

# Study of Anatomical Variations in Suprascapular Notch and Its Clinical Importance in Nerve Entrapment

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## Abstract

**Introduction:** The scapula is a large flat, triangular bone which lies on the posterolateral aspect of the chest wall having suprascapular notch (SSN), a variable depression on the superior border of scapula, near the root of coracoid process. The SSN is converted into a foramen by the superior transverse scapular (suprascapular) ligament, it is sometimes ossified. The suprascapular nerve traverses the foramen and is the main site for injury and entrapment of the nerve. Anatomical variations of the SSN are a possible cause of nerve entrapment. So the objective of the present study was to see variations in the shape of Suprascapular notch on gross examination.

**Materials and Methods:** 150 dried human scapulae were studied in the department of Anatomy of Govt. Medical College. The Scapulae were examined for different shapes of SSN including absence of notch.

**Results:** Out of total 150 scapulae 28% scapulae had indentation at the site of Suprascapular notch most common variation. 25.33% had U shaped notch, 20% had J shaped notch, 8% had V shaped notch. Absence of notch was also noted.

**Conclusion:** In our study indented notch is most common, which has a lower chance of nerve entrapment as compared to V shaped notch, which is least common in our study. Detail knowledge of SSN variations may be essential for surgeons performing suprascapular nerve decompression.

**Keywords:** Scapula; Supra scapular notch; Suprascapular nerve; Nerve entrapment.

## Introduction

The scapula is a large flat, triangular bone which lies on the posterolateral aspect of the chest wall, covering parts of the 2<sup>nd</sup> to 7<sup>th</sup> ribs. It has costal and dorsal surfaces, superior, lateral and medial borders, inferior, superior and lateral angles, and three processes, the spine, its continuation the acromion and the coracoids process. The suprascapular notch (SSN) is a variable depression

on the superior border of scapula, near the root of coracoid process.<sup>1</sup>

The SSN is converted into a foramen by the superior transverse scapular (suprascapular) ligament, it is sometimes ossified. The suprascapular nerve traverses the foramen and the suprascapular vessels cross above the ligament.<sup>1</sup>

The suprascapular nerve is a large branch of the superior trunk that runs laterally deep to the two muscles and enters the supraspinous fossa through

the SSN, inferior to the superior transverse scapular ligament.<sup>1</sup>

The SSN is one of the most important point along the course of the suprascapular nerve because this region is the main site for injury and entrapment of the nerve.<sup>2,3</sup> Anatomical variations of the SSN are a possible cause of nerve entrapment, especially in individuals involved in repetitive and forceful overhead activities (e.g. Players).<sup>4,5</sup> Etiology was first described by Andre Thomas in 1936.<sup>6</sup>

Suprascapular nerve entrapment is characterised by chronic, poorly localised pain in the posterior or/ and lateral region of the shoulder, which may radiate down the arm or up into the neck, weakness of abduction and increased external rotation of the arm, with atrophy of the supraspinatus and infraspinatus muscles.<sup>7</sup> Males are more likely to suffer from suprascapular nerve entrapment than females.<sup>8,9</sup>

Anatomical variations in shape and size of SSN are very common. A narrow SSN may predispose a patient to neuropathy. A V-shaped notch is more likely to be associated with nerve entrapment<sup>10</sup>. So this study was conducted to see variations in shape of suprascapular notch.

### Objective

To see variations in the shape of Suprascapular notch on gross examination.

### Materials And Methods

150 dried human scapulae were studied in the department of Anatomy of Shri Krishna Medical College, Muzaffarpur. The Scapulae were examined for different shapes of notches. Absence of notch was also taken into consideration.

### Results

A total of 150 scapulae were analysed in the present study. 85 were of right side 65 of left side. Out of total 150 scapulae 38 (25.33%) had U shaped notch (Fig. 1A), 30(20%) had J shaped notch (Fig. 1C), 12 (8%) had V shaped notch (fig 1D). Absence of notch was noted in 28 (18.67%) scapulae (Fig 1B). 42 (28%) scapulae had indentation at the site of Suprascapular notch (Fig 1E).



**Fig 1:** Showing variations in the shape of SSN: (A) U Shape; (B) Notch Absent; (C) J Shape notch; (D) V shape; (E) Indented Notch.

## Discussion

Since past, many classifications of Suprascapular notch variations has been done in various scientific literatures.<sup>10,11,12</sup> Hadricka et. al<sup>12</sup> divided the SSN into into five types based on visual observation: shallow (type II), medium (type III) and deep (type IV). In type I, the SSN was absent, and in type V, a complete foramen was formed. Rangachary et al.<sup>10</sup> studied 211 American scapulae in 1979 and classified suprascapular notch into six types (Type I – Type VI). This classification was on the basis of following criteria's (a) Depth of notch, (b) Width at superior border of notch and (c) Widest point within the notch. They concluded that a small notch have greater chance of nerve impingement than a large one. Bayramoglu et al.<sup>13</sup> in 2003 classified the scapulae on the basis of classification of Rengachary et al.<sup>10</sup> and described two main types of notches i.e U- and V-shaped. Various Authors<sup>14,15</sup> found in their study that V shaped notches have lesser area than U shaped notches, so this is a causative factor for suprascapular nerve entrapment syndrome, but no direct clinical correlation was found. Iqbal et al 2010<sup>16</sup> found three different types of notch i.e. U, V and J in their study on Pakistani population. In their study, J shaped was most common type. In present study indented notch is most common and V shaped notch is least common. Vashudha TK et.al<sup>17</sup> studied 115 Indian dried scapulae for different shapes of suprascapular notch and degree of ossification of suprascapular ligament.They found eight different shapes of suprascapular notch. Vandana R et al<sup>18</sup> studied 134 dried scapulae and classified the SSN into six different types which are U, J, V, W, Indentation and absent SSN. In their study they found that U shaped SSN was most common and W shaped was least common. In present study indented notch is most common and V shaped notch is least common. Patel P et al<sup>19</sup> studied on 80 dried scapulae and found only three different types of SSN i.e. U, J and V shaped, in which U shaped was most common and V shaped was least common.

## Conclusion

Our Study has very precisely described the SSN variations in a limited population. The size of the SSN is considered to play a part in the predisposition of nerve entrapment. A small notch has a larger tendency of nerve impingement than a larger notch.<sup>10</sup> In our study indented notch is most common, which has a lower chance of nerve

entrapment as compared to V shaped notch, which is least common in our study. Detail knowledge of SSN variations may be essential for surgeons performing suprascapular nerve decompression.

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