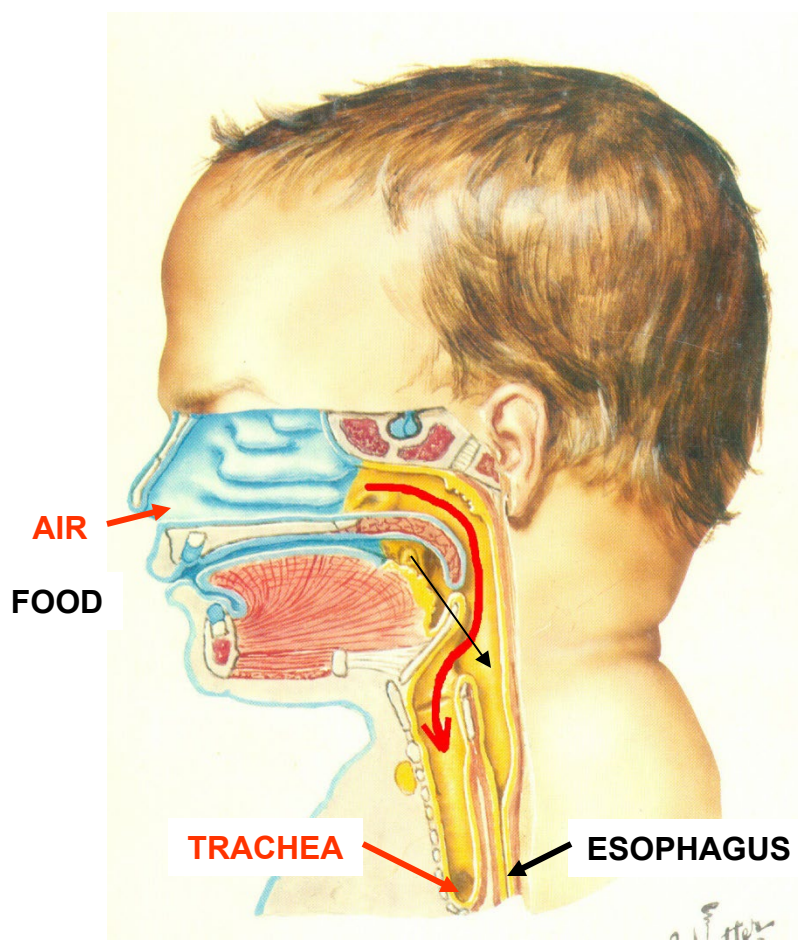


# NASAL CAVITY



## OUTLINE:

- I. NASAL CAVITY
- II. PARANASAL AIR SINUSES
- III. PALATE
- IV. PALATINE TONSILS

**Problem:** Nasal Cavity and Oral Cavity open to Pharynx; Path of air crosses path of food intake; Permits breathing when chewing

**Solution:** Soft Palate functions as flap valve

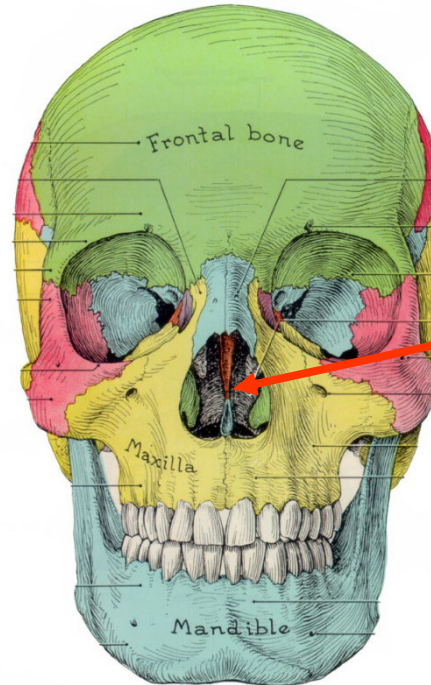
**Clinical:** Burrito story; Other - sinus infections, tonsillitis

# NASAL CAVITY

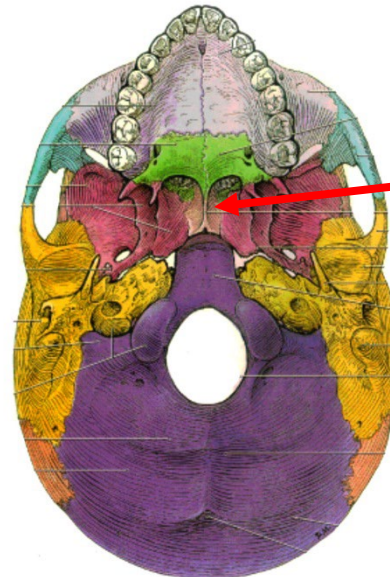
Upper most part of respiratory system

Functions:

- 1) **Modifies air** – warms, humidifies and filters
- 2) **Sense smell** – hunt animals, enjoy flowers, avoid noxious odors, allure of perfume

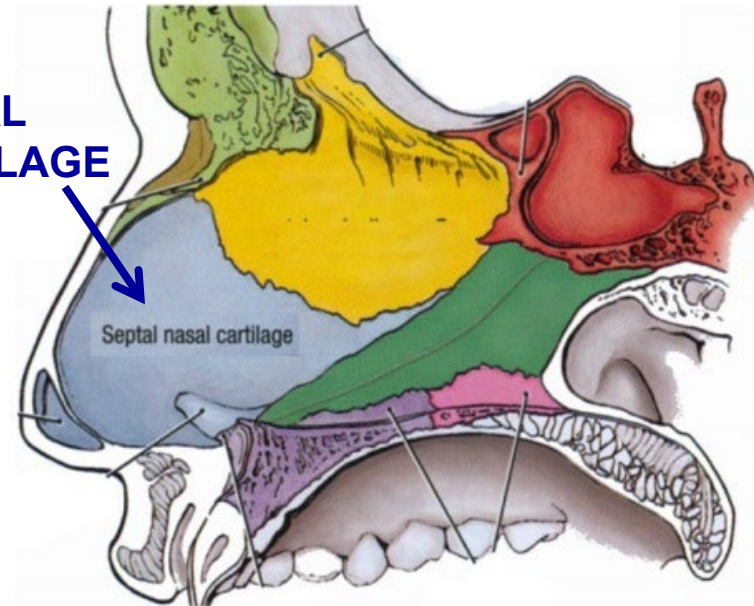
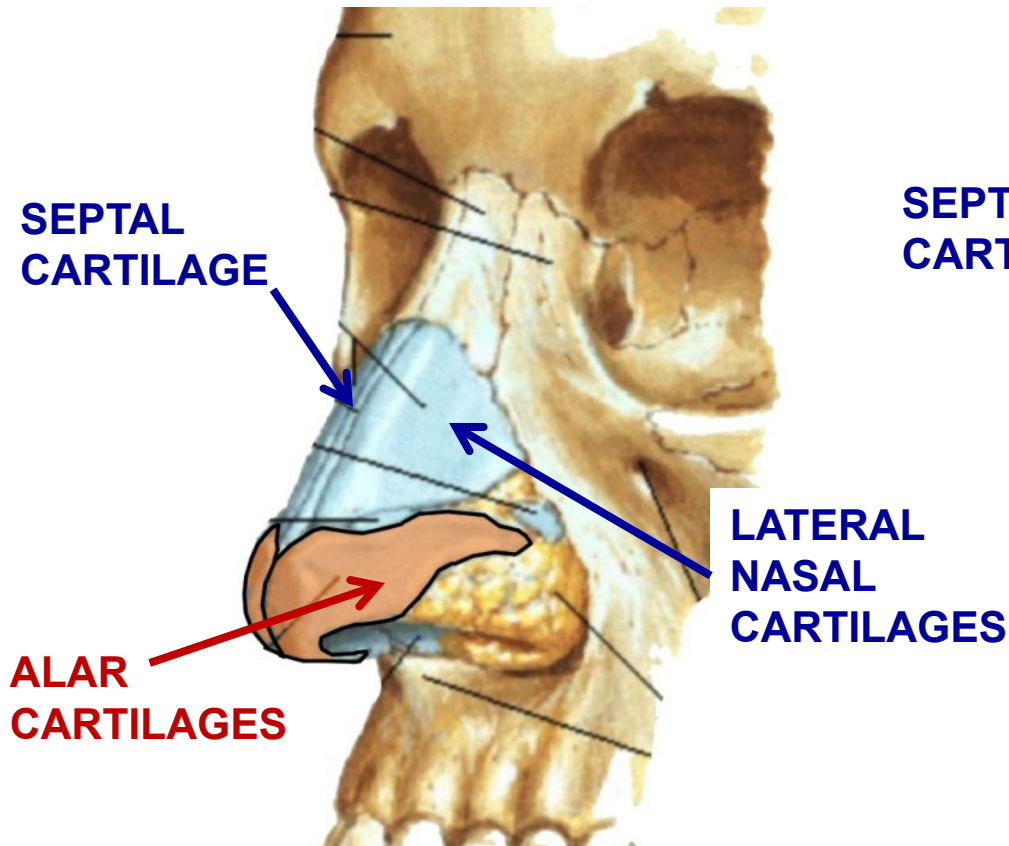


Ant.  
Opening =  
Anterior  
Nares



Post opening =  
Posterior Nares  
=  
Choanae  
(ko'-an-ay)  
(greek for  
funnels)

# A. NASAL CARTILAGES



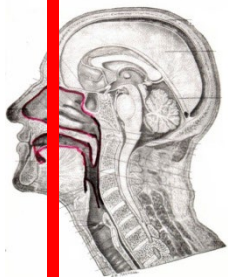
MIDLINE = VIEW OF NASAL SEPTUM

**Nasal Cartilages -**

- 1) Septal cartilage with fused Lateral Nasal Cartilages
- 2) Alar cartilages - surround medial side of nostrils

**Function of Cartilages - flexible, opening inferiorly directs inhalation toward mouth (smell what you eat)**



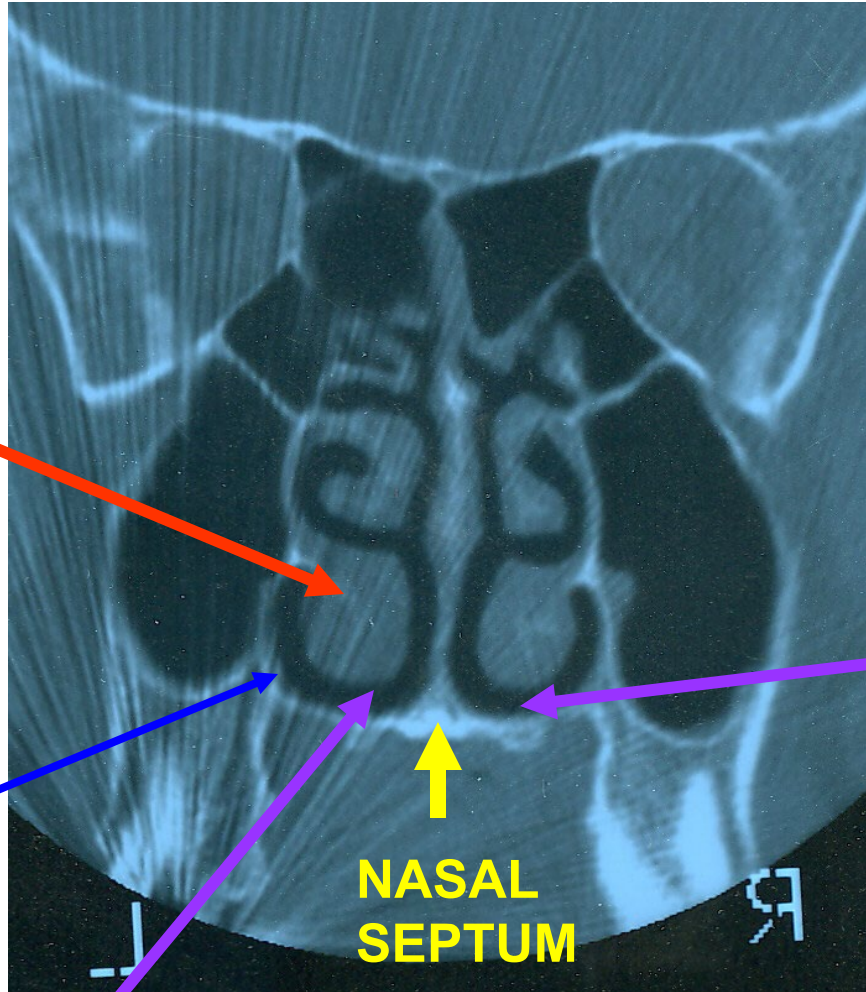


ORIENT  
PLANE

# CORONAL CT of INTERIOR OF NASAL CAVITY

Projections that increase surface area called **Nasal Conchae** (con'-key)=  
**Turbinates**

Cavity is lined with mucoperiosteum



AIR

NASAL  
SEPTUM

SPACE BELOW CONCHA IS CALLED MEATUS (L. passage)

# B. BOUNDARIES OF NASAL CAVITY

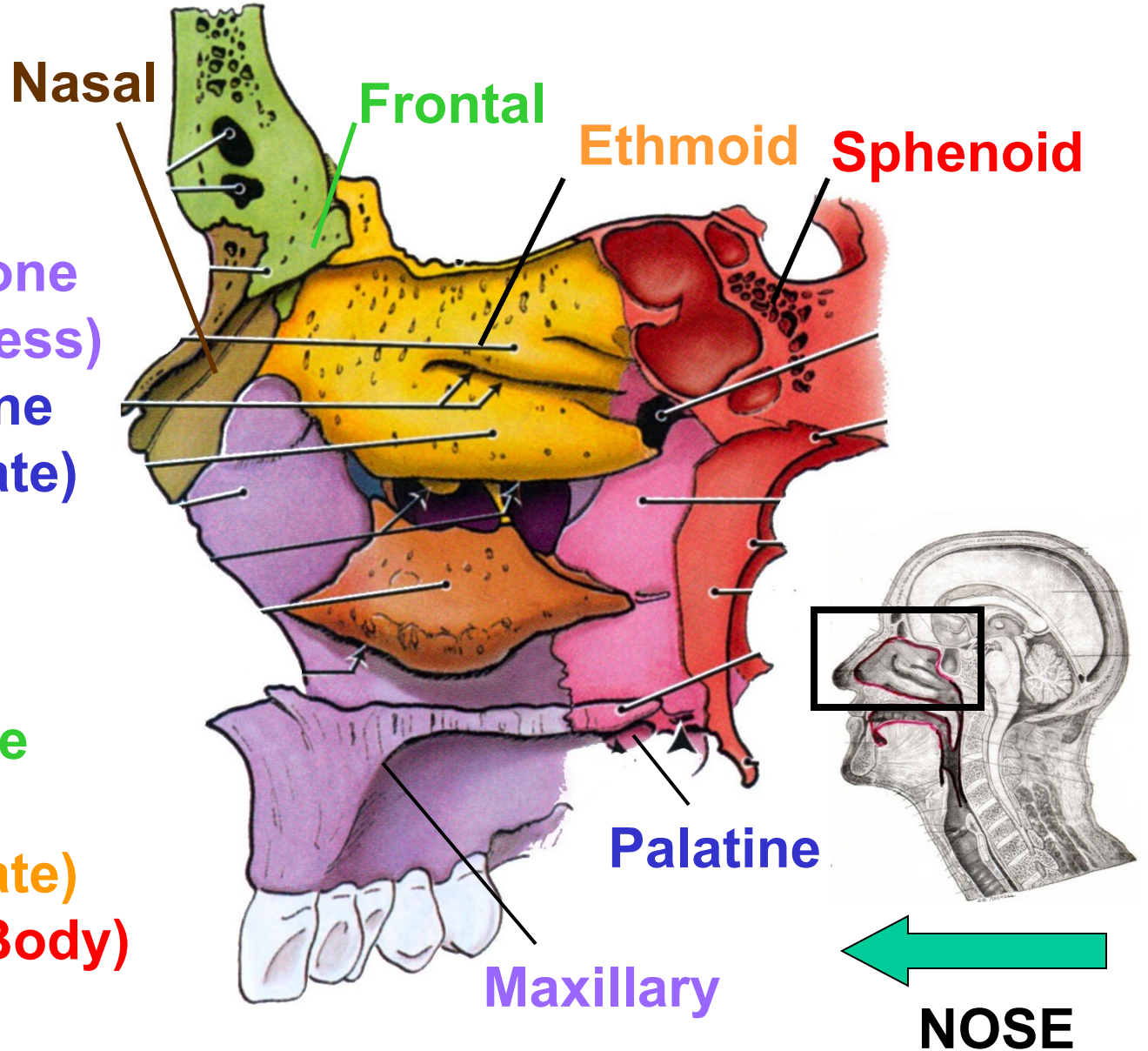
## Boundaries

Floor = Palate

- 1) Maxillary Bone (Palatine Process)
- 2) Palatine Bone (Horizontal Plate)

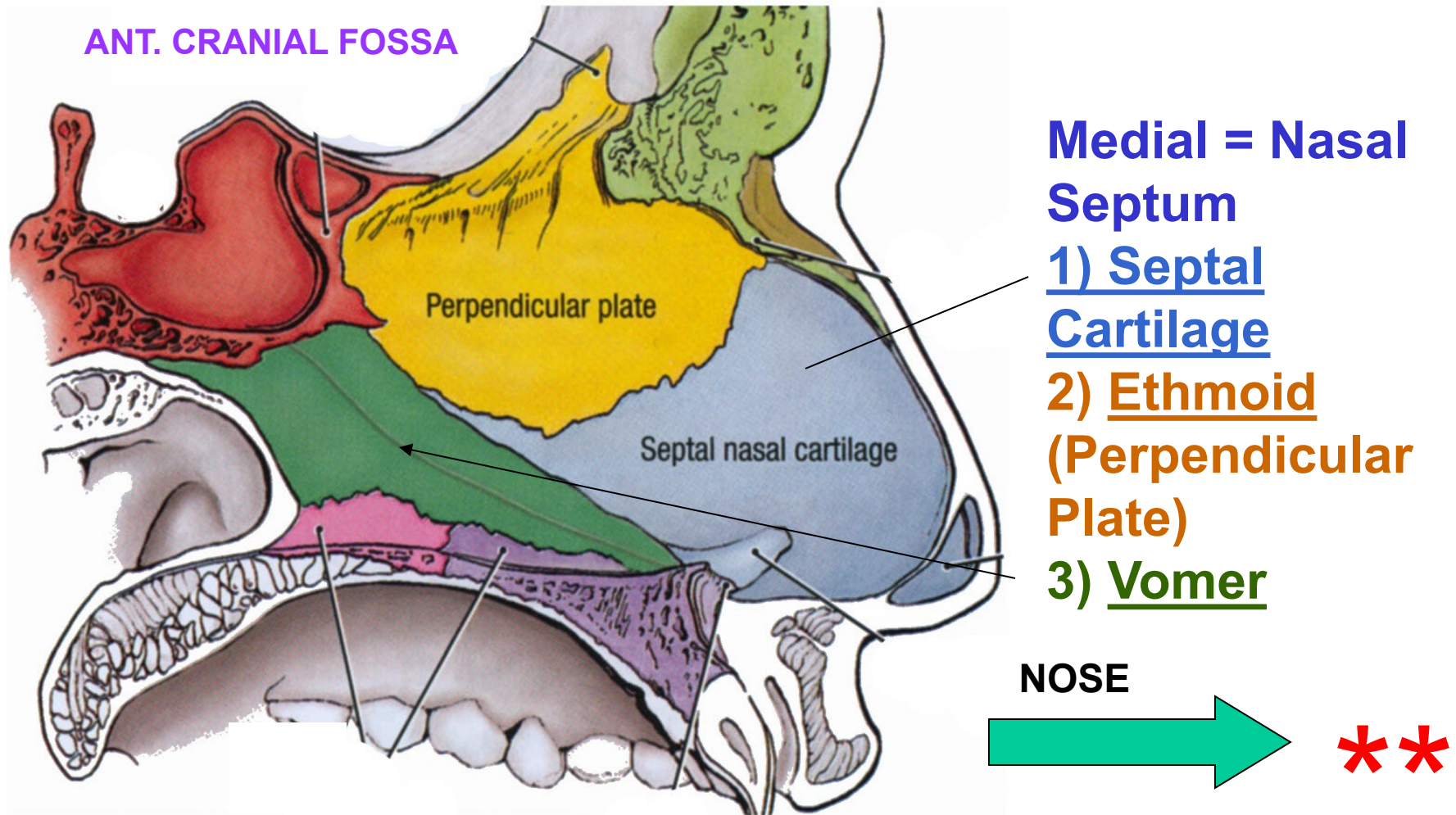
## Roof

- 1) Nasal Bone
- 2) Frontal Bone
- 3) Ethmoid (Cribriform Plate)
- 4) Sphenoid (Body)





## B. BOUNDARIES OF NASAL CAVITY

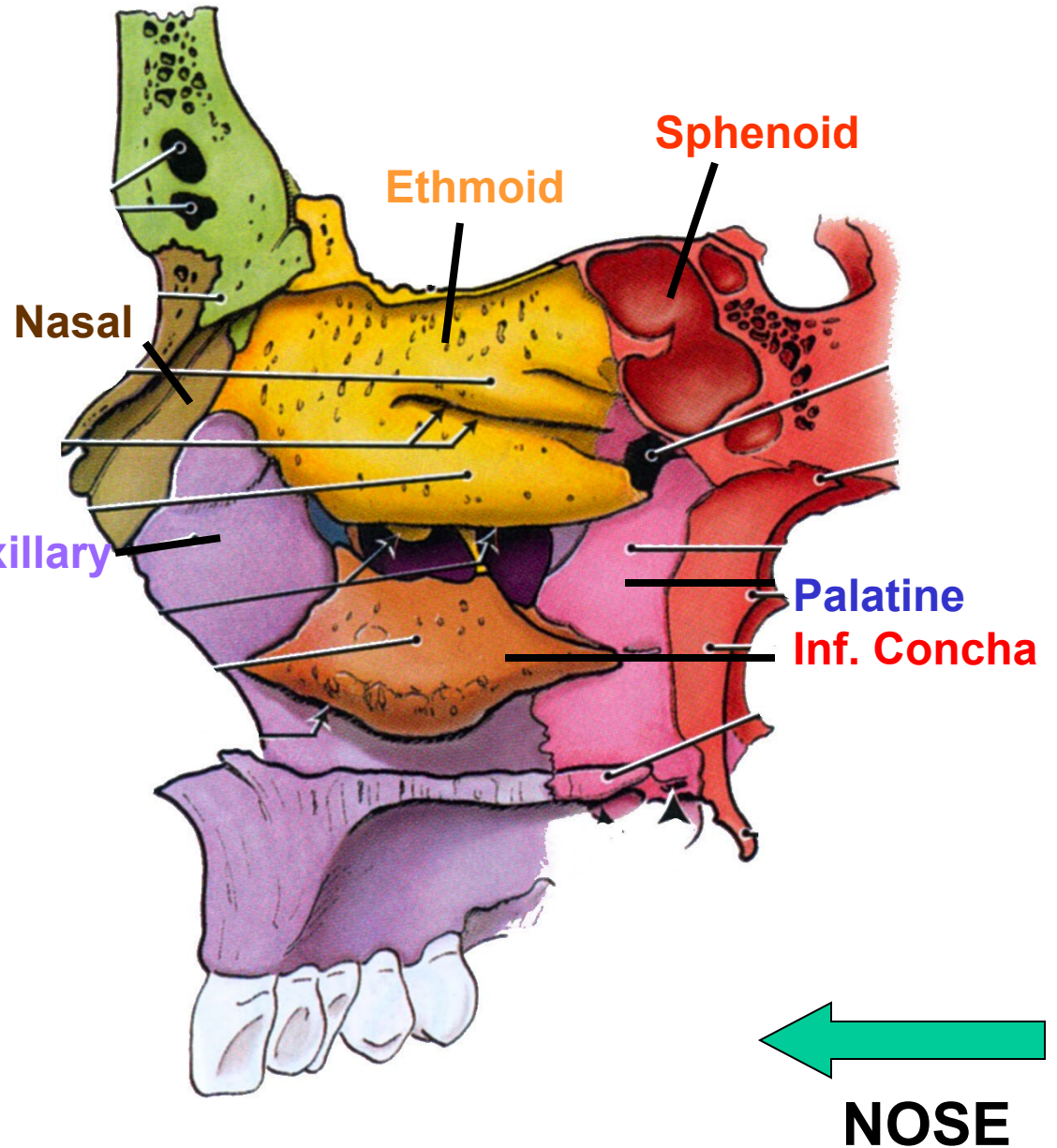


**CLINICAL** – Fracture of nose can break Cribriform plate, floor of Ant. Cranial fossa - **leak CSF from nose**; can result in Meningitis

# C. LATERAL WALL OF NASAL CAVITY

## Lateral Wall

- 1) Nasal Bone
- 2) Maxillary
- 3) Inferior Concha
- 4) Palatine
- 5) Ethmoid
- 6) Sphenoid





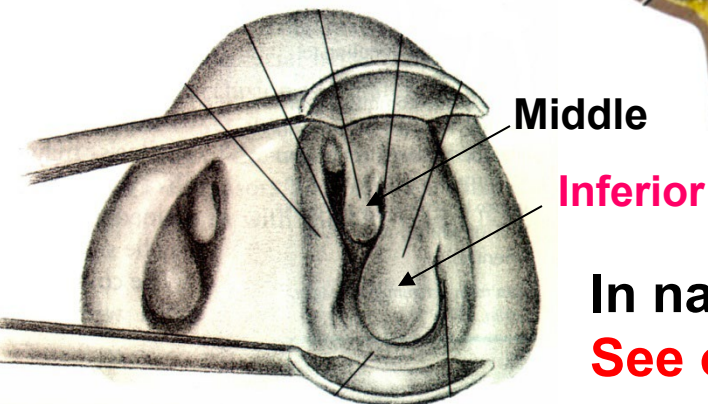
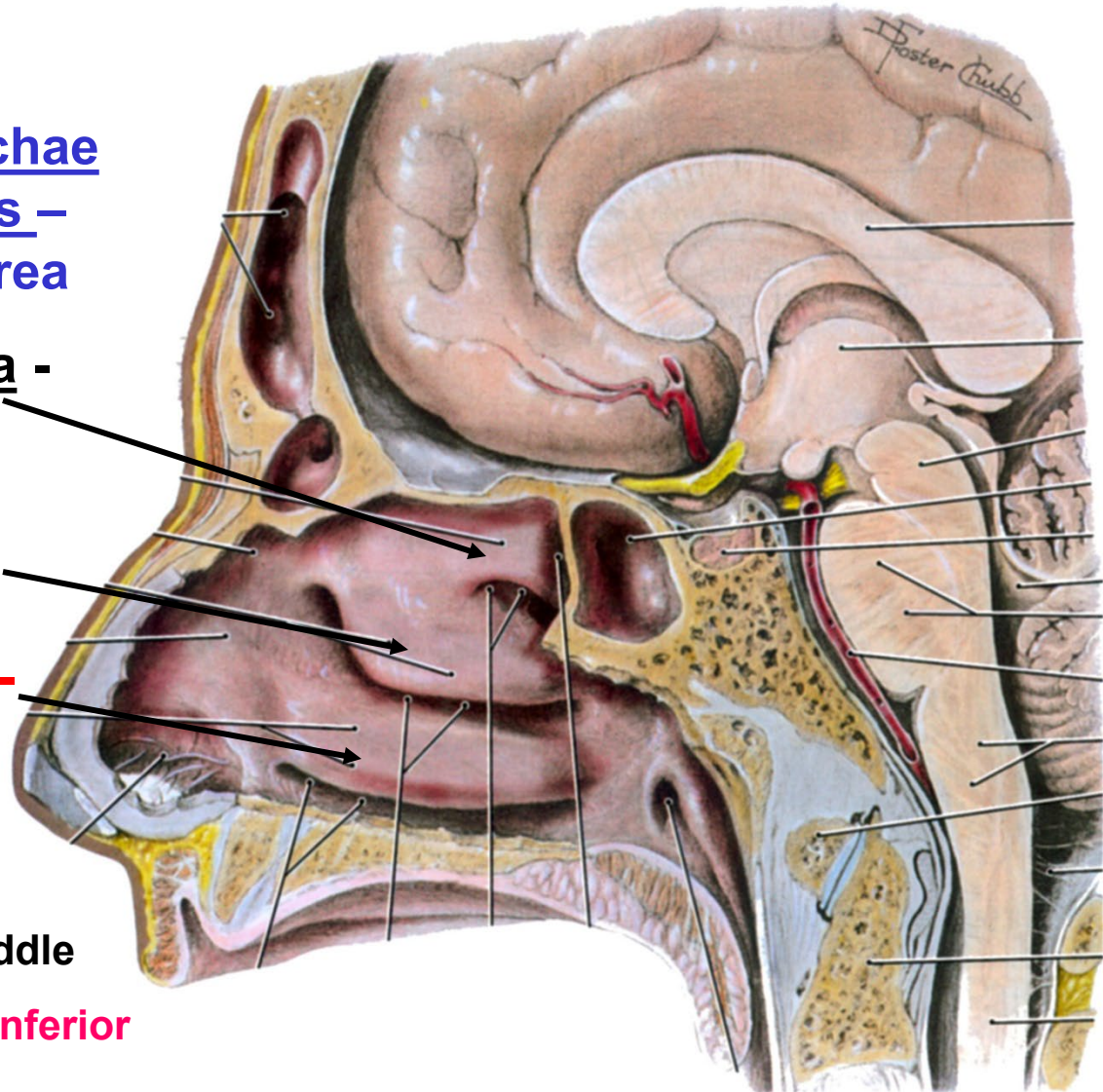
# C. LATERAL WALL OF NASAL CAVITY

Projections = Conchae (shell) or turbinates – increase surface area

1) Superior Concha - Ethmoid

2) Middle Concha - Ethmoid

3) Inferior Concha - separate bone

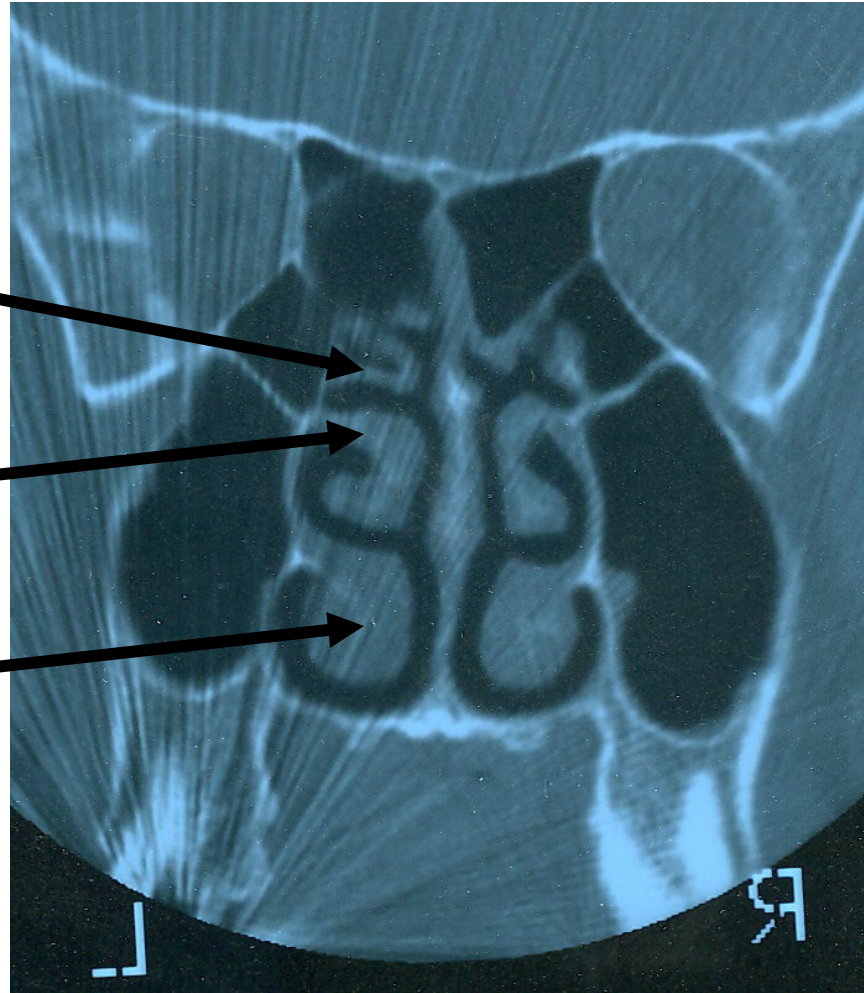


In nasal speculum view,  
**See only Middle and Inferior Conchae (Turbinates)**



# CORONAL CT of NASAL CAVITY

- 1) Superior Concha - Ethmoid
- 2) Middle Concha - Ethmoid
- 3) Inferior Concha - separate bone



# NASAL CAVITY: SPACES

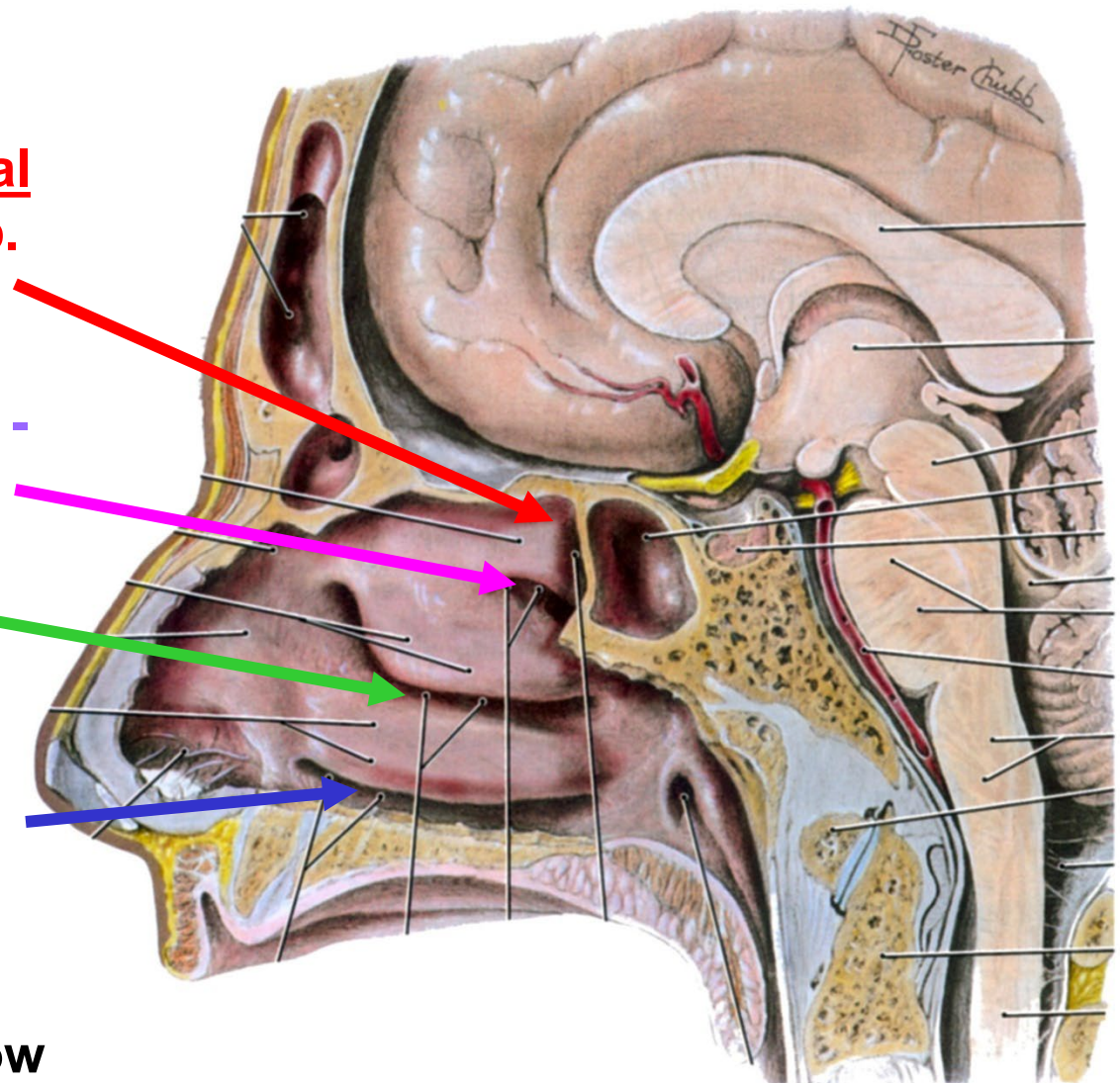
a. Spheno-Ethmoidal Recess - above Sup. Concha

b. Superior Meatus - Below Sup. Concha

c. Middle Meatus - Below Mid. Concha

d. Inferior Meatus - Below Inf. Concha

**Meatus = Passage (Latin), located below concha**



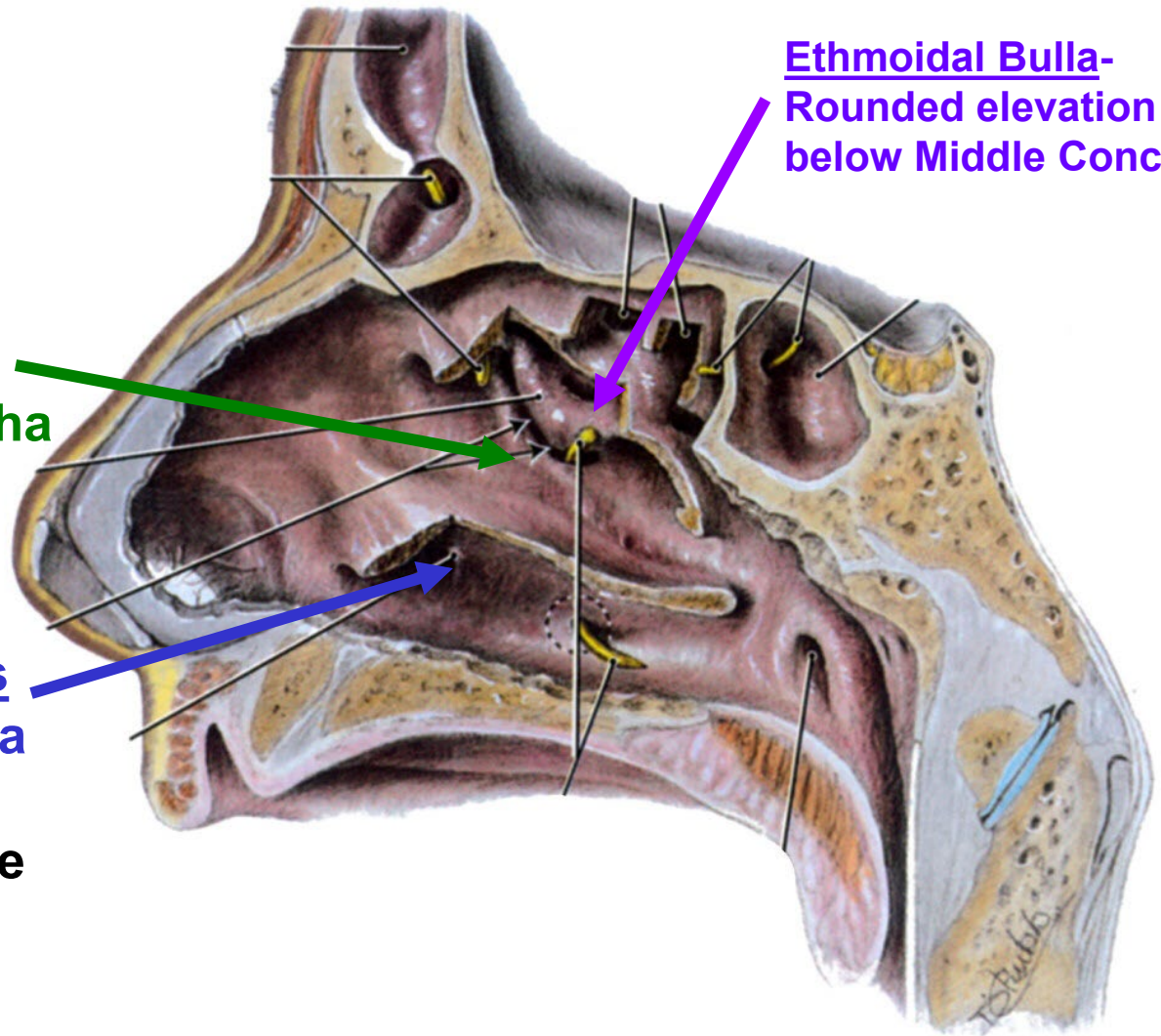
# NASAL CAVITY: REMOVE (REFLECT) CONCHAE IN DISSECTION

Ethmoidal Bulla-  
Rounded elevation  
below Middle Concha

3) Middle Meatus  
Below Mid. Concha

4) Inferior Meatus  
Below Inf. Concha

**Meatus = Passage**  
(Lat.)



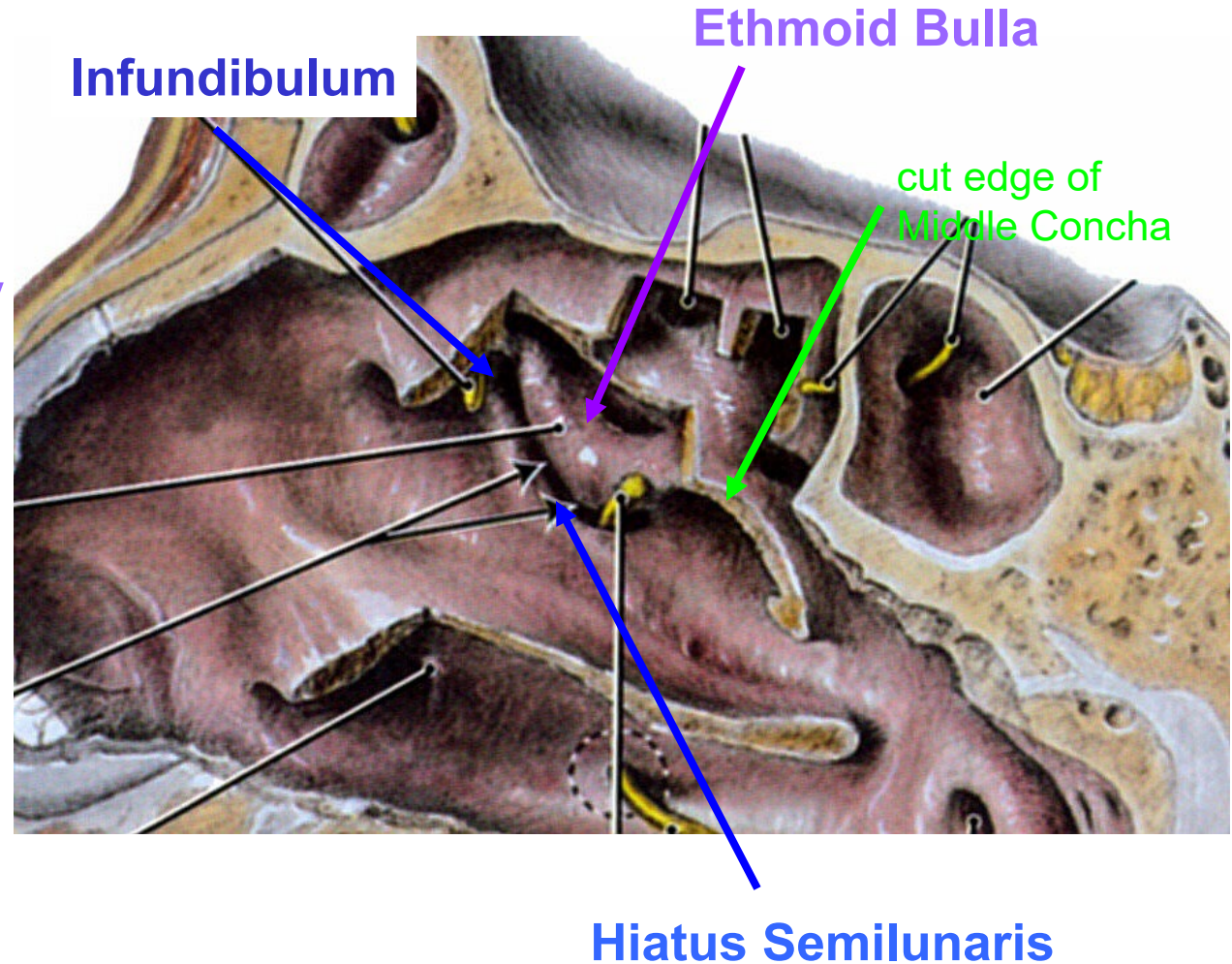


# ORIENT/TERMINOLOGY: STRUCTURES IN MIDDLE MEATUS

## Terms

1) Ethmoidal Bulla - Rounded elevation below Middle Concha - Formed by projection of Middle Ethmoidal air cells

2) Hiatus Semilunaris = C-shaped slit below Bulla - Infundibulum is anterior part of Hiatus



**Bulla = L. rounded prominence, blister**

# NASAL CAVITY: OPENINGS

## a. Sphenoethmoidal Recess

- 1) Olfactory Foramina
- 2) Sphenoid air sinus

## b. Superior Meatus – Post. Ethmoidal air cells

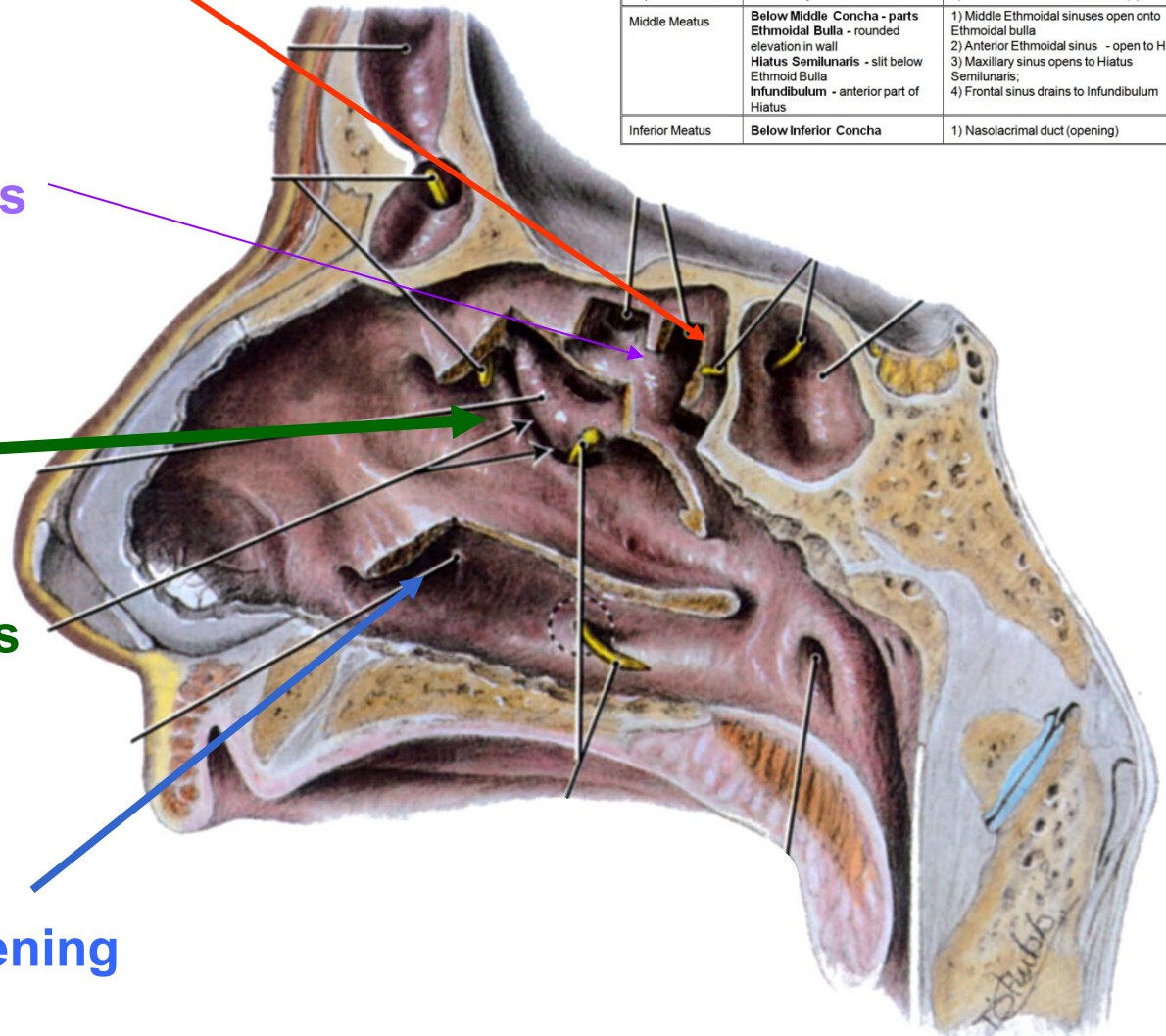
## c. Middle Meatus

- 1) Middle ethmoidal air cells - Bulla
- 2) Ant. Ethmoidal air cells - Hiatus Sem.
- 3) Max. Sinus - Hiatus Semilunaris
- 4) Frontal Sinus - Infundibulum.

## d. Inferior Meatus – opening of Nasolacrimal duct

### SUMMARY CHART IN HANDOUT

Space	Location	Openings/Sinuses
Sphenoethmoidal Recess	Above Superior Concha	1) Olfactory foramina of cribriform plate and 2) Sphenoidal air sinus (opening)
Superior Meatus	Below Superior Concha	1) Posterior Ethmoidal Air sinus (opening)
Middle Meatus	Below Middle Concha - parts Ethmoidal Bulla - rounded elevation in wall Hiatus Semilunaris - slit below Ethmoid Bulla Infundibulum - anterior part of Hiatus	1) Middle Ethmoidal sinuses open onto Ethmoidal bulla 2) Anterior Ethmoidal sinus - open to Hiatus Semilunaris; 3) Maxillary sinus opens to Hiatus Semilunaris; 4) Frontal sinus drains to Infundibulum
Inferior Meatus	Below Inferior Concha	1) Nasolacrimal duct (opening)





## C. AND D. NERVES of NASAL CAVITY

### Nerves

1. Olfactory N. - SMELL

Olfactory Area

2. General Sensation -

**ALL SOMATIC  
SENSORY** touch,

pain, etc.

**V1 + V2 \***

- V1 Anterior Ethmoidal N.

- V2 Nasal Branches

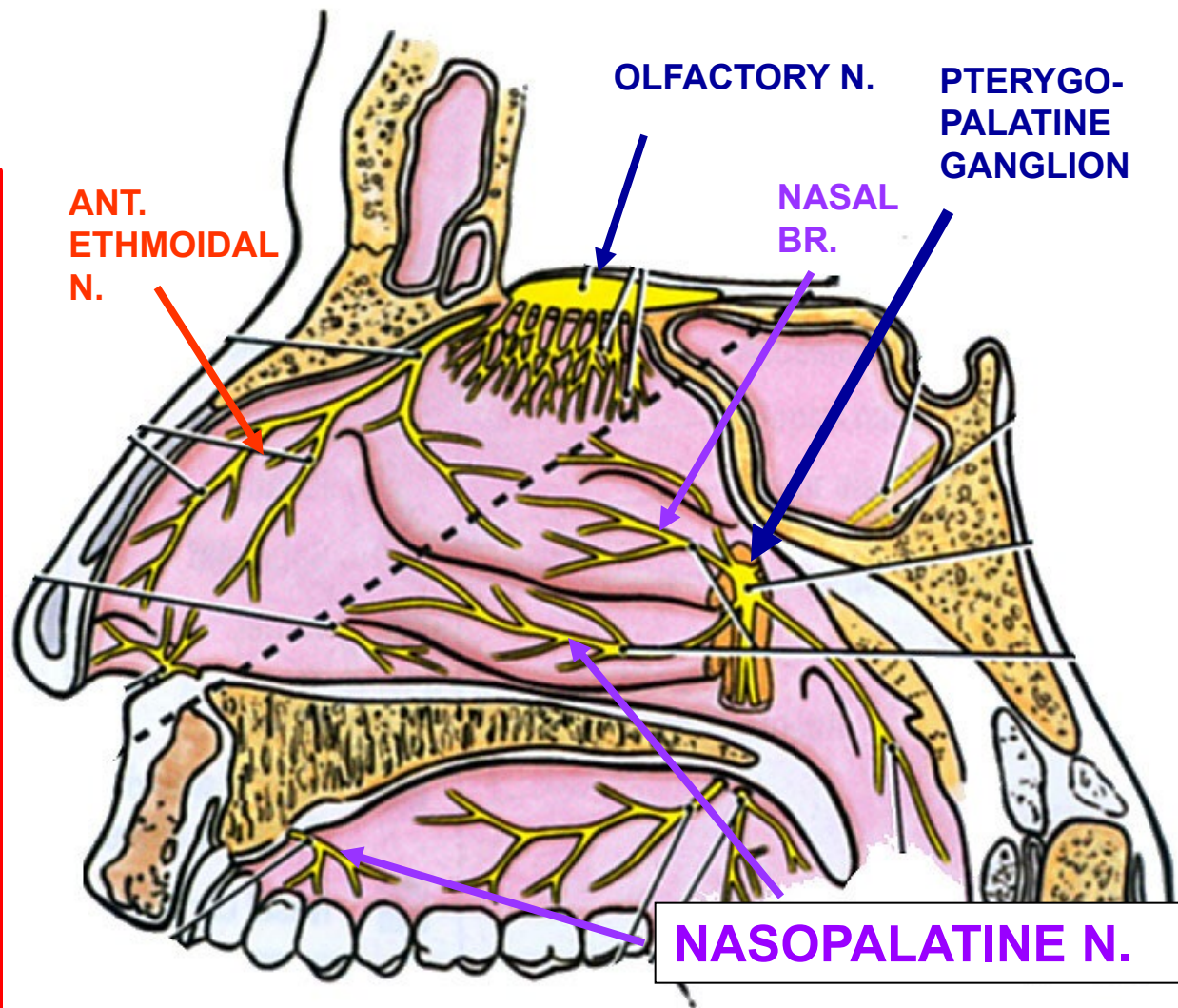
- V2 Nasopalatine N.

3. Mucous Glands of nose - VISCERAL

MOTOR PARASYMP. -

VII - Facial N. by Pterygopalatine

Ganglion \*



OLFACTORY AREA = area of Olfactory nerve endings  
RESPIRATORY AREA = rest of nasal cavity



## E. and F. ARTERIES/VEINS, LYMPHATICS

### 1. Arteries

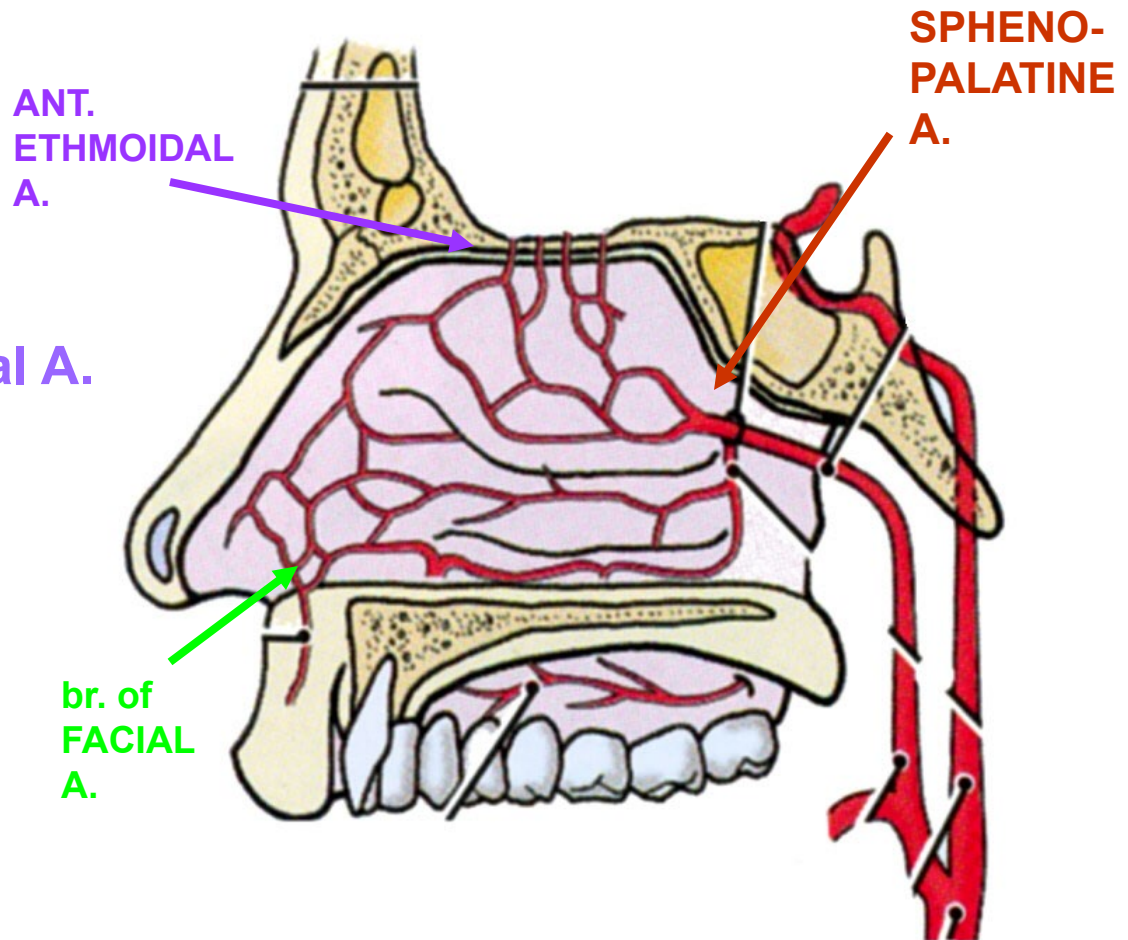
- a. Sphenopalatine Artery  
- from Maxillary A.
- b. Ant. and Post Ethmoidal A.  
- from Ophthalmic A.
- c. Branches of Facial A.

### 2. Veins

- a. Ethmoidal vein  
drain to Ophthalmic v.
- b. Other branches to  
Pterygoid Venous Plexus
- c. Facial Vein

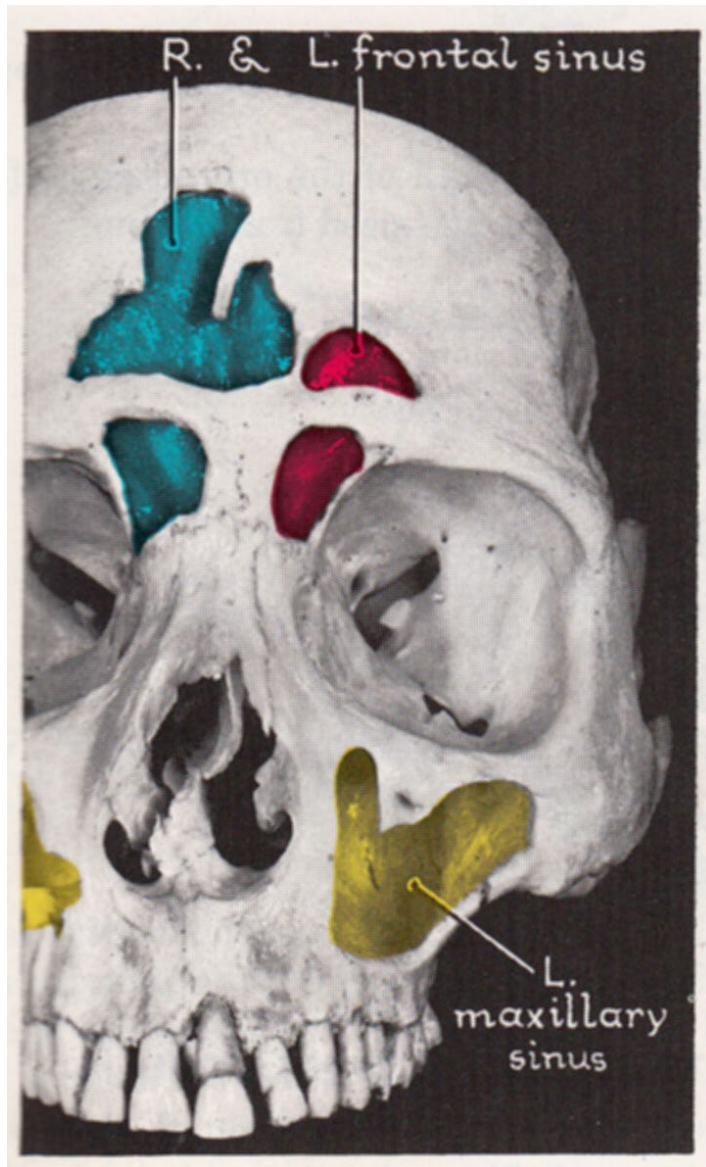


Note: Epistaxis (nosebleed) can be extensive due to Anastomoses – Spurting if arterial



F. Lymphatics-  
Retro-  
pharyngeal  
Nodes

## II. PARANASAL AIR SINUSES



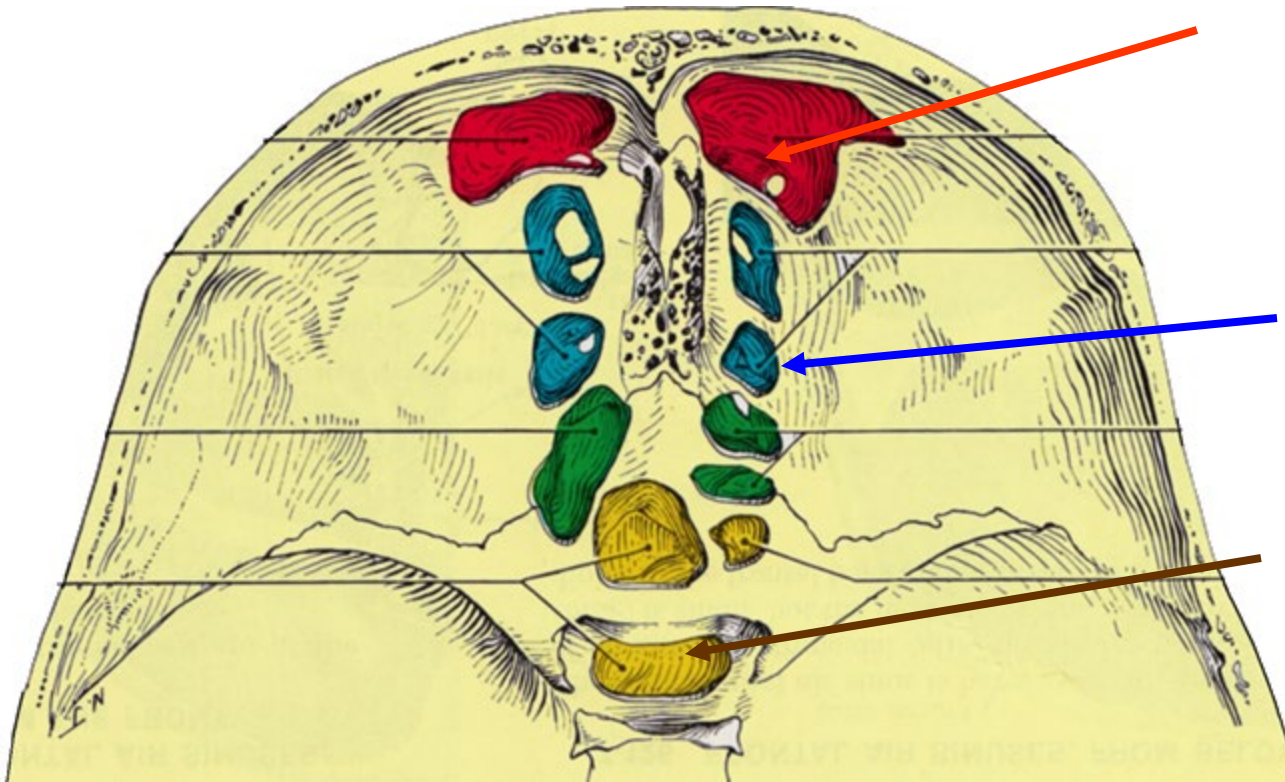
- 1) Air filled extensions of Nasal Cavity
- 2) All Paired
  - Develop and enlarge after birth
  - Lined by mucous membrane
  - Serve to lighten bones
- 3) **A mistake of evolution?**
  - If filled bones with spongy (cancellous) bone, would not get infected

# PARANASAL AIR SINUSES

VIEW: FLOOR OF  
ANT. CRAN. FOSSA  
WITH BONE  
REMOVED

All usually paired

NOSE



A. Frontal - separate  
by septum, variable  
size

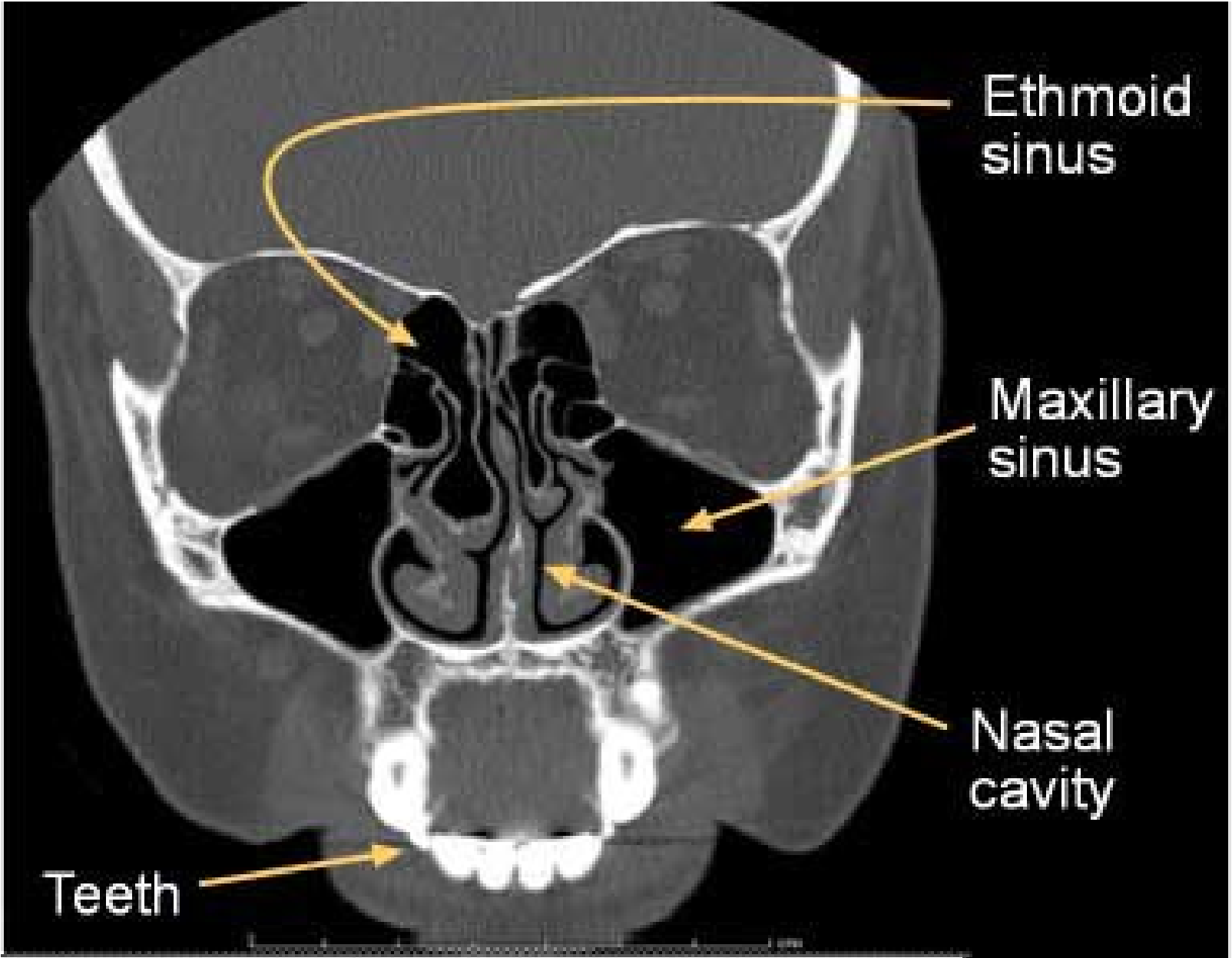
C. Ethmoid- also  
called air cells (Ant.,  
Mid., Post.)

B. Sphenoid - in  
body of Sphenoid  
bone



**Ethmoid - Blocked Sinus Infection Can Spread to Orbit**





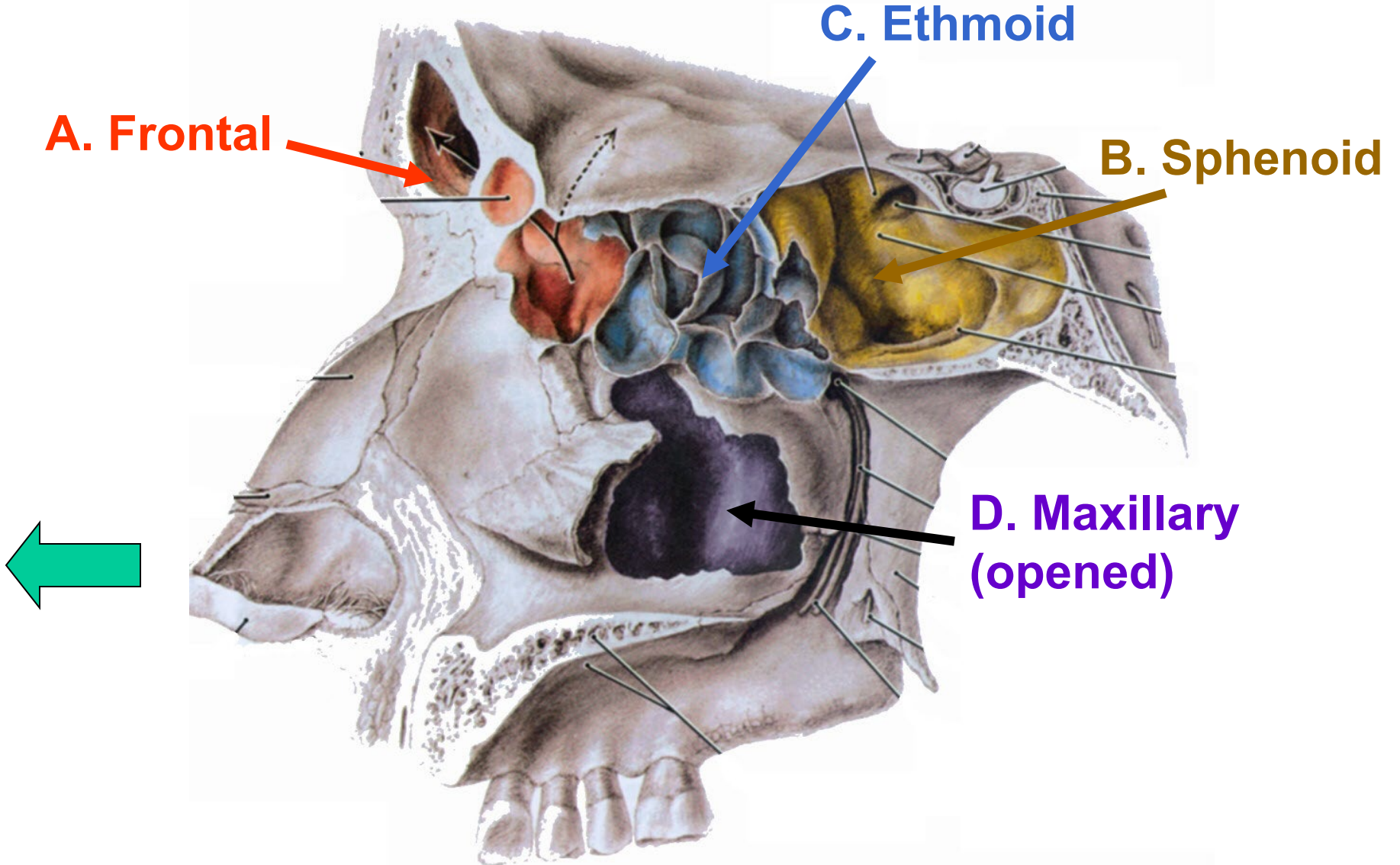
Ethmoid sinus

Maxillary sinus

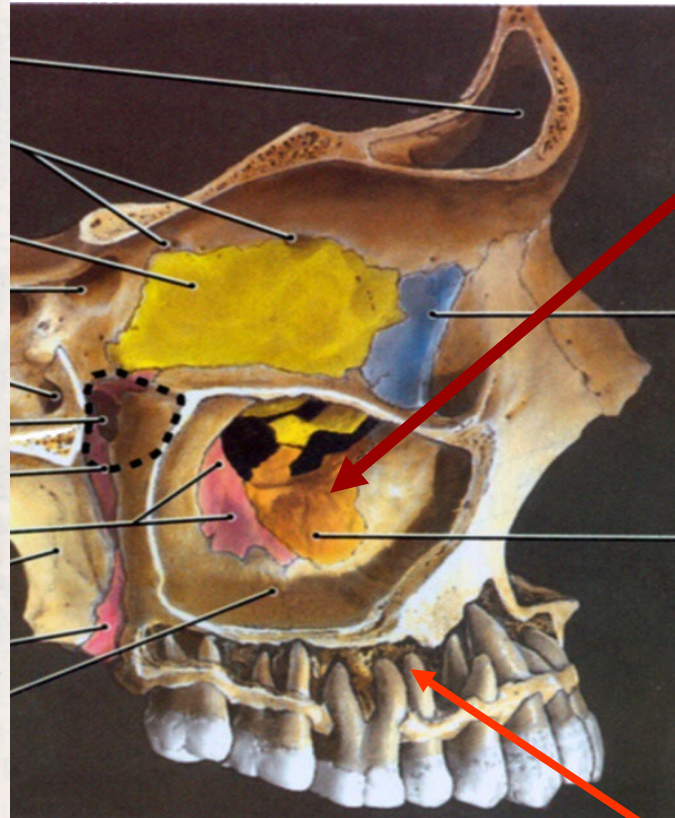
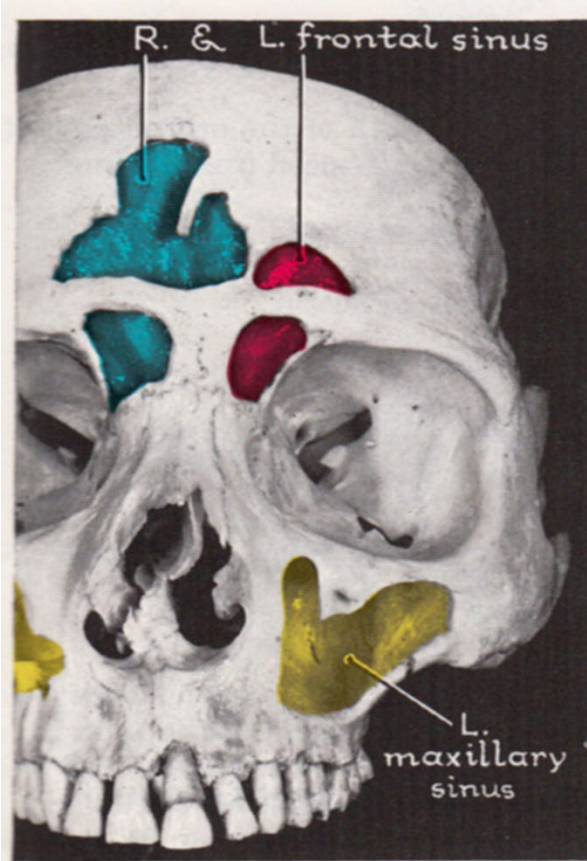
Nasal cavity

Teeth

# PARANASAL AIR SINUSES



# PARANASAL AIR SINUSES



## D. Maxillary Sinus

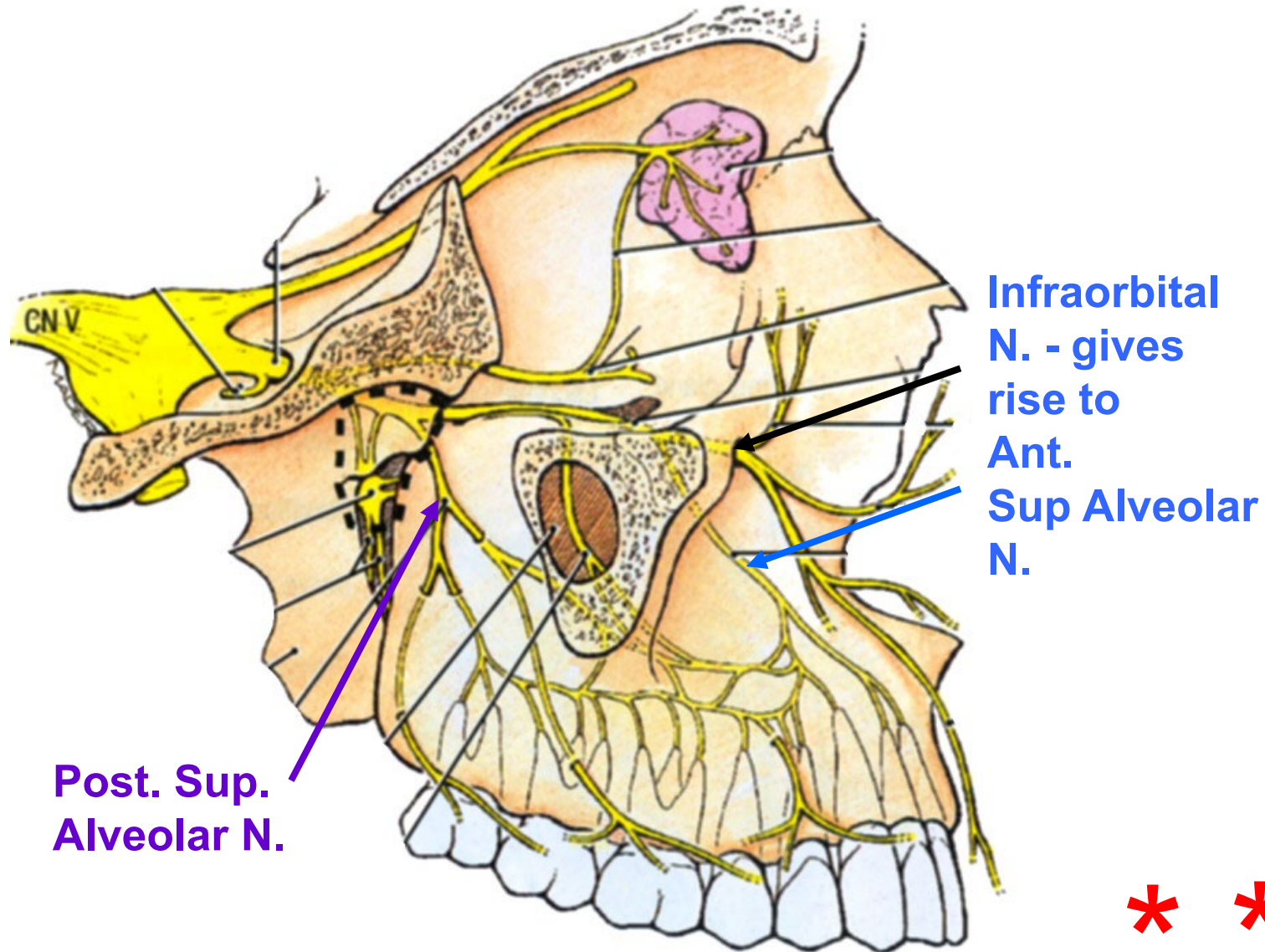
- Largest
- Occupies entire Body of Maxilla
- Roof = Floor of Orbit
- Nasal Cavity is medial to sinus

**CLINICAL - Roots of Maxillary Teeth are in Floor of Sinus - can damage by tooth extraction**





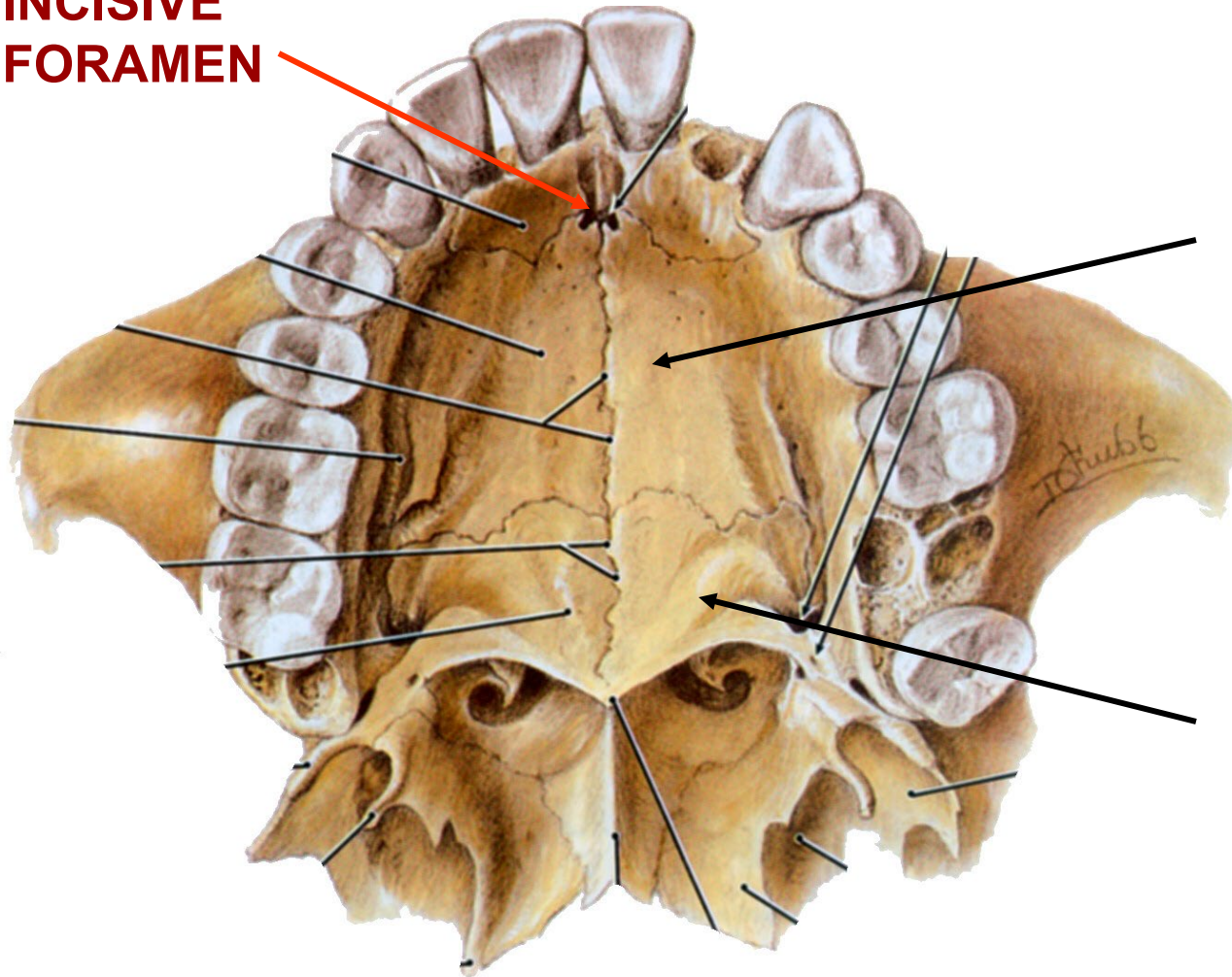
# PARANASAL AIR SINUSES: NERVES



**V2 - Ant. & Post. Sup. Alveolar N. supply Max Sinus & Teeth;  
(Infected sinus can feel like a tooth ache)**

# III. PALATE DEVELOPMENT

**INCISIVE FORAMEN**



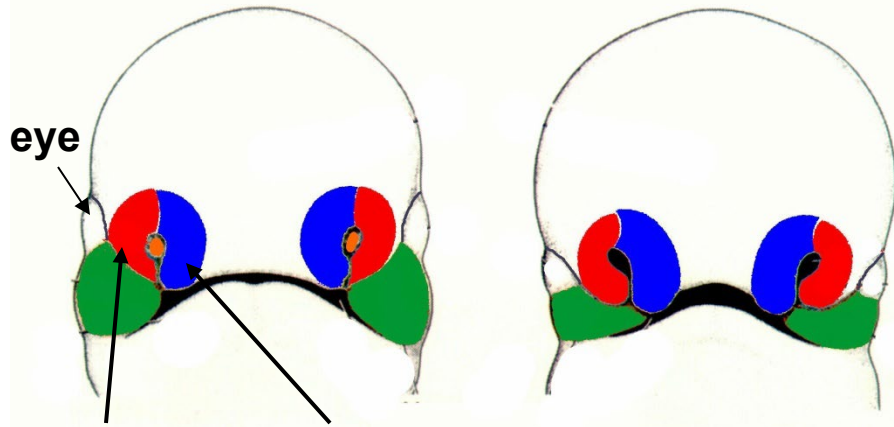
**B. Anatomy**

**1. Hard  
Palate  
a. Maxillary  
Bones  
(palatine  
process)**

**b. Palatine  
bones  
(horizontal  
plate)**

# DEVELOPMENT OF FACE

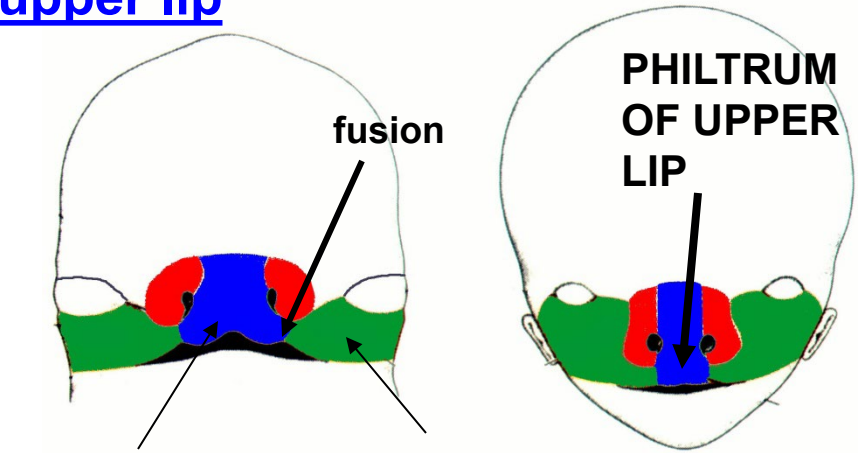
## 2. Medial and **Lateral** Nasal Processes – form at margins of nasal placodes



**Lateral nasal process**

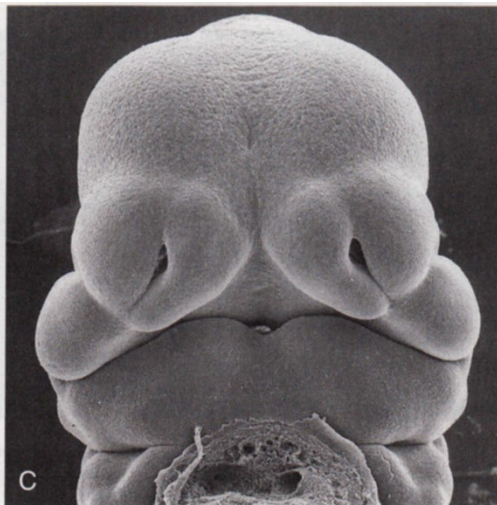
**Medial nasal process**

## 3. Medial nasal process and Maxillary Process – fuse to form upper lip



**Medial nasal process**

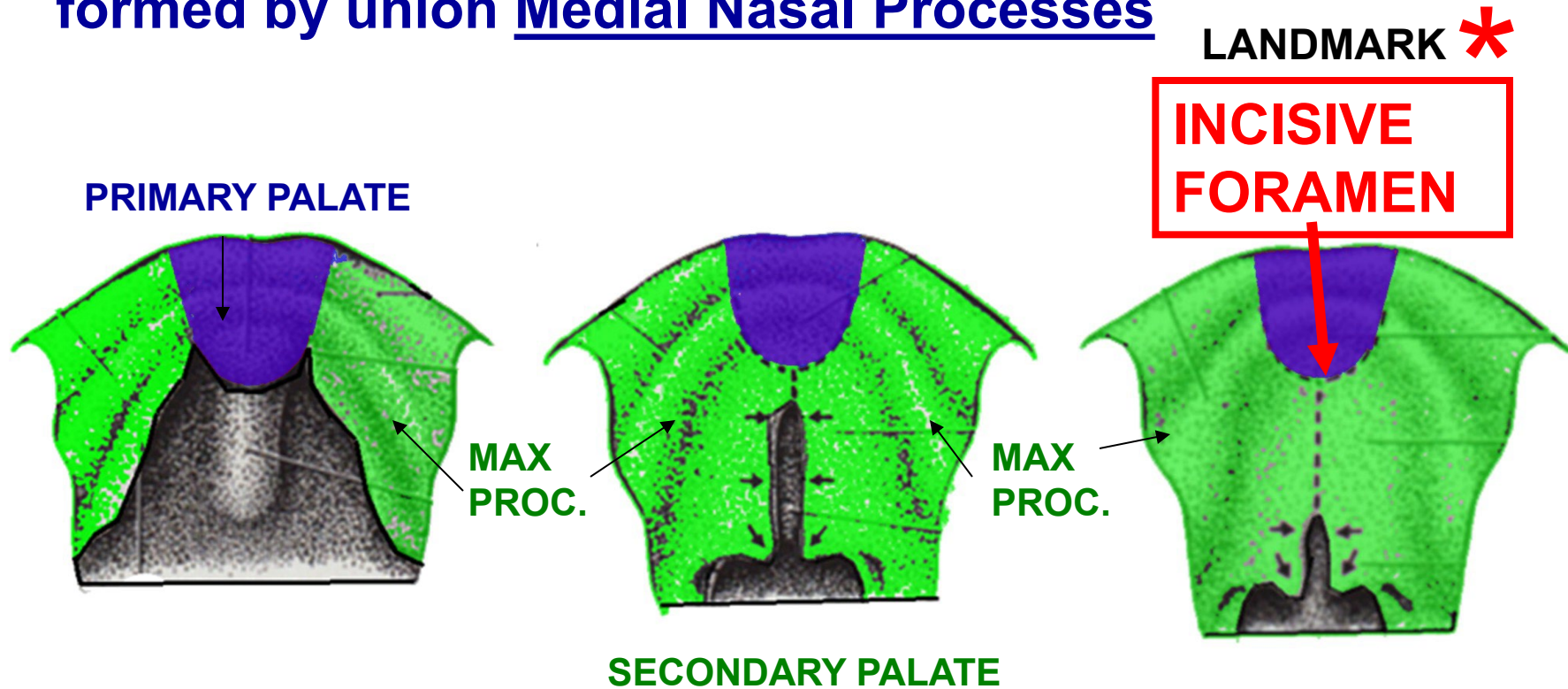
**Maxillary process**





# A. PALATE DEVELOPMENT

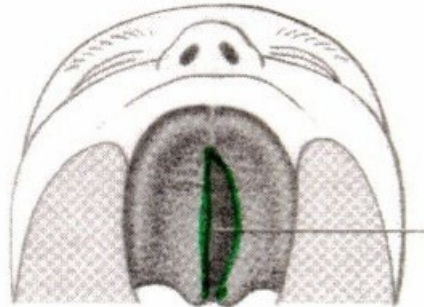
a. Primary Palate – Anterior to Incisive Foramen formed by union Medial Nasal Processes



b. Secondary Palate – Posterior to Incisive Foramen-  
formed by fusion of Maxillary processes

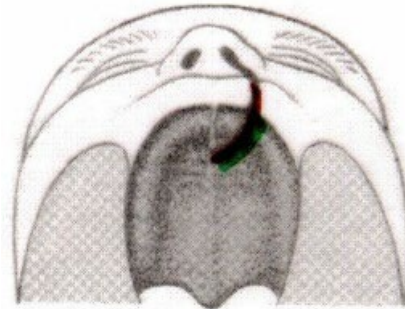
# MALFORMATIONS: CLEFT PALATE

2) Posterior Cleft Palate - Not fuse **\***  
Secondary palate  
(not fuse Maxillary Processes each side)



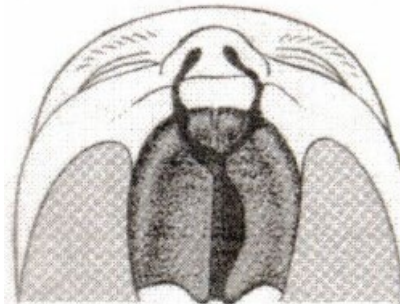
1:2500  
births

1) Anterior Cleft Palate - Not fuse **\***  
Medial Nasal Process  
and Maxillary Process



1:1000  
Births

Can be unilateral  
or bilateral



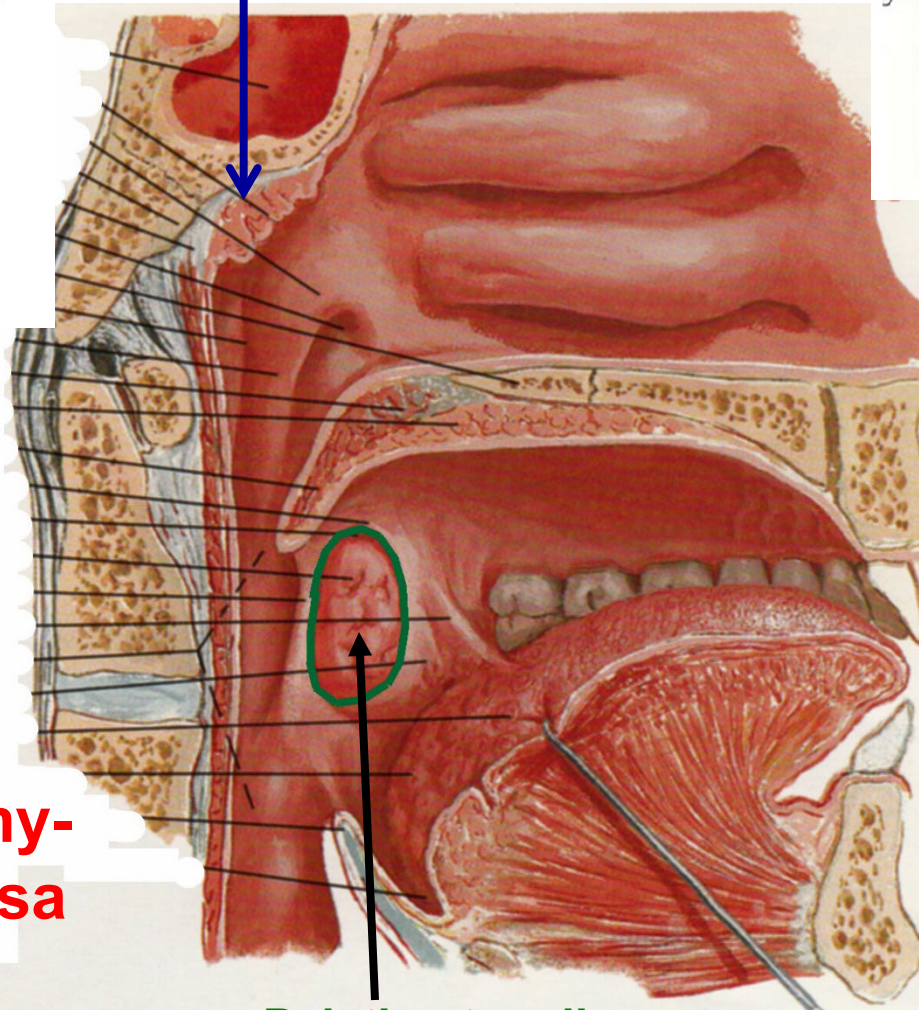
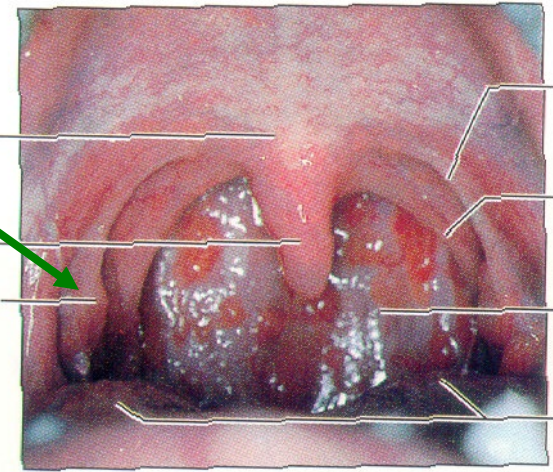
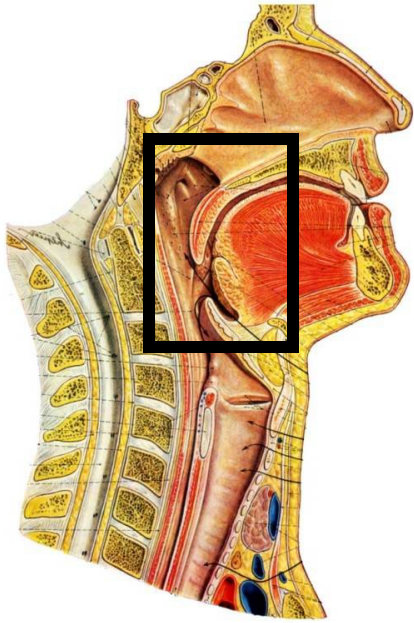
Note: Ant. Cleft Palate is same as Cleft Lip



# VI. PALATINE TONSILS

PHARYNGEAL  
TONSIL =  
ADENOIDS

Palatine Tonsil



Palatine Tonsil -  
lymphoid tissue  
In oropharynx  
between  
Palatoglossal  
and  
Palatopharyngeal  
Arches

Tonsillectomy-  
incise mucosa  
to remove  
Palatine tonsil

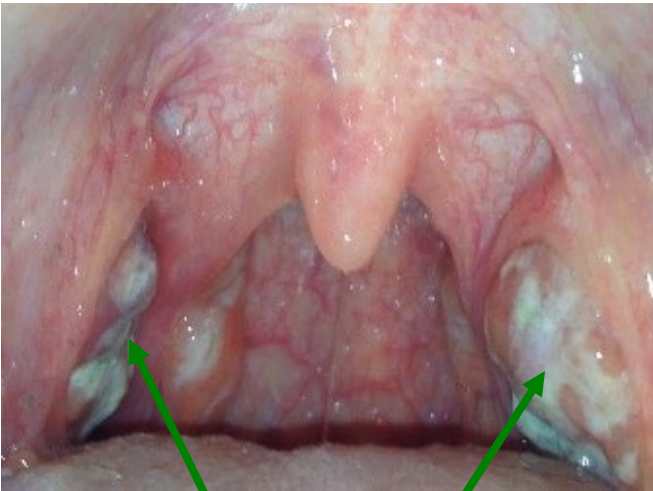
Palatine tonsil



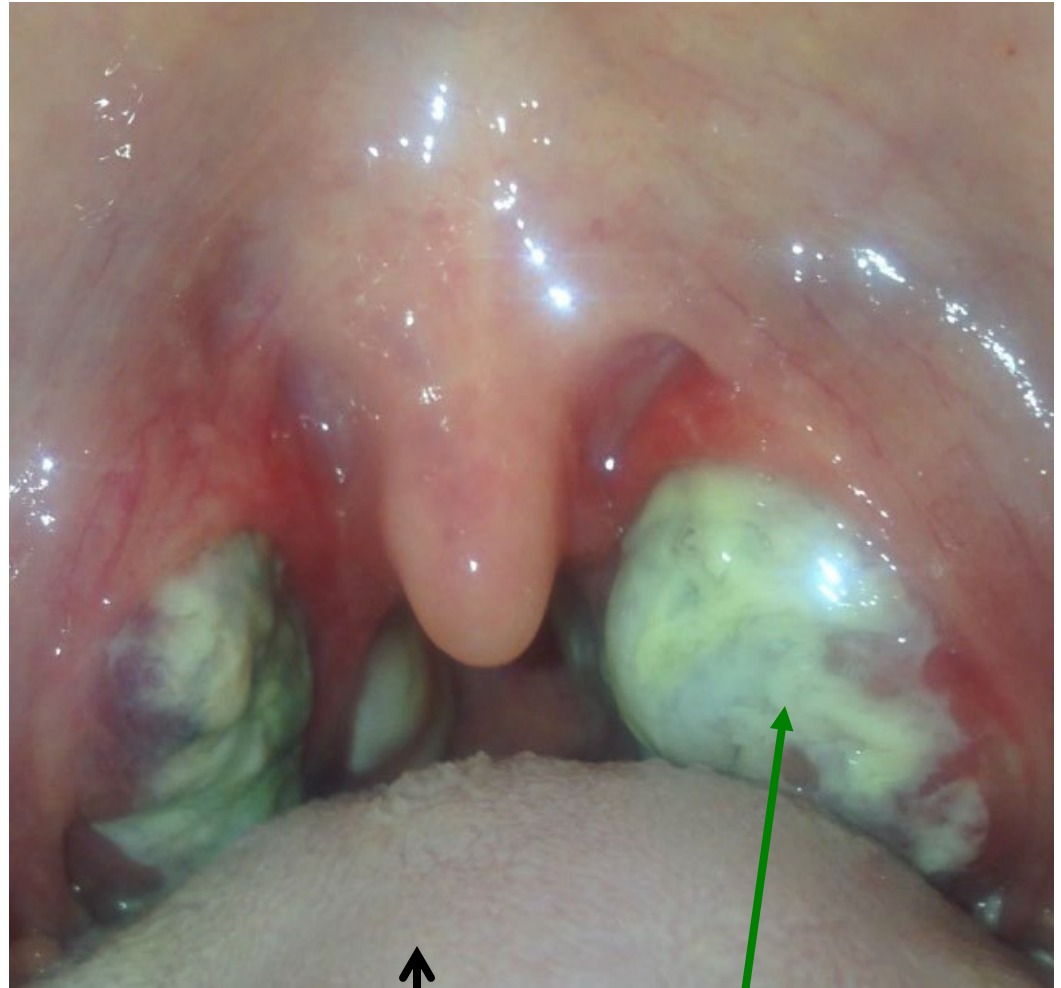
# TONSILLITIS = inflammation of (Palatine) tonsils

Cause - bacterial (Streptococcus) or viral infection

UVULA



**Palatine Tonsils**

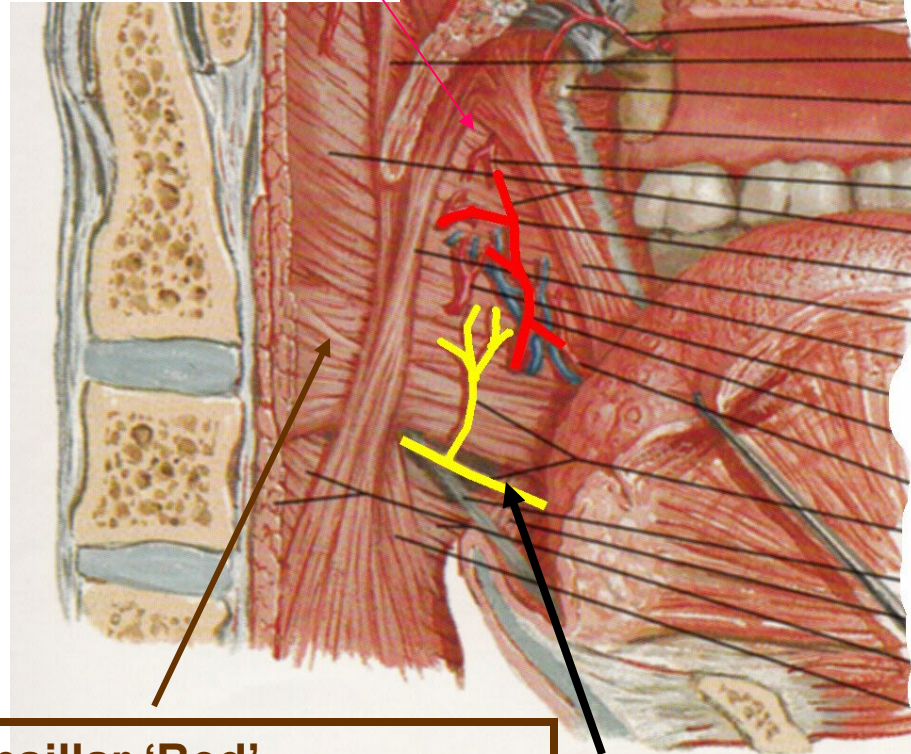


hi mag image:  
tilt head

**Palatine Tonsil**

# PALATINE TONSILS

**TONSILLAR BR.  
OF FACIAL A.**



**Tonsillar 'Bed' –  
Formed by  
1) Superior Constrictor of  
Pharynx  
2) Styloglossus**

**IX**

## **A. Arteries-**

**From Tonsillar branch of  
Facial Artery - can be large**

**B. Veins – join Pharyngeal  
Plexus of Veins – Drain to  
Facial lingual or Inf. Jugular**

**C. Lymphatics –Deep cervical  
nodes**

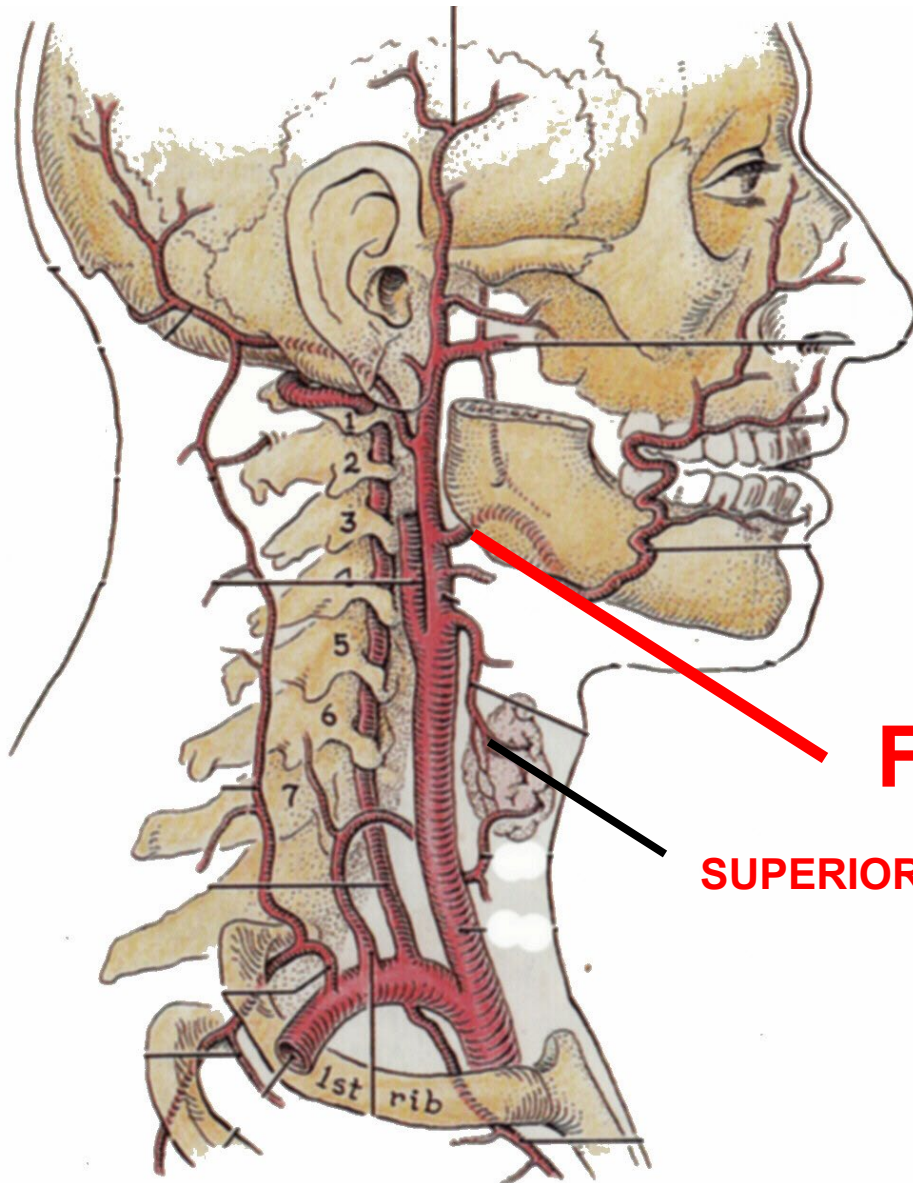
**\*Jugulo-Digastric- Enlarged**

**Note:**

**1) Glossopharyngeal Nerve  
only covered by Pharyngo-  
Basilar Fascia can be  
damaged \*\*\***

**2) Extensive bleeding after  
tonsillectomy - tonsillar  
branch of Facial Artery**

# FACIAL ARTERY



NOSE →

**FACIAL A.**

**COURSE =  
'WIGGLE' X 3**

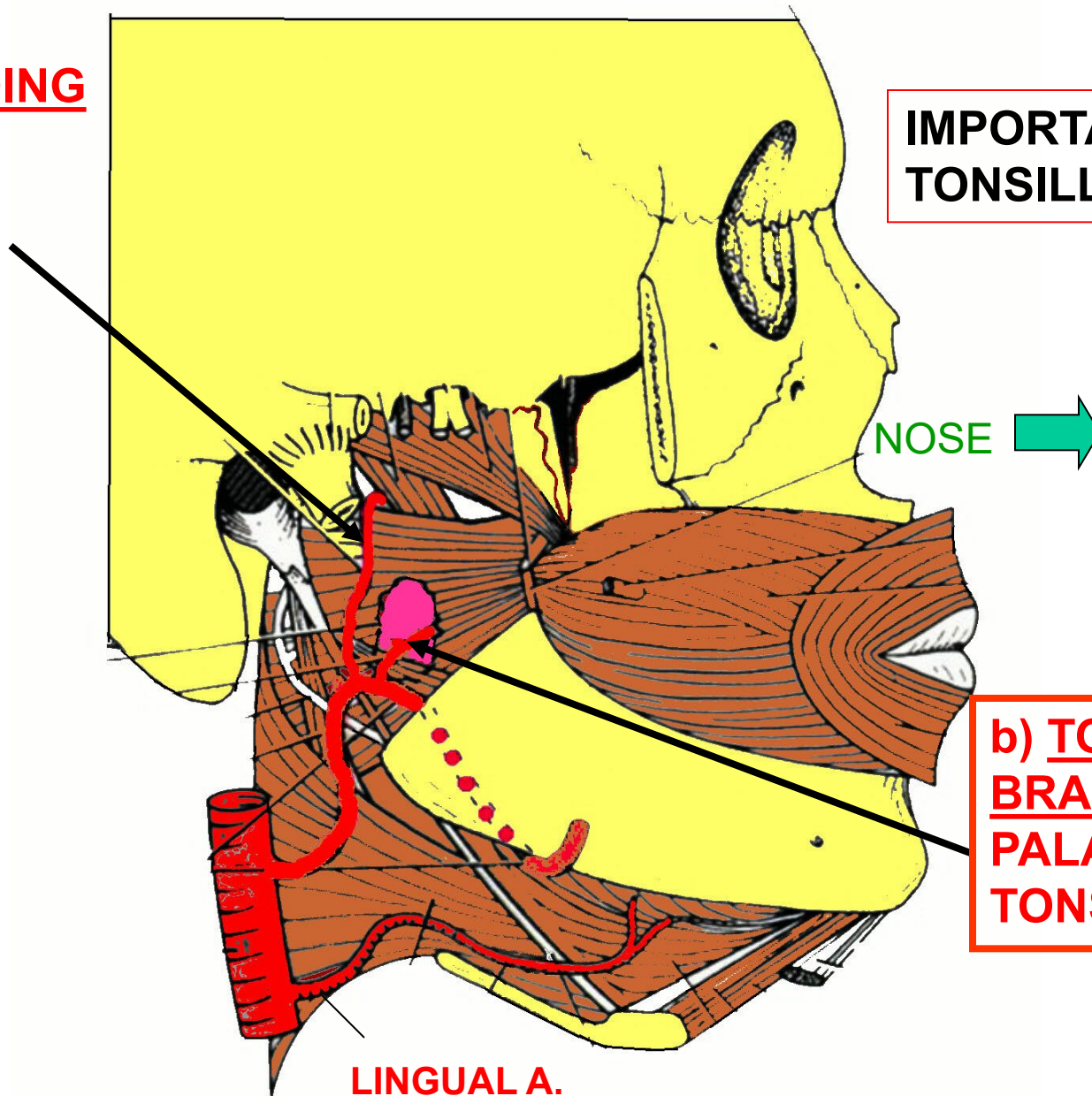
**SUPERIOR THYROID A.**



# FACIAL ARTERY- BRANCHES MEDIAL TO MANDIBLE

a) ASCENDING PALATINE ARTERY - PALATE

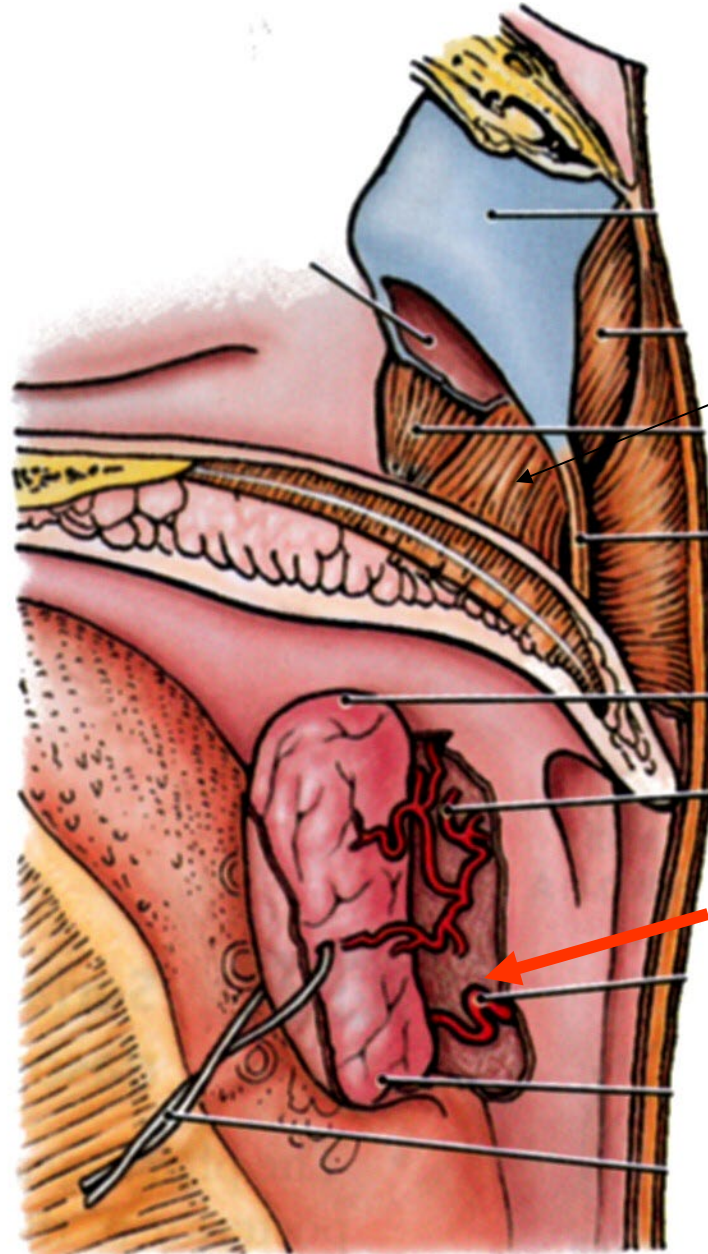
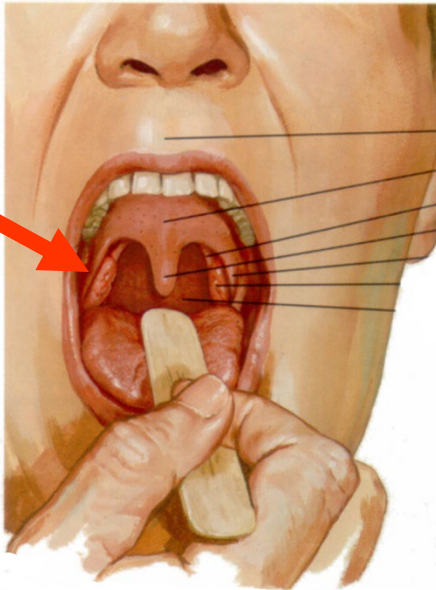
IMPORTANT IN TONSILLECTOMY



b) TONSILLAR BRANCH - PALATINE TONSIL

# FACIAL ARTERY- BRANCHES MEDIAL TO MANDIBLE

PALATINE  
TONSIL



what  
muscle?

**NOTE: TONSILLECTOMY -  
Post-operative bleeding  
of Tonsillar branch of  
Facial artery is \* \*  
complication of  
removal of palatine  
tonsils; also damage IX**

**b) TONSILLAR  
BRANCH -  
PALATINE  
TONSIL**

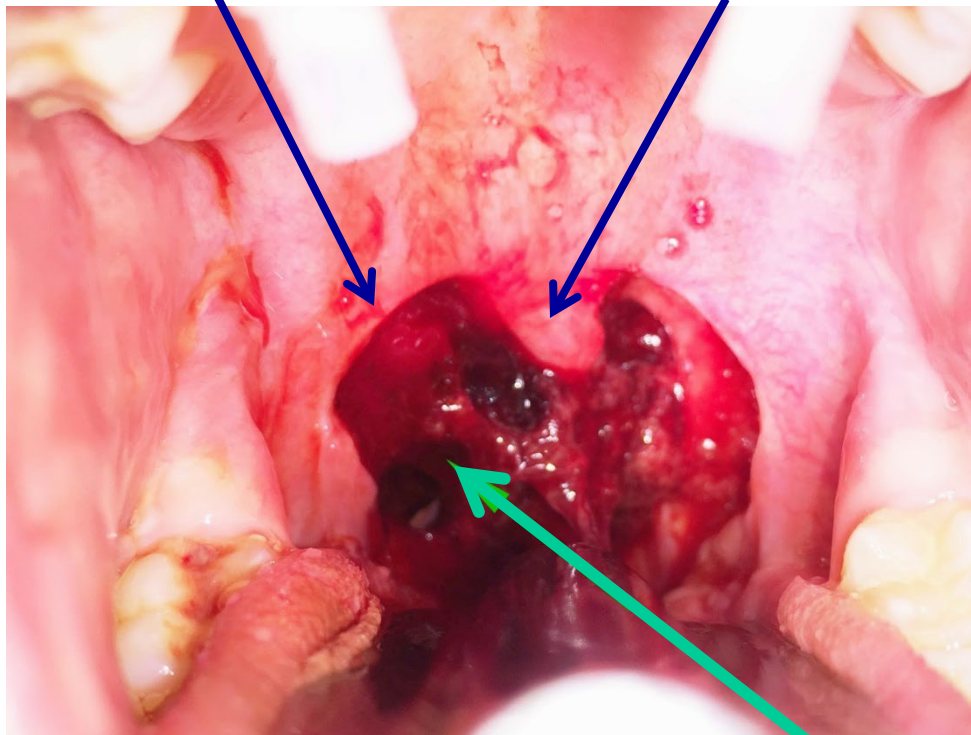
note: Board question



# POSTOPERATIVE BLEEDING FOLLOWING TONSILLECTOMY

Palatoglossal arch

Uvula



Blood clot

Palliative Technique: Eat ice cream without spoon



Note: define Palliative - relieving pain without dealing with the cause of the condition.