

# Coexistence of suprascapular notch and suprascapular foramen. A rare anatomical variation and its clinical correlation—A Case Report

Dr.S.Saritha

Professor of Anatomy; KAMS &RC (Hyderabad). Correspondence author-Dr.S.Saritha: Email address: [kmr.saritha@gmail.com](mailto:kmr.saritha@gmail.com)

## Abstract

The suprascapular notch is the most common site of suprascapular nerve entrapment, which manifests in disability and pain of the upper limb. The suprascapular nerve entrapment, a possible risk factor being the ossification of the anterior coracoscapular ligament (ACSL), a structure that runs in the suprascapular notch, below the superior transverse scapular ligament. The unique anatomical variation of the suprascapular notch associated with a suprascapular foramen was discovered in one of the 75 analyzed scapulae in the department of Anatomy during the routine study. The suprascapular notch (SSN) is the site where the suprascapular nerve (SN), accompanied by its associated vein, traverses the upper border of the scapulae under the superior transverse scapular ligament (STSL). The corresponding artery runs over the ligament.

The knowledge of this rare variation of the suprascapular notch and the coexistence of the suprascapular foramen at the suprascapular region should be helpful in arthroscopic and open procedures at the suprascapular region and also the safety of operative decompression for the suprascapular nerve.

**Keywords:** Suprascapular foramen (SSF), suprascapular notch (SSN), Anatomical variation, suprascapular Nerve entrapment & anterior coracoscapular ligament (ACSL).

**Introduction** We present a very rare anatomical variation in the suprascapular region: the coexistence of the suprascapular notch and the suprascapular foramen. The variation was found during the routine osteological studies in the department of Anatomy. The suprascapular foramen was situated inferior to the suprascapular notch. A bony bridge lay between them, is created by an **ossified anterior coracoscapular ligament (ACSL)** discovered by Avery et al<sup>1</sup>. This anatomical variation increases the risk of suprascapular nerve entrapment by the bony margins. This bony bridge passing through the middle part of the suprascapular notch reduces the space available for nerve passage (bony bridge decreases the

space by about 36.5–38.6 %). The purpose of this study was to document the incidence, morphology, origin and clinical significance of the existence of a bony foramen within the suprascapular notch.

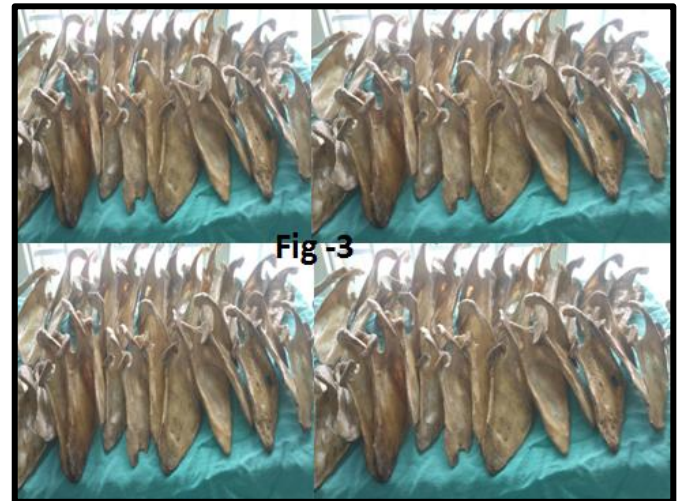
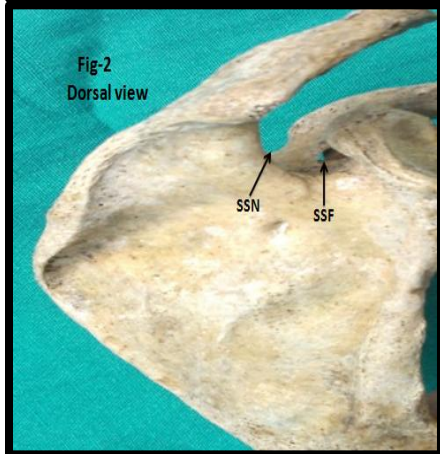
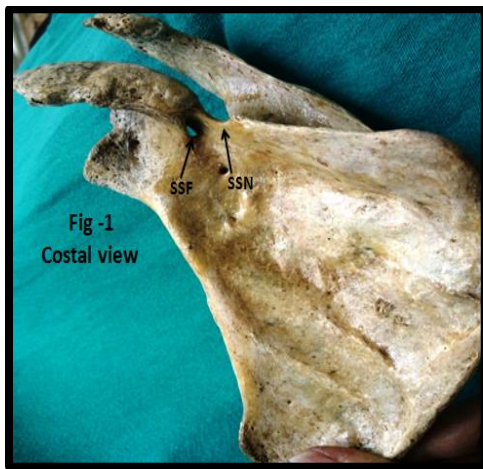
## Observations and results: (fig-1,2&3)

A search of the collection of the Department of Anatomy was carried out by visual observation on

75 dried scapulae (**fig-3**). One right scapula revealed coexisting SSN and SSF (**Fig. 1&2**) i.e. there was a bony foramen within the suprascapular notch. The bony foramen was beneath and a notch above it. This result is due to the complete ossification of the **anterior coracoscapular ligament (ACSL)** and it occurs in about 1% of the population. The age, sex and medical history of the donor were unknown. A

bony bridge within the suprascapular notch narrows the notch enough to be considered as a potential risk factor for the suprascapular nerve entrapment syndrome.

The aim of the present study is to obtain a safe zone which would be useful to avoid iatrogenic nerve lesion; and to verify the reliability of the existing data for the management and literature review on the topic.



## Discussion

Knowledge of anatomical variations is important for the safety of operative decompression of the entrapment of the suprascapular nerve. The suprascapular region is site for the injury or entrapment to the suprascapular nerve, resulting in ossification of the anterior coracoscapular ligament (ACSL), a structure that runs in the suprascapular notch, below the superior transverse scapular ligament. A suprascapular notch that normally accommodates the suprascapular nerve may be less capacious if it also houses the suprascapular artery, which would exert pressure on the nerve. On the other hand, the presence of inferior bony bridge caused by the **ossification of ACSL** decreases the total area of space for the suprascapular nerve and vessels and it may result in suprascapular nerve entrapment. Many anatomical variants of the suprascapular notch have been reported in the literature, but coexistence of the SSN and SSF has been described by only three people. (Hrdicka 1942; Natsis et al. 2007; Sinkeet et al. 2010).<sup>2,3&4</sup> **In our study**, the frequency of the coexistence of a suprascapular notch and a suprascapular foramen was observed in one right scapula among 75 scapulae. Four hypotheses on the formation of the coexistence of a suprascapular notch and foramen were done on the latest anatomical findings. (Avery et al. 2002; Bayramoğlu et al. 2003)<sup>1&5</sup>. Coexistence of the **suprascapular notch and the suprascapular foramen** a rare

anatomical variation and was found during radiological and anatomical investigations by Michał Polgu et.al<sup>6</sup>. The suprascapular foramen was situated inferior to the suprascapular notch. A bony bridge lay between them, likely created by an ossified anterior coracoscapsular ligament.(ACSL) This anatomical variation is similar to **our case**, may be due to ossified ACSL. The double suprascapular foramen is also a unique anatomical variation and the new hypothesis of its formation was described. In such cases Suprascapular nerve running through inferior suprascapular foramen and Suprascapular vessels passed through superior suprascapular foramen (artery medially and vein laterally). A new hypothesis of double suprascapular foramen formation presented based on recent anatomical findings. (Discovered in 2002 of the anterior coracoscapsular ligament)<sup>1,7</sup>. It is due ossification of both transverse scapular ligament & ACSL. Scientists hypothesize that a suprascapular notch that normally accommodates the suprascapular nerve may be less capacious if it also houses the suprascapular artery, which would exert pressure on the more fragile nerve, resulting in suprascapular nerve syndrome. The superior bony bridge may also protect vessels from injury. The presence of inferior bony bridge decreases the total area of space for the traveling suprascapular nerve and vessels and it might predispose to suprascapular nerve entrapment.<sup>8</sup> In Coexistence of the suprascapular notch and the suprascapular foramen, the suprascapular foramen is situated inferior to the suprascapular notch. A bony bridge lay between them is created by an ossified anterior coracoscapsular ligament (ACSL). This bony bridge passing through the middle part of the suprascapular notch reduces the space available for nerve passage and decreases the space by about 36.5-38.6 %<sup>9</sup>. **Conclusion** The study was performed with a limited number of scapulae, more radiological, clinical and cadaveric studies need to be done. The study provides precise data in diagnosis of the suprascapular nerve entrapment and to make a decision about safe operative procedure. Radiologists, neurosurgeons and orthopedic surgeons should bear this variation in mind, since its existence alters the surgical

technique or arthroscopic decompression of the Suprascapular Nerve.

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