

Original article:

A study on complete absence of the suprascapular notch in the population of Assam

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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 coracoids process. It is converted into a foramen by the superior transverse scapular ligament. The suprascapular nerve passes through this foramen while the suprascapular vessels passes above the ligament. The suprascapular notch may be absent in some cases which may result in suprascapular nerve entrapment neuropathy characterized by a vague pain on the posterolateral aspect of shoulder, weakness on external rotation and abduction of the arm and atrophy of the supraspinatus and infraspinatus muscles. The present study was carried out to find out the incidence of complete absence of the suprascapular notch in the population of Assam.

MATERIALS & METHODS: The study was carried out on 236 dry human scapula (126 right & 110 left) which were examined macroscopically for presence or absence of the suprascapular notch.

RESULT: In this study, 42 (17.79%) scapulae presented with absent suprascapular notch. Of these, 17(7.2%) belonged to the right side and 25 (10.59%) belonged to the left side.

CONCLUSION: The incidence rate of absence of suprascapular notch could vary from population to population. Since it is a major cause of suprascapular nerve entrapment neuropathy, every clinician should keep this in mind while treating conditions associated with the shoulder joint.

KEY WORDS: Scapula, Suprascapular notch, Transverse scapular ligament, Entrapment neuropathy.

INTRODUCTION:

The scapula is a flattened triangular piece of bone that lies on the posterolateral aspect of the thoracic cage and extends vertically from the second to the seventh rib. It presents with three borders (Superior, Medial & Lateral) and three angles (Superior, Inferior & Lateral). The superior border extends from the superior angle to the lateral angle and it is the thinnest & the shortest of the three borders. Near the coracoids process, the superior border presents a notch called the suprascapular notch. This notch is converted into a foramen by the attachment of the superior transverse scapular ligament to it's edges [1]. The suprascapular nerve,

the branch from the upper trunk of the brachial plexus, passes through this foramen and supplies the supraspinatus muscle and descends lateral to the scapular spine with the suprascapular vessels & supply the infraspinatus and gives a twig to the shoulder joint [2]. Previous studies reveals that the superior transverse scapular ligament (suprascapular ligament) shows many variations like multiple bands, partial or complete ossification etc. According to Khan [3], the suprascapular notch is frequently bridged by bone. Overhead abduction of the shoulder joint exert traction on the suprascapular nerve, which leads to its compression against the superior border of scapula. Absence of

suprascapular notch have been reported by many authors which could be a major cause of the symptoms of suprascapular nerve entrapment syndrome. According to Rengachary et al [4][5], there are six different types (Type I- Type VI) of suprascapular notch and in Type I, there is complete absence of a notch (no discrete notch). Compression of the suprascapular nerve at the suprascapular notch was first described by Kopell and Thompson et al [6].The incidence of suprascapular nerve entrapment increases in Type I variety of suprascapular notch variation.

AIMS & OBJECTIVES:

The present study is undertaken as very little or no data is available regarding incidence of complete absence of suprascapular notch in the population of Assam. We intended to find out the incidence rate of absent suprascapular notch in the population of this region and compare it with the findings of previous authors all over the world.

MATERIALS & METHODS:

The present study was carried out on 236 dried human scapulae of unknown sex procured from the

department of Anatomy at Jorhat Medical College, Jorhat and Assam Medical College, Dibrugarh, Assam. Scapula were also collected from the first year medical students of both the colleges. Among these, 126 were right sided & 110 were left sided scapulae. Each scapula was examined macroscopically for the presence or absence of the suprascapular notch on its superior border, near the root of the coracoid process. The data so obtained was recorded and tabulated. Scapula without a notch was photographed.

INCLUSION & EXCLUSION CRITERIA:

Scapula with deformities and damaged superior border were excluded from the study.

RESULTS:

Among the 236 scapulae included in this study, we found that 42 (17.79%) scapula did not have a suprascapular notch on its superior border. Of these, 17 (7.2%) were right sided and 25 (10.59%) were left sided scapula. Thus we found that absence of suprascapular notch was more common on the left side.

Table1: Specimen with and without suprascapular notch (n=236)

No. of scapula with notch	No. of scapula without notch	Total
194 (82.2%)	42 (17.79%)	236

Table 2: Showing side distribution of absent suprascapular notch (n=42)

Right side	Left side	Total
17 (7.2%)	25 (10.59%)	42

Photograph of scapula with suprascapular notch –



Photographs of scapula without sprascapular notch-



DISCUSSION:

According to the available literature, many authors have described about the variations in the shape of the suprascapular notch as well as about the incidence of absence of suprascapular notch in their

studies (Table 3). The entrapment of the suprascapular nerve most commonly occurs at the level of suprascapular notch due to absence of the notch or narrow dimensions of the notch or ossification of the suprascapular ligament.

Table 3: Comparison of incidence of absence of suprascapular notch as reported by various workers.

Author	Year of study	No. of specimen	Population	Incidence rate (%)
Rengachary et al [4][5]	1979	211	American	8
Natsis et al [7]	2007	423	Greek	8.3
Ofusori et al [20]	2008		Nigerian	Single case report
Iqbal et al [11]	2010	250	Pakistani	18
Sinkeet et al [15]	2010	138	Kenyan	23.91
Wang et al [16]	2011	295	Chinese	28
Soni et al [21]	2012	100	Indian	2
Polguy et al [8]	2013	81	Poland	6
Paolo Albino et al [22]	2013	500	Italian	12.4
Vasudha et al [9]	2013	115	Indian	6
Mahato & Suman [12]	2013	112	Indian	19.64
Muralidhar Reddy sangam et al [17]	2013	104	Indian	21.15
Pragna et al [10]	2013	80	Indian	6.25
Vandana & Sudha [23]	2013	134	Indian	4.5
Rekha BS [19]	2013		Indian	Single case report
Usha Kannan et al [24]	2014	400	Indian	20
Md. J Akhtar & PK Madhukar [14]	2014	220	Indian	15.46
Nagaraj S et al [18]	2014	104	Indian	23
Ukti Desai [13]	2014	200	Indian	16
Present Study	2017	236	Indian (north-east region)	17.79

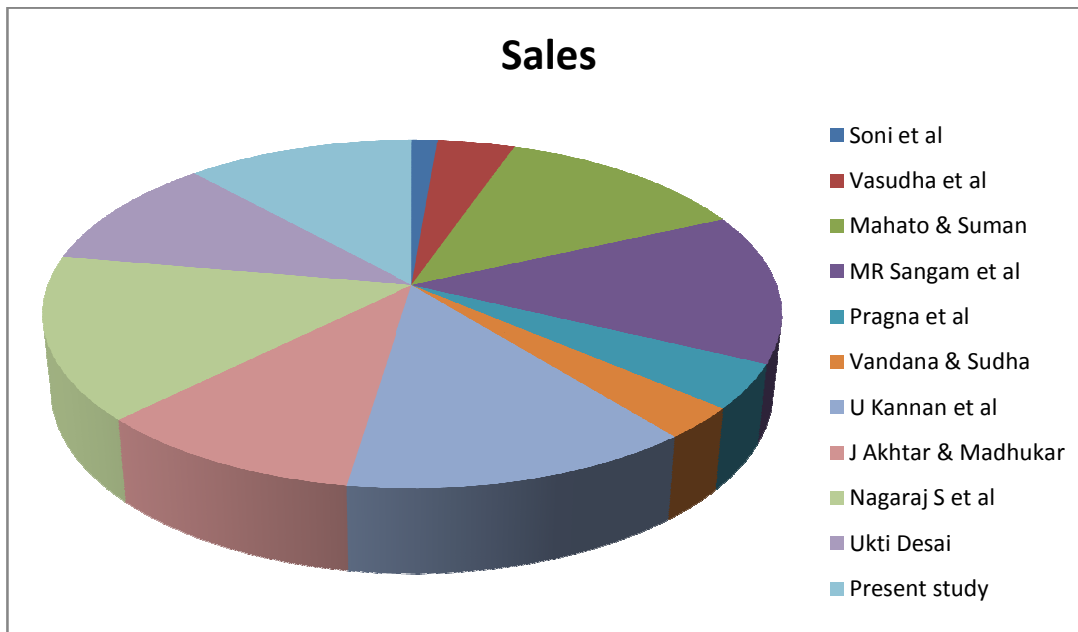
Rengachary et al [4,5] conducted a study on 211 American scapulae and classified the suprascapular notch into six types (Type I-Type VI) based on the width at the superior border of the notch, the widest point within the notch and the depth of the notch. They reported scapula without a notch (Type I) in 8% of their specimen. In similar studies conducted by Natsis et al [7], Polguy et al [8], Vasudha et al [9] and Pragna et al [10], they reported the incidence of absence of suprascapular notch to be 8.3%, 6%, 6% and 6.25% respectively. In the present study we found the incidence of absent suprascapular notch to be 17.79%. This is much higher than the findings of the authors mentioned above. However, our findings (17.79%) resembles the findings of Iqbal et al (18%)[11], Mahato & Suman (19.64%)[12], Ukti Desai

(16%)[13], J Akhtar & PK Madhukar (15.46%)[14].

Sinkeet et al [15] analyzed 138 Kenyan scapulae and reported the incidence of absent suprascapular notch to be 23.91%. Similarly, Wang et al [16], Muralidhar Reddy Sangam et al [17] and Nagaraj et al [18] reported the incidence of absent suprascapular notch to be 28%, 21.15% and 23% respectively. This is much higher than what we found. Single cases of complete absence of suprascapular notch have been reported by Rekha BS [19] and Ofusori et al [20].

The following pie diagram represents the findings of incidence of absent suprascapular notch by Indian authors who carried out this study in different parts of India.

Figure 1: Showing the incidence of absent suprascapular notch in different parts of India. (Ref: Table 3)



Variations in the shape of the suprascapular notch along with morphological variation of the suprascapular ligament are some factors which are responsible for the suprascapular nerve entrapment syndrome. In addition to these, complete absence of suprascapular notch may also be one of the contributing factors of suprascapular nerve entrapment neuropathy causing dull or burning pain in the posterolateral aspect of the shoulder that exaggerate on activity [12]. In case of absence of suprascapular notch, compression of the suprascapular nerve by the suprascapular ligament

possibly occur on the superior border of the scapula [4][5][20]. Such nerve entrapment conditions can be diagnosed with the help of investigations like X-ray, CT scan, NCV (nerve conduction velocity) test, EMG (electromyogram), MRI etc.

CONCLUSION:

The incidence of complete absence of the suprascapular notch varies in different population. It can be a major cause for suprascapular nerve entrapment neuropathy. Information regarding its anatomical variation should always be kept in mind during surgical procedures of the shoulder region.

REFERENCES:

1. RMH McMinn. Last's Anatomy, 9th ed, UK Edition, Churchill Livingstone, 2009, p-68.
2. Khan MA. Complete ossification of the superior transverse scapular ligament in an Indian male adult. *Int.J.Morphol*, 2006;24(2):195-6.
3. Rengachary SS, Burr D, Lucas S, Hassanein KM, Mohn MP & Matzke H. Suprascapular entrapment neuropathy: a clinical anatomical and comparative study. Part 1- Clinical study. *Neurosurg*, 1979;5:441-46.
4. Rengachary SS, Burr D, Lucas S, Hassanein KM, Mohn MP & Matzke H. Suprascapular entrapment neuropathy: a clinical anatomical and comparative study. Part 2. Anatomical study. *Neurosurg*, 1979;5:447-51.
5. Thompson WAL & Kopell HP. Peripheral entrapment neuropathies of upper extremities. *New England J of Medicine*, 1959;260:1261-1265.
6. Natsis K, Totlis T, Tsikaras P, Appell HJ, Skandalakis P, Koeke J, Proposal for classification of suprascapular notch: a study on 423 dried scapulas. *Clin Anat*, 2007;20:135-9.
7. Polguj M, Kazimierz S, Jedrzejewski, Mirosław Topol, Special paper- Anatomical pathology. Sexual dimorphism of the suprascapular notch- morphometric study. *Arch Med Sci*. 2013;9,1:177-183.
8. Vasudha TK, Ashwija Shetty, Sadashivana Gowd, Rajasekhar SSSN. Morphological study on suprascapular notch and superior transverse scapular ligaments in human scapulae. *Int J Med Res Health Sci*, 2013;2(4):793-798.
9. Pragna Patel, SV Patel, SM Patel, Badal Jotania, Sanjay Chavda, Dhara Patel. Study of variations in the shape of suprascapular notch in dried human scapula. *Int J Biol Med Res*. 2013;4(2):3162-4.

10. Iqbal K, Iqbal R, Khan SG,. Anatomical variations in shape of suprascapular notch of scapula. *J Morphol Sci.* 2010,27(1):1-2.
11. Mahato & Suman. Complete absence of the suprascapular notch: a risk factor for suprascapular nerve entrapment neuropathy, *JEMDS*, 2013;2(25):4542-4547
12. Dr Ukti Desai. Complete absence of suprascapular notch in dried human scapulae in Gujrat region: a risk factor for suprascapular nerve compression. *Int J of Scientific Research*, 2014;3(8):288-289
13. Md Jawed Akhtar, PK Madhukar. A study on complete absence of suprascapular notch. *Int J of Sci & Research (IJSR)* 2014;3(11):411-415
14. Sinkeet SR, Awori KO, Odula PO, Ogeng'o JA, Mwachaka PM. The suprascapular notch: its morphology and distance from the glenoid cavity in Kenyan population. *Folia Morphol (Warsz)* 2010;69:241-45
15. Wang HJ, Chen C, Wu LP, Pan CQ, Zhang WJ, Li YK. Variable morphology of suprascapular notch: an investigation and quantitative measurements in Chinese population. *Clin Ana.* 2011;24:47-55
16. Muralidhar Reddy Sangam, Sattiraju Sri Sarada Devi, Karumanchi Krupadanan, Kolla Anasuya. A study on the morphology of the suprascapular notch and its distance from the glenoid cavity. *J Clin Diagn Res.* 2013;7(2):189-92
17. Nagaraj S, MK Krishnaiah, Praveen Kumar M, AR Sherke. Study of morphological variations of suprascapular notch. *IOSR Journal of Dental and Medical Sciences.*2014;13(6):121-123
18. Rekha BS. Complete absence of suprascapular notch- a case report. *Journal of Evolution of Medicine and Dental Sciences.*2013;2(1):19-22
19. David A Ofusori, Raymond A Ude, Christina U Okwuonu, Olamide A Adesanya. Complete absence of suprascapular notch in a Nigerian scapula: a possible cause of suprascapular nerve entrapment. *Int J Shoulder Surg.* 2008 Oct-Dec;2(4)85-86
20. Soni G, Mallik VS, Shukla L, Chhabra S, Gaur N. Morphometric analysis of suprascapular notch. *The internet Journal of Biological Anthropology.*2012;5(1):DOI:105580/2b19
21. Paolo Albino, Stefano Carbone, Vittorio Candella, Valerio Arceri, Anna Rita Vestri, Stefano Gumina. Morphometry of the suprascapular notch: correction with scapular dimensions and clinical relevance. *BMC Musculoskeletal Discord.*2013;14:172
22. Vandana R, Sudha Patil. Morphometric study of suprascapular notch. *National J of Clinical Anatomy.*2013;2(3):140-44
23. Usha Kannan, NS Kannan, J Anbalagan, Sudha Rao. Morphological study of the suprascapular notch in Indian dry scapula with specific reference to the incidence of completely ossified superior transverse scapular ligament. *J Clin Diagn Res.* 2014 March;8(3):7-10