

# Radiological study of the intumescencia septi nasi anterior

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## Abstract

Intumescencia septi nasi anterior (ISNA) is a common anatomical variation that is not routinely noticed by surgeons or radiologists. ISNA is a mucosal bulging located on each side of the anterior part of the septum. The aim of this study was to investigate the prevalence of ISNA in different ages and sexes.

In this study, computerized tomography (CT) scans of the paranasal sinus were obtained from 595 patients who had symptoms of chronic sinusitis. Among 595 subjects, ISNA was found in 332 (55.79 per cent) of subjects. It was found more frequently in males than females in every age group.

Although ISNA is a common anatomical variation, it is generally overlooked. This is the first report on ISNA in different age groups and sexes.

**Key words:** Nasal Septum; Anatomy

## Introduction

The nasal septum constitutes the medial wall of the nasal cavity and its anterior half is composed of cartilage. The posterior half is composed of the lamina perpendicularis of the ethmoid bone and vomer.<sup>1</sup> Sometimes bone crests, local enlargement of cartilage, cartilaginous paraseptae and chondroosseous joints can be found on the septum and these structures impair the smoothness of the surface of the septum.<sup>2–4</sup>

Intumescencia septi nasi anterior (ISNA) was first described in 1662 by Morgagni as a mucosal protuberance on the anterior part of the septum. In 1900, Schiefferdecker demonstrated the vascular network on the anterior part of the septum and defined it as turbinate.<sup>4</sup>

ISNA is a mucosal protuberance on the anterior part of the septum. It is usually bilateral.<sup>5</sup> It is covered by pseudostratified ciliated columnar epithelium. The number of mucous glands in the tunica propria of ISNA is less than the rest of the nasal mucosa. Because the structure of ISNA is similar to the structure of the turbinates, it is called the septal turbinate. Its vascular supply comes from the branches of the ethmoidal artery and facial, superior ophthalmic and ethmoid veins.<sup>4</sup>

ISNA is a mucosal structure. Delank *et al.* have found ISNAs' mean thicknesses to be 10.2 mm vertically and 6.5 mm sagittally in the studies carried out on cadavers. The thickness of the nasal septum, which is normally 4–5 mm, can reach 12–13 mm. The mean distance to the nasal base is 29 mm.<sup>1</sup>

The aim of this study was to investigate the prevalence of ISNA in the patients who have had computerized tomography (CT) of the sinuses for chronic sinusitis in different ages and sexes and to draw attention to these generally overlooked but common anatomical variations.

## Material and methods

This study was conducted in the Departments of ENT and Radiology. A total of 595 patients were recruited into the study. After medical histories of the patients were recorded and physical examinations were completed, CT scans of the paranasal sinuses in coronal section were obtained. Patients receiving antihistamines, nasal decongestants and antibiotics were not included in this study. The patients with a history of an operation or trauma concerning the nasal cavity or paranasal sinuses were excluded.

CT scans of subjects were performed using Toshiba TCT-60 AX and Picker PQS spiral CT scanners without using any contrast medium. CT scans were performed while the patients were in a prone position, with their heads hyperextended. Slice thicknesses were 5 mm in both scanners. While the slice interval was 5 mm in Picker PQS, it was 4 mm in Toshiba TCT-60 AX. Images were taken between the glabella and dorsum sellae. The scan time was one second for Picker PQS and four seconds for Toshiba TCT-60 AX. Dose parameters were 120 kV and 100 mAS, the window width was 800–1000 HU and the window level was 0–(-50) for both scanners.

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TABLE I  
INCIDENCES OF ISNA AMONG AGE GROUPS AND SEXES

Age groups	Total number	Sex		Subjects with ISNA (%)	Sex	
		Women	Men		Women with ISNA (%)	Men with ISNA (%)
8–20	94	41	53	60 (63.82)	22 (36.66)	38 (63.34)
21–40	384	159	225	227 (59.11)	91 (39.91)	136 (60.09)
41–60	104	53	51	42 (40.38)	18 (42.85)	24 (57.14)
61 and ↑	13	8	5	3 (23.07)	1 (33.33)	2 (66.67)
Total	595	261	334	332	132	200

The CT scan was performed in the coronal section to see the relationship between the lateral nasal wall and ISNA. Measurements were made using the millimetric scale on the CT images. Thicknesses below 8 mm were considered as normal. Thicknesses above 8 mm were studied in three groups as 8–9 mm, 10–15 mm, and 16–20 mm.

The prevalence of ISNA in different ages and sexes was investigated. The unilaterality or bilaterality status of ISNA was also evaluated.

## Results

Results obtained from the investigation of the prevalence of ISNA among patients with symptoms of chronic sinusitis who have undergone CT scan in coronal section are demonstrated in Table I. The state of the sinuses are not relevant to ISNA. The prevalence of ISNA in every age group is given separately for each sex.

The patients' ages ranged from eight to 74 years, and the mean age was 29.8 years. Three hundred and thirty-four (56.14 per cent) of the subjects were male and 261 (43.86 per cent) were female (Table I). While the mean age of the subjects who had ISNA was 28 years, it was 33.7 years in patients who had no ISNA.

Among 595 subjects, ISNA was found in 332 (55.79 per cent) subjects. Among 332 subjects who had ISNA, 200 (60.24 per cent) subjects were male and 132 (39.76 per cent) subjects were female.

The feature investigated in this study was the thickness of ISNA. Outcomes and their association with gender are given in Figure 1.

Another feature investigated in our study was the unilaterality or bilaterality status of ISNA. Among 332 subjects where ISNA was determined, ISNA was unilateral in 19 (5.72 per cent) subjects and bilateral in 313 (94.28 per cent) subjects. (Figures 2 and 3)

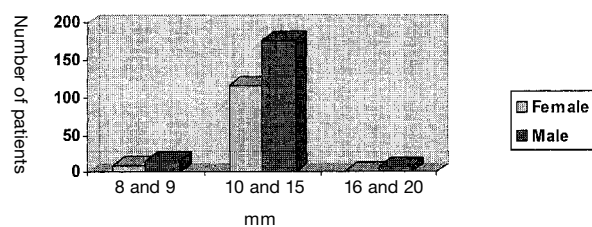


FIG. 1

Thicknesses of ISNA and their association with sexes.

ISNA was more frequently observed among males as can be seen in Table I. It was determined that ISNA was very common among juvenile and adult patients but it was rare in older patients. It was seen at the highest rate in the age group eight to 20 years.

## Discussion

Use of CT scans has become more common in diagnosis of diseases of the nasal cavity and paranasal sinuses during recent years and investigation of anatomical variations in these regions can be performed in detail. CT scans performed in the coronal section are more useful in the detection of anatomical variations of the nasal cavity and paranasal sinuses.

ISNA, which was first reported by Morgagni in 1662, has different names in literature and this leads to confusion in nomenclature. Intumescencia means 'self expandable' in Latin. 'Septal turbinate' is also used as a synonym of ISNA but this is wrong because ISNA's structure and function is not similar to lateral turbinates. Rhinophysiologically, its expansion function is less than the lateral turbinates.<sup>6</sup> ISNA is primarily a glandular structure and not a venous structure. Saunders showed that no cavernous tissue was identified in the nasal septum.<sup>7</sup>

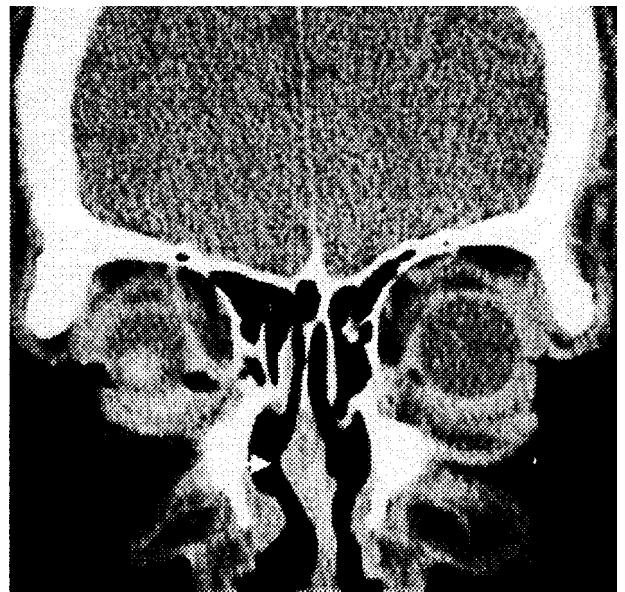


FIG. 2

Unilateral intumescencia septi nasi anterior (arrow).

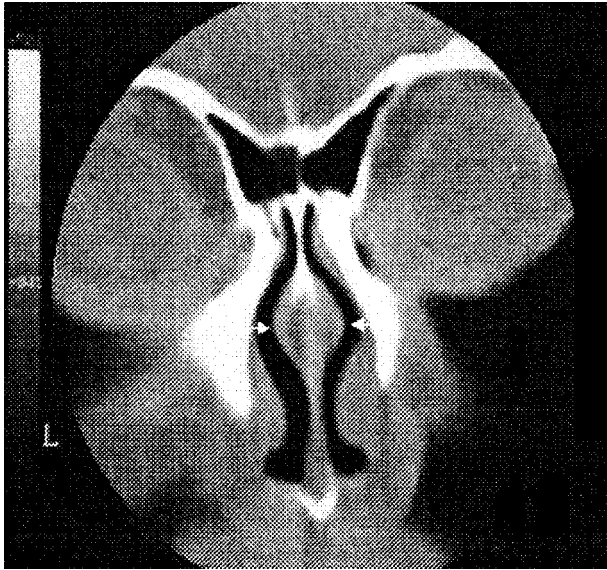


FIG. 3

Bilateral intumescencia septi nasi anterior (arrows).

Maran investigated the relationship between the lateral nasal wall, middle turbinate and ISNA in a cadaver study and demonstrated that ISNA constricted the inlet of the nose approximately 2–3 mm and caused a disruption in respiration.<sup>8</sup> Delank reported an improvement of 43 per cent in respiratory values when ISNA was shrunk by application of xylomatazolin. When it was shrunk with saline, there was an improvement of 14 per cent in respiratory values. Delank has reported that various filling conditions of the intumescencia have no significant influence on rhinomanometrical parameters. When he visualized the endonasal flow within a nasal model containing a septal protuberance, he realized that the intumescencia considerably altered the quality and local velocities of the endonasal airstream.<sup>1</sup> It is not certain if the anterior septal intumescence contributes significantly to nasal obstruction. Saunders also showed that correlation between subjective airway patency and anatomical parameters including magnetic resonance imaging (MRI) of the ISNA studied was generally very weak.<sup>9</sup>

There is no adequate reporting of the prevalence of ISNA in literature. Perovic reported an incidence of 54 per cent and Delank reported an incidence of 66.4 per cent.<sup>1</sup> We found a prevalence of 55.79 per cent. Delank also reported differences associated with age groups. These results are generally similar to our results, but they have not given male:female ratios. Also the relation between thickness of ISNA and sexes was not determined.

ISNA can be found in every age group and in both sexes. In our study we found that ISNA is more frequent in males than females in every age group. Prevalence of ISNA appears to decrease as individuals get older. This ratio was also low in Delank's

study. This can be explained by the general mucosal atrophy which occurs among elderly people. The nasal passage is broader in the elderly.

- **This study looks at mucosal bulging of the anterior septum (Intumescencia septi nasi anterior)**
- **The study concludes that this is a common finding and is more prevalent in males**

ISNA may be confused with septal deviations and tumoral tissues. It can also change the direction of the airstream which leads to alterations of the smelling and respiratory functions. Further studies have to be performed to clarify the effects of these anatomical variations on nasal functions.

In conclusion, this is the first report of the prevalence of check ISNA in a wide series. ISNA is a common anatomical variation found frequently among males.

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