--	--
Sinkeet et al (2010) ⁴	29%	21%	22%	18%	4%	5%
Iqbal et al (2010) ⁵	13%	20%	18%	--	--	--
Soni et al (2012) ⁶	58%	7%	2%	--	3%	--
Mahdy ey al (2013) ⁷	76%	13%	--	--	--	--
Vandana et al (2013) ⁸	35%	5.2%	4.5%	3%	12.6%	--
Paolo Albino et al (2013) ⁹	22.8%	19.8%	12.4%	10%	3%	31%
Manikum et al (2015) ¹⁰	5%	65%	5%	7%	--	18%
Manmeet kour et al (2016) ¹¹	46.6%	8.3%	13.3%	--	3.2%	--

Table-3: Comparison with the previous studies



Graph-1: Variations in the morphology of suprascapular notch

highest incidence which is similar to the findings of Rangachary (1979)², Ticker (1998)³, Sinkeet (2010)⁴, Soni (2012)⁶, Vandana (2013)⁸, Manmeet kour (2016)¹¹, but Iqbal (2010)⁵ and Manikum (2015)¹⁰ described the highest incidence of Type II suprascapular notch, Paolo Albino (2013)⁹ described the highest incidence of Type VI suprascapular notch.

In the present study, Type VI suprascapular notch, could not be identified, but Rangachary (1979)², Sinkeet (2010)⁴, Paolo Albino (2013)⁹ and Manikum (2015)¹⁰ described the incidence of Type VI suprascapular notch as 3%, 5%, 31% and 18% respectively.

Surgical significance

Suprascapular nerve entrapment is an acquired neuropathy secondary to the compression of the nerve in the bony suprascapular notch.² Suprascapular nerve entrapment is a relatively uncommon but one of the significant cause for shoulder pain and disability.¹² There are several potential causes for the nerve entrapment along its course, but most commonly entrapment can occur in the supra scapular and spinoglenoid notches where the nerve course is limited by bony and ligamentous constrains. Traction neuropathy can also occur during overhead sports causing excessive nerve excursion.¹³ The suprascapular nerve entrapment may occur at any point along its course but in the case of absence of suprascapular notch, compression of suprascapular nerve by the suprascapular ligament possibly occur on the superior border of the scapula. Although it has been hypothesized that suprascapular nerve entrapment is more likely to be associated with a narrow V-shaped notch but no direct correlation between notch type and suprascapular nerve entrapment has been found clinically.¹⁴

CONCLUSION

In the present study an attempt has been made to describe the incidence of different morphological variations of the suprascapular notch in the Rayaleesma zone of south india. The knowledge of the variations in the morphology of the suprascapular notch is useful for the Orthopaedic surgeons and Radiologists for quick identification of the type of the notch in the plain radiographs and for correlation of the suprascapular entrapment neuropathy with the specific type of the notch.⁵ Thorough understanding of the morphology of suprascapular notch is also important for surgeons performing the nerve decompression especially by endoscopic techniques.¹¹

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