



## Morphological study of Hiatus Semilunaris of Nasal Cavity

### Anatomy

<b>*Dr.S.B.Mane</b>	Professor, Department of Anatomy, Krishna Institute of Medical Sciences University, Karad. *Correspondence Author
<b>Mrs. P. P. Patil</b>	PG student, Department of Anatomy, Krishna Institute of Medical Sciences University, Karad.
<b>Dr. M. M. Thorat</b>	Assistant Professor, Department of Anatomy, Krishna Institute of Medical Sciences University, Karad.
<b>Dr. S. S. Mohite</b>	Associate Professor, Department of Anatomy, Krishna Institute of Medical Sciences University, Karad.
<b>Dr. Mrs. S. A. Shedge</b>	Assistant Professor, Department of Anatomy, Krishna Institute of Medical Sciences University, Karad.

### ABSTRACT

#### Introduction:

Hiatus semilunaris is a cleft in the middle meatus of nose. Maxillary, Anterior Ethmoidal and Frontal air sinuses open in this cleft. It is essential for otorhinolaryngologists to know the exact position of the Hiatus semilunaris and the exact sites of openings of the paranasal air sinuses during various endoscopic procedures and surgeries.

#### Materials & Methods :

In the present study the Length and Height of the Hiatus semilunaris were measured in cadavers by using sliding vernier caliper. Total 50 specimens were studied; in that 27 were of right and 23 of left side. Anterior and posterior distance of Hiatus semilunaris from anterior and posterior nasal openings was also measured and statistically analysed.

#### Results :

Average Length of Hiatus semilunaris on Right side is 1.72cms & on the Left side is 1.78cms. Average Breadth of Hiatus semilunaris on Right side is 0.34cms & on the Left side is 0.34cms.

#### Discussion :

Parameters are useful for Anatomists as well as for Otorhinologists to know the exact position of the Hiatus semilunaris during various surgeries.

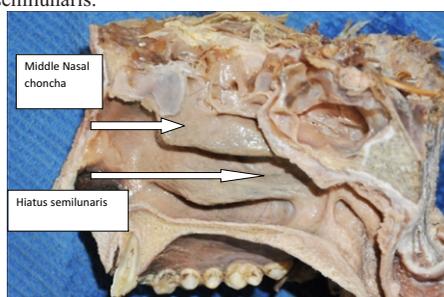
### KEYWORDS

Hiatus semilunaris, Nasal cavity, Middle nasal meatus, Lateral wall of Nasal cavity, Middle nasal choncha.

#### Introduction:

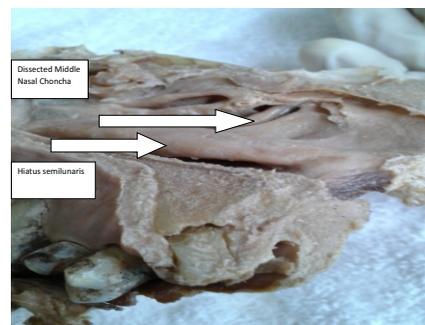
Hiatus semilunaris is the semilunar cleft present in the middle meatus of Nasal cavity<sup>1</sup> (Photograph-1). Maxillary air sinus, Frontal air sinus, Anterior Ethmoidal air sinus opens into the Hiatus Semilunaris (Photograph-3). Osteomeatal complex is the term used for a group of anatomical structures that contribute to the final common drainage pathway of Maxillary, Anterior Ethmoidal and Frontal sinuses<sup>8</sup>. The Haller cell is an asymptomatic maxilloethmoidal cell, extramural one that extends into the orbital wall inferior and medial and in some situations may narrow the osteomeatal complex predisposing to the onset of sinusitis through obstruction of the maxillary sinus drainage<sup>9, 10, 11, 12</sup>. Anatomical variation of the lateral nasal wall, including the pathway from the frontal, ethmoidal, and maxillary sinuses may affect the communication between the paranasal sinuses and the nasal cavity. The middle meatus and hiatus semilunaris are areas where variations can occur which predispose patients to recurring sinusitis.<sup>2</sup>

That's why there was a need to study in detail the morphology of the Hiatus semilunaris. Which we have considered here. Lateral wall of the Nasal cavity shows generally three chonchas & three meatuses. Below the Middle Nasal choncha, there is Middle meatus. In middle meatus, there is presence of the semilunar cleft, which is termed as Hiatus semilunaris.



#### Photograph-1: Lateral wall of Nasal Cavity showing Hiatus semilunaris (Middle nasal choncha is intact).

After dissection of Middle nasal choncha, the Hiatus semilunaris is totally visible (Photograph-2).



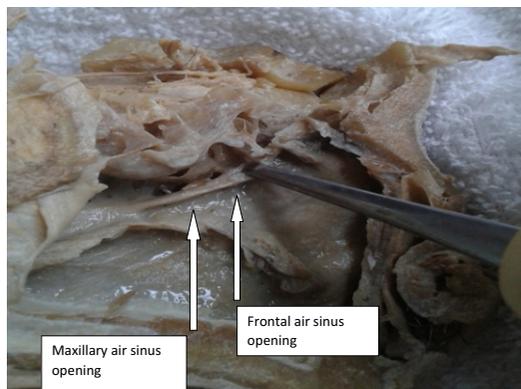
#### Photograph-2: showing Hiatus semilunaris (Middle nasal choncha is dissected).

This study was aimed at the features of Hiatus semilunaris: viz- Length of Hiatus semilunaris, Breadth of Hiatus semilunaris, Anterior and posterior distance of Hiatus semilunaris from anterior and posterior nasal openings.

The anatomical variations of the lateral wall of the nasal cavity may create technical difficulties during endoscopic sinus surgeries. Endoscopic surgeries involving the middle meatus are commonly performed as majority of the paranasal air sinuses open into the Hiatus semilunaris<sup>3</sup>. Considering the clinical importance of the middle meatus, this study was undertaken.

#### Materials & Methods:

Study was conducted in the Department of Anatomy, Krishna Institute of Medical Sciences University, Karad, Maharashtra. Total 50 specimens were studied; in that 27 were of right and 23 of left side. Formalin preserved cadaveric specimens were taken. Then they were washed. Then by using Dissection instruments, Lateral wall of the Nasal cavity was nicely exposed. Middle Nasal Concha is dissected so as to visualize Hiatus Semilunaris clearly (Photograph-2). Length and Height(Breadth) of the hiatus semilunaris were measured in cadavers by using sliding vernier caliper. Anterior and posterior distance of hiatus semilunaris from anterior and posterior nasal openings was also measured.



**Photograph-3: Opening of Maxillary & Frontal air sinus in Hiatus Semilunaris.**

**Statistical analysis:**

Quantitative data was summarized into maximum, minimum, mean and Standard Deviation; while Qualitative data was summarized into number & percentages. Comparison of quantitative data was done by applying unpaired 't' test while chi-square test was used for qualitative data comparison. Correlation coefficient was determined by using Pearson's correlation method. Difference and Correlation was said to be significant if p was less than 0.05

**Observations & Results:**

Distance of Anterior margin of Hiatus semilunaris from Anterior nasal opening was significantly differing in right and left side (t= 2.178 ,p= 0.036 ) (Table-1).

**Table-1: Side wise descriptive statistics of Distance of Anterior margin of Hiatus semilunaris from Anterior nasal opening (in cms).**

	Right side	Left side
Maximum	4.69	4.07
Minimum	2.68	1.47
Mean	3.44	3.11
Standard Deviation	0.42	0.61

Distance of Posterior margin of Hiatus semilunaris from Posterior nasal opening was not significantly differing in right and left side (t= 1.015 ,p= 0.316 ) (Table-1).

**Table-2: Side wise descriptive statistics of Distance of Posterior margin of Hiatus semilunaris from Posterior nasal opening (in cms).**

	Right side	Left side
Maximum	3.55	3.48
Minimum	1.77	1.66
Mean	2.51	2.38
Standard Deviation	0.43	0.50

**Table- 3: Parameters of Hiatus Semilunaris**

Side	HSL	HSW	HSDA	HSDP	
Right Side	N	27	27	27	
	Minimum	0.58	0.13	2.68	1.77
	Maximum	2.79	0.46	4.69	3.55
	Mean	1.72	0.34	3.44	2.51
	Std. Deviation	0.43	0.09	0.42	0.43
Left Side	N	23	23	23	

	Minimum	1.31	0.15	1.47	1.66
	Maximum	2.46	0.98	4.07	3.48
	Mean	1.78	0.34	3.11	2.38
	Std. Deviation	0.30	0.17	0.61	0.50
Unpaired 't' test	t value	0.505	0.127	<b>2.178</b>	1.015
	p value	0.616	0.900	<b>0.036</b>	0.316

HSL: Hiatus Semilunaris Length

HSB: Hiatus Semilunaris Breadth

HSDA: Distance of Anterior margin of Hiatus semilunaris from Anterior nasal opening

HSDP: Distance of Posterior margin of Hiatus semilunaris from Posterior nasal opening

**Discussion:**

Our study shows that the Shape of Hiatus Semilunaris is elongated cleft, which is in all cases Semilunar. According to Gray's Anatomy<sup>1</sup>, Hiatus Semilunaris is Semilunar cleft. So our study correlates with that. According to David L. Daniels et al<sup>4</sup>, Hiatus Semilunaris is the narrow, slitlike passage. According to Roberto Maroldi et al<sup>6</sup>, Hiatus Semilunaris is a subtle fissure. According to Schaeffer JP<sup>7</sup>, Hiatus Semilunaris is slit like space. According to Dr. T. Balasubramanian<sup>14</sup> Hiatus Semilunaris lies between the anterior wall of the Bulla and the free posterior margin of the uncinat process and Hiatus Semilunaris is infact a two dimensional space. According to Vijay Bajaj et al<sup>15</sup>, They got enlarged bulla ethmoidalis in 21.25% cases , because of that they got a narrow Hiatus Semilunaris.

Dahistrom K<sup>5</sup> categorized the Hiatus Semilunaris into five types according to the varying morphologies. In our study we got regular pattern of the Hiatus Semilunaris. Andreea et al<sup>13</sup> characterized Hiatus Semilunaris as Hiatus Semilunaris Superior & Hiatus Semilunaris Inferior. We considered Hiatus semilunaris inferior is the main One. And simply called it as Hiatus Semilunaris.

Average Length of Hiatus Semilunaris is 1.72cms on the Right side & 1.78cms on the Left side. According to Kelly Dahistrom et al<sup>5</sup>, The length of the Hiatus Semilunaris was found to be shorter on left side. But in our study, we got length of Hiatus Semilunaris is more on Left side.

**Conclusion:**

- Shape of the Hiatus Semilunaris is Semilunar.
- Average width of Hiatus Semilunaris on Right side is 0.34cms and on the Left side is also 0.34cms.
- Average Length of Hiatus Semilunaris on Right side is 1.72cms and on the Left side is 1.74cms.
- Distance of Anterior margin of Hiatus semilunaris from Anterior nasal opening on the Right side is 3.44cms and on the Left side is 3.11cms.
- Distance of Posterior margin of Hiatus semilunaris from Posterior nasal opening on the Right side is 2.51cms and on the Left side is 2.38cms.
- Distance of Anterior margin of Hiatus semilunaris from Anterior nasal opening was significantly differing in right and left side (t= 2.178 ,p= 0.036 )
- This study will basically help to Anatomists, to know what is the exact morphology of Hiatus Semilunaris. And secondarily it may be helpful to Otorhinologists to conduct sinus surgeries as the major sinuses like maxillary, frontal opens into the Hiatus Semilunaris. There is considerable anatomical variation in this area that may interfere with normal nasal function and predispose to recurrent sinusitis, chronic sinusitis.

**Conflicts of interest:**

The authors have none to declare.

**Acknowledgements:**

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