

# SPHENOID SINUS ANATOMICAL VARIANTS AND IT'S RELATIONS: COMPUTED TOMOGRAPHY STUDY

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## Introduction

Sphenoid sinus is housed within the body of the sphenoid bone . enclosed by a thin layer of bone which separates it from the nearby crucial structures like the internal carotid artery, cavernous sinus, optic nerve, optic chiasm and the pituitary gland. Occasionally, it extends into the lesser wings, the greater wings and pterygoid plates of the sphenoid bone, as well as to the clivus posteriorly. The sphenoid sinus is normally made up of two asymmetrical cavities partitioned by one or more septae that are often asymmetric. It is highly variable in shape, size, and relationship to the Sella and adjacent neurovascular structures. In Lang's classification there are four patterns of pneumatization; conchal, presellar, sellar and postsellar. Sphenoid sinus pneumatization can vary from being nonexistent to being substantial, which causes the bone that protects important structures including the internal carotid arteries, the optic nerves, maxillary nerves and the Vidian nerve to be thin or entirely missing. Protrusion of the optic nerve in majority of studies was defined as a bulging of the optic canal into the sphenoid sinus cavity so as to cause the exposure of more than half the circumference of the nerve, with or without defects in the bony margins .

Delano et al. categorized the various relationships between the optic nerve and posterior PNS into four groups, as follows: type 1 optic nerve, type 2 optic nerve, type 3 optic nerve and type 4 optic nerve. Onodi cell is the posterior-most ethmoid cell that extends into the sphenoid bone, and it pneumatizes superiorly and laterally into the sphenoid sinus.

## Aim of the work

The aim of the study was to evaluate the normal variations of the sphenoid sinus and its neurovascular relations by CT scan and to compare the outcomes for the males and females.

## Subjects and Methods

The current study was conducted on 200 patients, consisting of 100 males and 100 females, all above 20 years. The patients were recruited from Alexandria university main hospital having undergone PNS CT scan.

## Results

In males, there were 2 patients (2%) with conchal type of pneumatization, 13 patients (13%) with pre-sellar type, 70 patients (70%) with sellar type and 15 patients (15%) with post-sellar type. In females, there were 2 patients (2%) with conchal type, 9 patients (9%) with pre-sellar type, 76 patients (76%) with sellar type and 13 patients (13%) with post-sellar type. Regarding septal attachment to carotid CC, in males, 18 patients (18%) had septal attachment to the. In females, 18 patients (18%) had septal attachment to the CC. In the male population, 43 patients (43%) showed one or more types of hyperpneumatization while in females, 46 patients (46%) showed one or more types of hyperpneumatization. In the male population, 31 patients (31%) had Onodi cells while in females, 27 patients (27%) had Onodi cells. The optic nerve was classified according to Delano's classification. In males, on the right, 62 patients (62%) had type 1 ON, 10 patients (10%) had type 2 ON, 16 patients (16%) had type 3 optic ON and 10 patients (10%) had type 4 ON. On the left, 60 patients (60%) had type 1 ON, 9 patients (9%) had type 2 ON, 21 patients (21%) had type 3 ON and 8 patients (8%) had type 4 ON. In females, on the right, 65 patients (65%) had type 1 ON, 10 patients (10%) had type 2 ON, 16 patients (16%) had type 3 ON and 7 patients (7%) had type 4 ON. On the left, 67 patients (67%) had type 1 ON, 11 patients (11%) had type 2 ON, 15 patients (15%) had type 3 ON and 5 patients (5%) had type 4 ON. Regarding optic nerve dehiscence, in males, 11 patients (11%) had dehiscence. In females 8 patients (8%) had dehiscence. In males, 25 patients (25%) had carotid bulge. In females, 18 patients (18%) had carotid bulge. As regards to CC dehiscence, in males 1 patient (1%) had right sided carotid dehiscence. In females, 2 (2%) had bilateral carotid dehiscence. In males, 19 patients (19%) had foramen rotundum bulge. In females, 15 (15%) had foramen rotundum bulge. As regards foramen rotundum dehiscence, in males, 12 patients (12%) had foramen rotundum dehiscence. In females, 7 patients (7%) had dehiscence. In males, 38 patients (38%) had Vidian canal bulge. In females, 40 patients (40%) had Vidian canal bulge. As regards Vidian canal dehiscence, in males, 18 patients (18%) had Vidian canal dehiscence. In females 17 (17%) had dehiscence. The comparison between females and males in all the parameters were not statistically significant apart from foramen rotundum bulge which was statistically significant.

Table (1): Comparison between males and females according to type of pneumatization

Type of pneumatization	Males (n=100)		Females (n=100)		c2	MCp
	No.	%	No.	%		
Pre-sellar	13	13.0	9	9.0	1.247	0.783
Post-sellar	15	15.0	13	13.0		
Sellar	70	70.0	76	76.0		
Conchal	2	2.0	2	2.0		

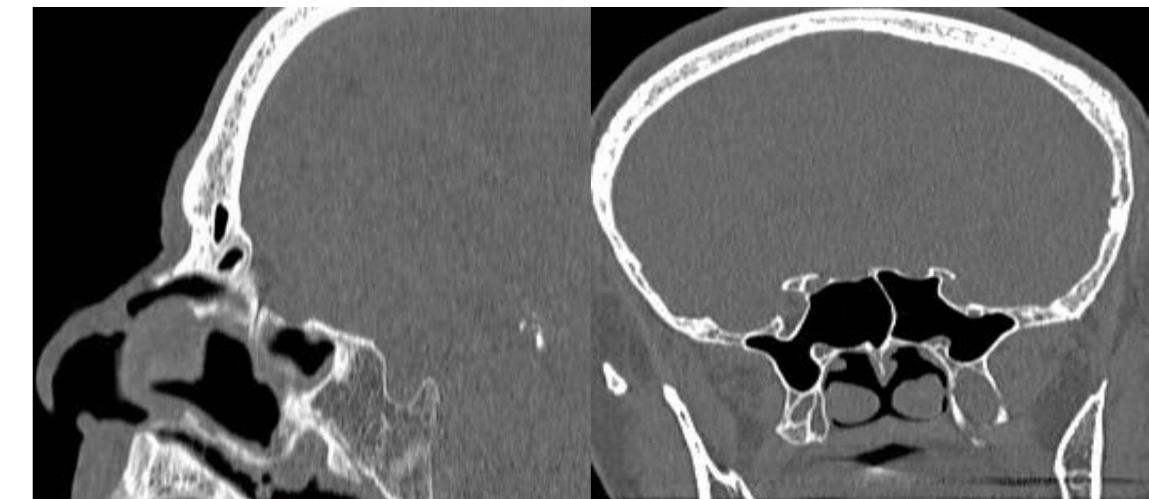


Fig (1): Sagittal bone window PNS CT scan of a 54-year old male patient showing conchal type of sphenoid sinus pneumatization.

Fig (2): Coronal bone window PNS CT scan of a 24-year-old female patient showing bilateral pneumatization of the pterygoid plates and greater wings.

## Conclusion

From the current study we can conclude the following; Sellar pneumatization is the most common pattern of pneumatization in both females and males. That majority of the study population had bilateral type 1 optic nerves. There is statistically significant difference in foramina rotunda bulge between males and females.