

Suprascapular Notch – A Knot or Not?

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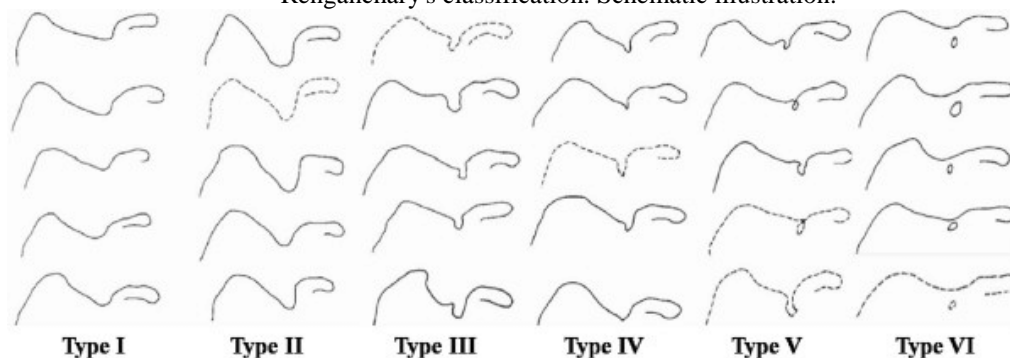
I. Introduction

The suprascapular notch (SSN) is a notch in the superior border of the scapula, just medial to the base of the coracoid process. This notch is converted into a suprascapular foramen (SSF) by the superior transverse scapular ligament, and serves for the passage of the suprascapular nerve and sometimes the ligament is ossified^{[1][2]}. Anatomical variations and anomalous or ossified superior transverse scapular ligament are also considered to be risk factors for suprascapular neuropathy. In previous studies, different types of SN were identified^{[3][4]}. The suprascapular nerve which supplies motor branches to the supraspinatus, infraspinatus, and sensory branches to the rotator cuff muscles, and the ligamentous structures of the shoulder and acromioclavicular joint.

According to Rengachary et al. 1979, there are six basic types of scapular notch^[5].

- Type I (8%): Notch is absent. The superior border forms a wide depression from the medial angle to the coracoid process.
- Type II (31%): Notch is a blunted V-shape occupying the middle third of the superior border.
- Type III (48%): Notch is U-shaped with nearly parallel margins.
- Type IV (3%): Notch is V-shaped and very small. A shallow groove is frequently formed for the suprascapular nerve adjacent to the notch.
- Type V (6%): Notch is minimal and U-shaped with a partially ossified ligament.
- Type VI (4%): Notch is a foramen as the ligament is completely ossified.

Rengachary's classification. Schematic illustration.



Kopell and Thompson were the first to describe entrapment syndrome (1959) of suprascapular nerve at the site of the suprascapular notch^[6]. Many studies have investigated and have identified the pathological factors related to this syndrome. The following proved to be involved in the aetiology as well as iatrogenic lesions during

- open or arthroscopic surgical procedures blind drilling during arthroscopic Bankart and SLAP repair
- advancement of rotator cuff during the repair of massive retracted rotator cuff tears^{[7][8][9]}
- arthroscopic anterior or double interval slide
- during the decompression of suprascapular nerve entrapment
- anterior shoulder dislocation
- injury from direct trauma
- ganglion cysts
- synovial and Ewing's sarcomas
- and chondrosarcoma and lipoma

II. Materials And Methods

A total of 200 dry scapulae were collected from the Departments of Anatomy and Forensic Medicine SVS Medical College Mahboobnagar, Telangana State, India. The Suprascapular notch were examined for presence, absence and variation in shapes.

III. Results

Shapes	Number	%
J shape	51	25.50%
U shape	108	54.00%
V shape	24	12.00%
Absence of notch	6	3.00%
*New shape identified	□ 3	1.50%
Suprascapular notch converted into foramen	8	4.00%
Total	200	100.00%

Table No.1: Suprascapular Notch and Foramen variations

The common shapes seen are U, J and V in decreasing frequency respectively, which concurs with the opinion of Rengachary et al^[5]. In 6 cases the notch was absent, and there was a mere exaggeration of the superior angle giving a concave shape to the superior border in the current study. This was different from what was seen in the normal scapula, where the superior border of the scapula is comparatively straight, with an indentation (suprascapular notch) at the junction of the medial two-thirds and the lateral third, just medial to the base of the coracoid process. The suprascapular notch had converted into a foramen in 8 cases in the present study which amounting to 4 % and thereby gaining a new significance though it was rare in all previous studies. A thorough search of the literature revealed no report of absence of the suprascapular notch in a Nigerian scapula – this appears to be the first^[8]. A new shape was seen in some cases which has been assigned a name ‘inverted omega (□)’ for further discussion in this study. The suprascapular notch at its junction with the superior border of scapula on either sides had spikes facing each other.



Figure : Complete absence of Suprascapular Notch



Figure : Suprascapular Foramen



Figure : Suprascapular Foramen



Figure : Suprascapular Foramen



Figure : Straight Superior border



Figure : Omega shaped notch

IV. Discussion

The suprascapular notch is usually present in every scapula. It is commonly bridged by the superior transverse scapular ligament and thus converted into a foramen, which is called the suprascapular foramen. Morphological variations of the suprascapular notch are very important clinically for possible predisposing factors, for compression of the suprascapular nerve in this region. In the whole population, approximately 1–2% all shoulder pain is caused by the suprascapular nerve entrapment syndrome^[13]. Various factors have been identified as being causes of suprascapular nerve entrapment, including variation in the shape of the suprascapular notch along with a thickened superior transverse scapular ligament^{[5] [10] [11]}. It could be postulated that complete absence of the suprascapular notch may also be one of the predisposing factors for the suprascapular nerve entrapment syndrome. The suprascapular nerve is a motor nerve originating from the upper trunk of the brachial plexus (C5 and C6)^[12]. The suprascapular nerve entrapment is a pathological condition wherein the affected nerve is compressed within the narrow passage of SSN/SSF. The compression of the nerve leads to mechanical irritation during shoulder movement which in turn may aggravate the condition. With entrapment of the nerve, atrophy of both the infraspinatus and supraspinatus muscles may occur. Black et al. reported that paralysis, weakness, numbness, and burning sensations in the hand may be the initial symptoms; later, there may be only weakness of abduction and external rotation, as is seen in suprascapular injury^[13]

Deformities in the shapes of the SSN are said to play a major role in this regard. However, clinical studies indicate that, there is no direct co-relation between type of the notch and nerve entrapment condition^[9]

V. Conclusion

The main reason for suprascapular nerve entrapment is morphological alterations in Suprascapular Notch or Suprascapular Foramen. Entrapment is a grave when alterations in both SSN and SSF are present together. In conclusion, co-existence of the suprascapular notch and tiny suprascapular foramen as seen in current case increases the risk of neuropathy by causing nerve irritation against bony margins during its passage through the foramen. The knowledge on such variations is essential for surgeons and orthopedicians, for making a proper diagnosis and for planning the most suitable surgical interventions. Radiological examination of the scapula in the diagnosis of nerve entrapment syndrome helps the clinicians in understanding the exact reason and location of entrapment which in turn enhances the therapeutic procedures..

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