

# Study of presence of bony supra – scapular foramen in Indian dry scapulae

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## Abstract

**Background:** The suprascapular notch, is a depression on superior border of the scapula, medial to the coracoid process. It is bridged by superior transverse scapular ligament, which is sometimes ossified and converts the notch into foramen. It transmits the suprascapular nerve to the supraspinatus fossa. Morphological variations of suprascapular notch can cause entrapment of suprascapular nerve, causing suprascapular nerve entrapment syndrome, which accounts to 1 to 2 % of shoulder pain in general population. The aim was to study the incidence of presence of bony supra-scapular foramen

**Methods:** A total of 50 dry scapulae, 25 right and 25 left were analysed to see for presence of supra - scapular foramen.

**Results:** The incidence of suprascapular foramen was 8% of the total scapulae studied.

**Conclusion:** Presence of supra - scapular foramen in Indian dry scapulae is high as compared to western literature. Anatomical knowledge of this foramen is important for surgeons as a cause for persistent shoulder pain, and as a risk factor during surgical explorations like supra - scapular nerve decompression.

**Key words:** suprascapular foramen, dry scapula, suprascapular nerve entrapment syndrome.

## Introduction

The suprascapular notch is a depression on the lateral part of the superior border of the scapula, medial to the coracoid process. It is bridged by the superior transverse scapular ligament (STSL), which is sometimes ossified forming the foramen. It transmits the suprascapular nerve to the supraspinatus fossa<sup>[1,2]</sup>. Suprascapular nerve supplies motor branches to supraspinatus, infraspinatus and sensory branches to the rotator cuff muscles, ligaments structures of shoulder joint and acromial joint. Accordingly, this notch is an important landmark of the suprascapular nerve during arthroscopic shoulder operations<sup>[3,4]</sup>.

Morphological variations of the suprascapular notch are very important clinically, for compression of the suprascapular nerve in this region. The suprascapular nerve entrapment results in weakness of the arm, difficulty in external rotation and abduction, and then, atrophy of the infraspinatus and supraspinatus muscles.

Suprascapular nerve entrapment syndrome is most frequently found in athletes who repeatedly experience stress on their shoulder like volleyball players, baseball players, weight lifters, tennis players, fencers, hunters using bows, dancers, figure skaters and individuals with occupations which require a lot of overhead work which requires extreme abduction and external rotation<sup>[5-9]</sup>.

The aim of the present study was to study the incidence of presence of suprascapular foramen.

## Materials and methods

A total of 50 dry scapulae, 25 right and 25 left were analysed to see for the presence of supra - scapular foramen. The scapulae were selected randomly from the bone sets present in the department. Without considering sexual dimorphism, all adult scapulae were included in the study sample.

Fisher exact chi square test was used for statistical analysis.

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## Results

Supra - scapular bony foramen, type VI of Rengachary classification, was present in 4 scapulae, 2 right and 2 left [Figure 1]. The incidence was 8% of the total scapulae studied.



**Figure 1. Supra-scapular foramen (SSF) of left scapula**

## Discussion

Variation of superior transverse scapular ligament and supra-scapular foramen has been studied by various workers. These variations have been identified as possible predisposing factors to supra-scapular nerve entrapment syndrome. One of the clinically most important places on the scapula is the supra-scapular notch. The supra-scapular nerve and vein run below this superior transverse scapular ligament, and above the ligament passes suprascapular artery<sup>[10-13]</sup>.

In the whole population, approximately 1–2% all shoulder pain is caused by the suprascapular nerve entrapment syndrome<sup>[14]</sup>. Suprascapular nerve entrapment was first described by Kopell and Thompson<sup>[15]</sup>.

Silva et al<sup>[16]</sup> have reported a 30.76% prevalence of the ossified superior transverse scapular ligament on dry scapulae in Brazilian population which is quite high. Ticker et al<sup>[17]</sup> in 1998 have reported variations in morphology of superior transverse scapular ligament. These variations include calcification of ligament, partial or complete ossification of ligament, multiple bands. The ossification of the superior transverse scapular ligament was considered anomalous by Lewis<sup>[18]</sup> and Harris<sup>[19]</sup> et al, suggesting one more factor to supra-scapular nerve entrapment syndrome.

Rengachary et al<sup>[20]</sup>, classified this notch into six types, based on its shape and they also stated that the size of the supra-scapular notch played a role in the predisposition of supra-scapular nerve entrapment.

Type I- no discrete notch,

Type II- wide V-shaped notch,

Type III- wide U shaped notch

Type IV- narrow V shaped notch

Type V- U shaped notch with partial ossification,

Type VI- bony foramen

In their opinion, a small notch gave a greater chance of a nerve impingement than a large one. This indicates that incidence of ossification of superior transverse scapular ligament varies in different populations.

Our study results closely coincide with the results of the other Indian authors - Jadav et al<sup>[21]</sup> and Perumal et al<sup>[22]</sup> and slightly higher than the Suman et al<sup>[23]</sup>. In some population complete ossification of STSL was very rare for example in Alaskan Eskimos - 0.3%, Native American - 2.1- 2.9%<sup>[23]</sup>

Khan<sup>[24]</sup> and Das et al<sup>[25]</sup> have first reported cases of complete ossification of superior transverse scapular ligament in Indian population.

Further detailed clinical studies involving screening of high risk population by specialists for the incidence of suprascapular nerve entrapment syndrome; and radiological studies to confirm nerve entrapment and surgical studies during decompression surgeries will provide detailed information on the entrapment causes and anatomical aspects.

## Conclusion

Our study concludes that the presence of supra - scapular foramen in Indian dry scapulae is not rare as reported in western literature. Anatomical knowledge of this foramen is important for clinicians to diagnose shoulder pain, and surgeons as its presence can be

a risk factor during surgical explorations involving a supra - scapular nerve decompression.

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