

Good morning



ANATOMY & FUNCTIONS OF MAXILLARY SINUS-1



OCH 25-26

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Learning outcomes

By the end of the lecture , students should be able to :

- Enumerate paranasal sinus and describe the location, shape, and boundaries of the maxillary sinus.
- Describe the boundaries and relations of the maxillary sinus
- Outline the embryological development of the maxillary sinus
- Discuss the blood supply, venous drainage, lymphatics, and nerve supply.
- Explain the functions of the maxillary sinus and its importance.



Introduction

What Is Air Sinus

Air sinus are air filled cavities within the bone.

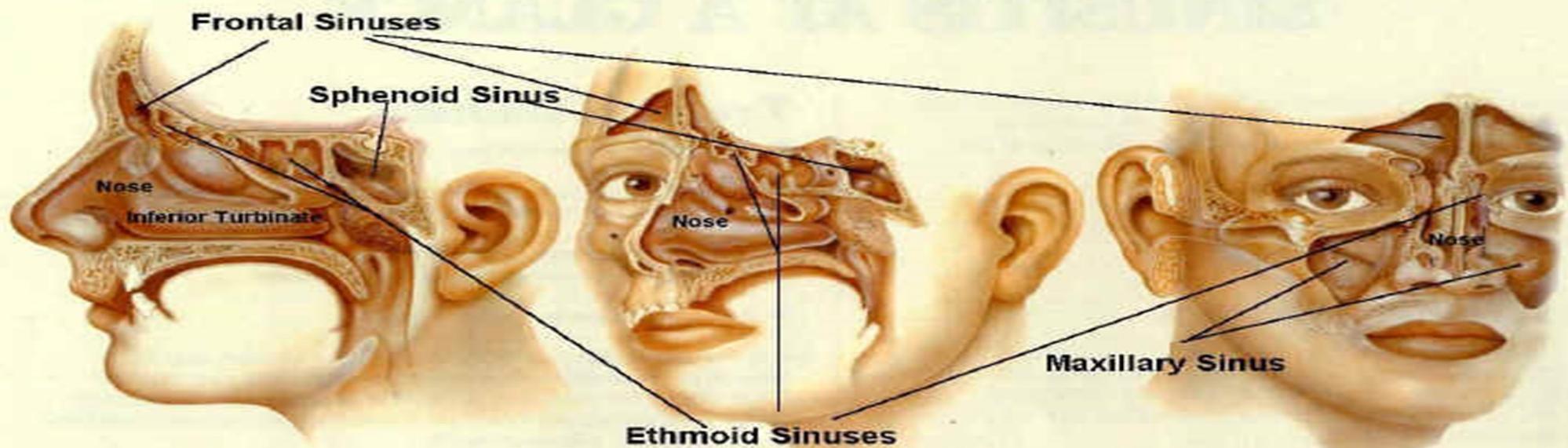
Air filled cavities present around nasal cavity are called as PARANASAL AIR SINUSES.

They all communicate with each other and open into the Lateral wall of the nasal cavity (drain into middle meatus)

Paranasal Air Sinuses

- Frontal air sinus
- Ethmoidal air sinus
- Sphenoidal air sinus
- Maxillary air sinus

Each sinus is name after the bone it resides in

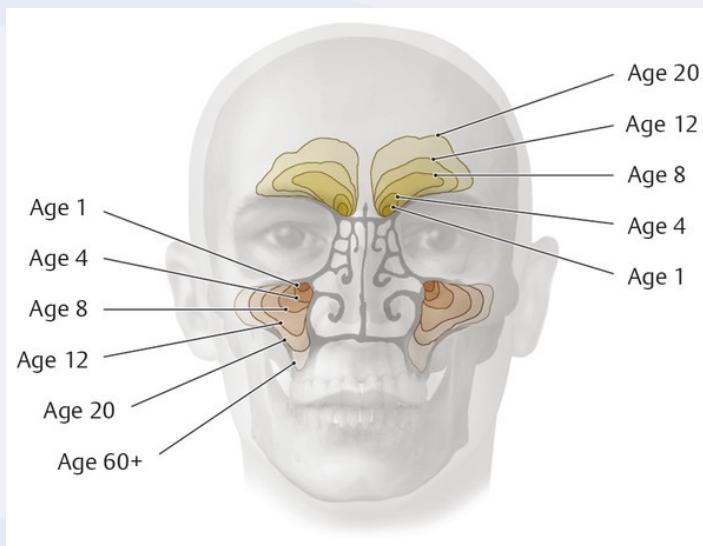


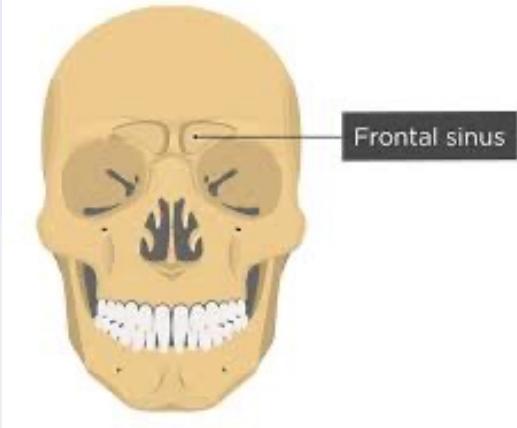
Development of sinus

Paranasal sinus development begins in the fetus and continues throughout childhood and adolescence. Full sinus maturation typically occurs in early adulthood.

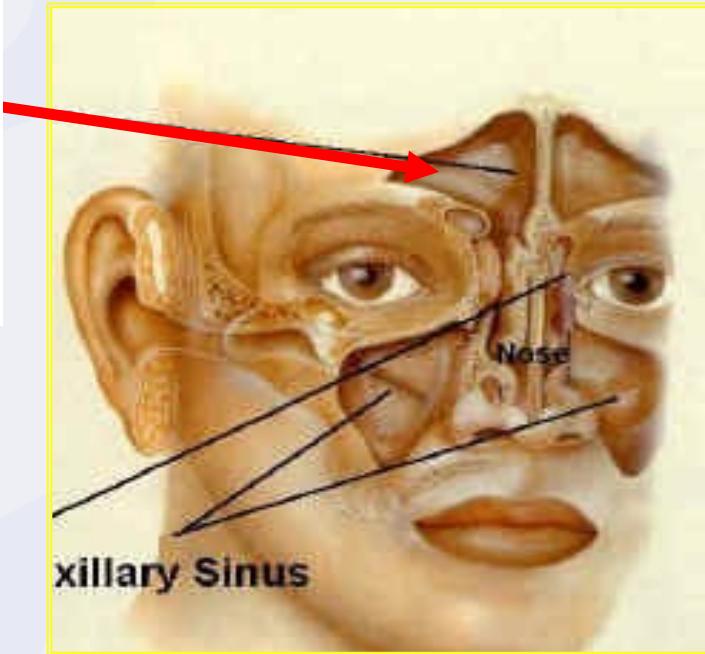
- **Maxillary Sinus:** first to develop, Development begins in **2nd gestational month**, originating from invaginations of the nasal cavity into the developing maxilla.
- **Ethmoid Sinuses:** begin to form during the **3rd gestation** and is present at birth.
- **Frontal Sinus:** Appears around **age 4 month** and expands to cross the supraorbital margin by age 6.
- **Sphenoid Sinus:** Begins to develop around **age 3** and can be seen on X-rays by age 8.

The Development Of The Sinuses			
Sinus	Gestational Month When Development Starts	Present in Clinically Significant Size	Fully Developed
Maxillary	2	Birth	12 years
Ethmoid	3	Birth	12 years
Frontal	4	3 years	18-20 years
Sphenoid	3	8 years	12-15 years



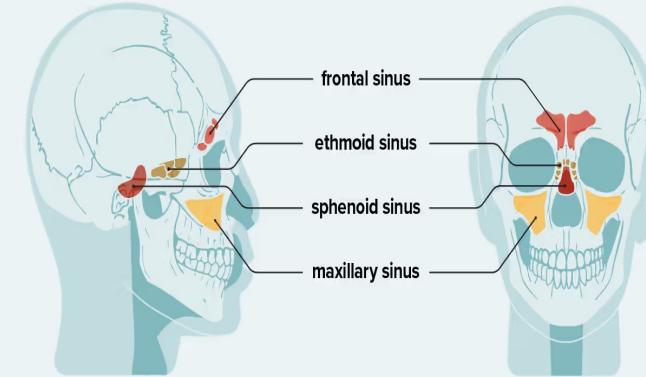


Frontal air sinus



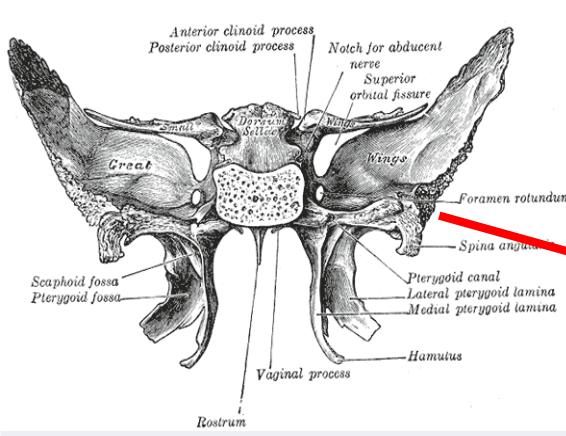
Sinuses

Anatomy

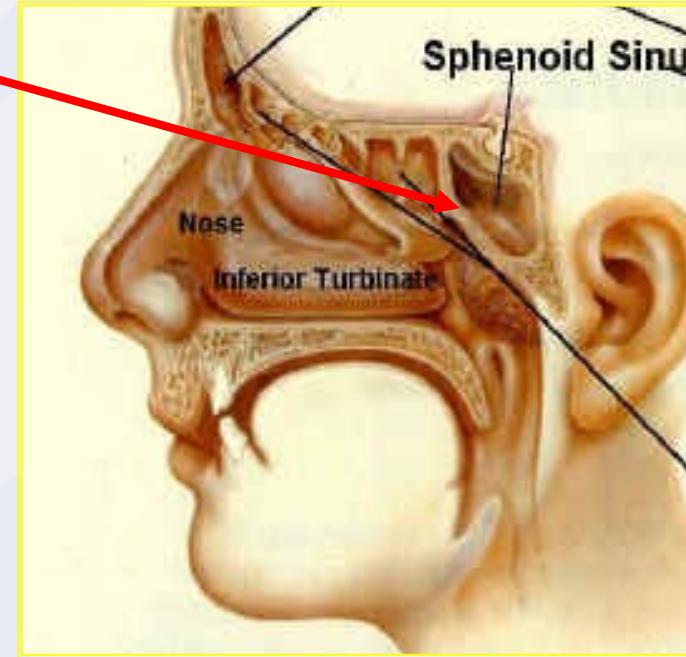


healthline

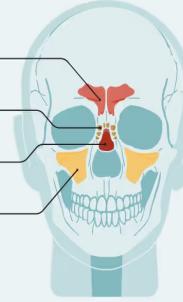
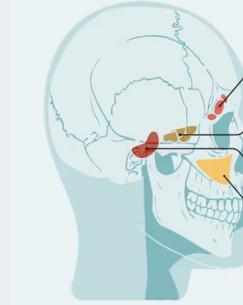
Paired sinuses, lies in the frontal bone deep to the superciliary arch
(above eyes in forehead bone)



Sphenoidal air sinus

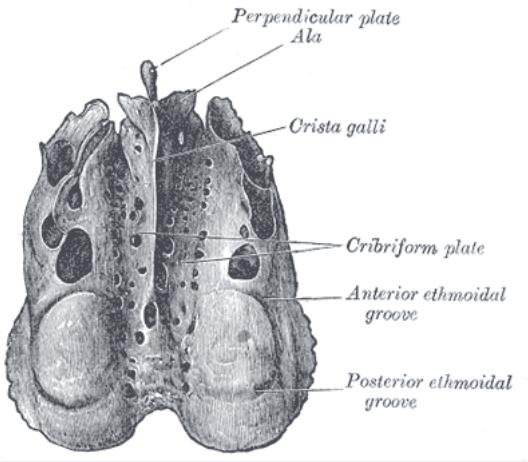


Sinuses
Anatomy

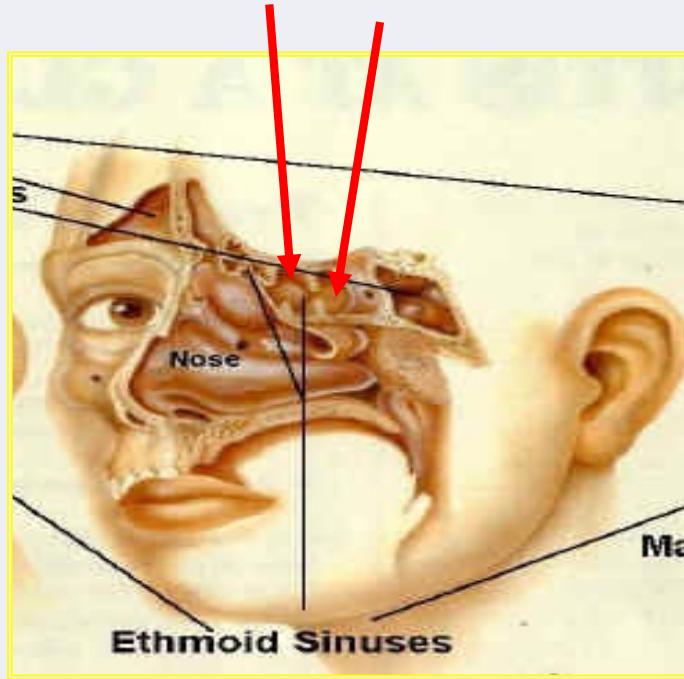


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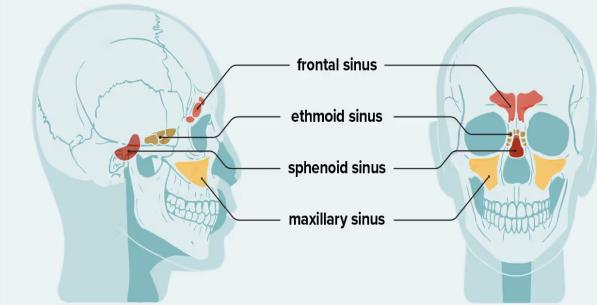
Paired sinuses, lie with in the body of the sphenoid bone (in centre of skull behind nasal cavity). Unequal in size



Ethmoidal air sinus



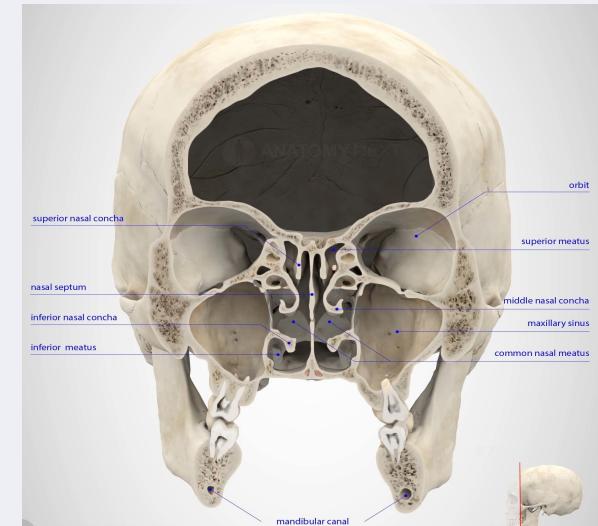
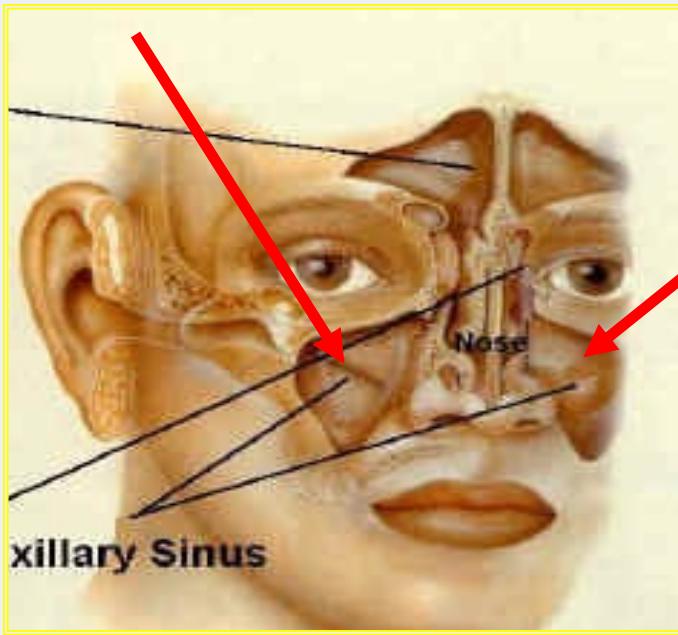
Sinuses
Anatomy



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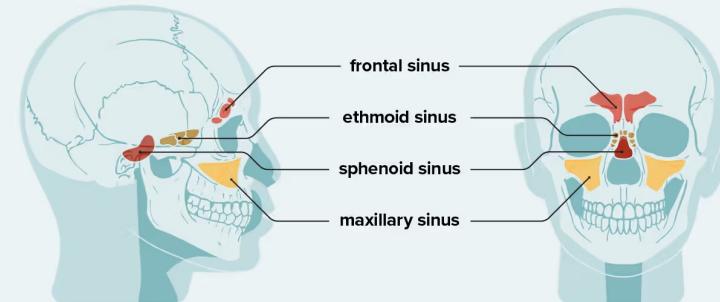
Are numerous (6-12 per side) inter communicating spaces – lie with in labyrinth of ethmoid bone (between nasal cavity and orbit)

Maxillary Air Sinus (ANTRA)



Lies in cheek bone under eyes in the maxillary bones
and is known as **Antrum of HIGHMORE**

Sinuses
Anatomy



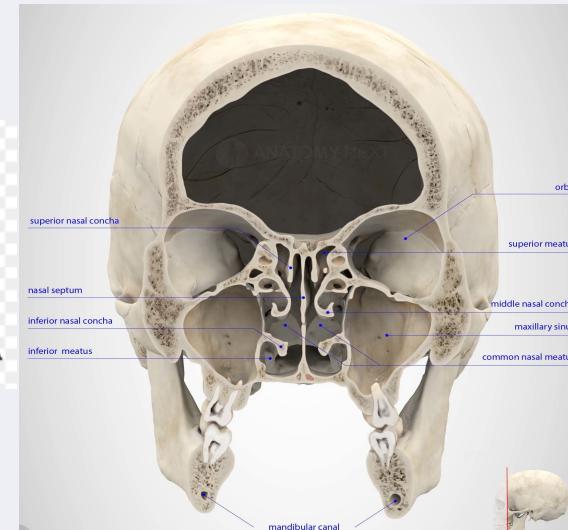
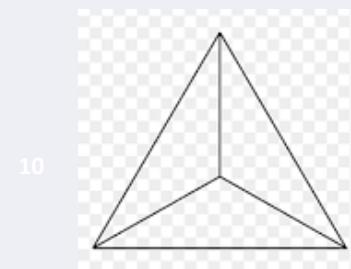
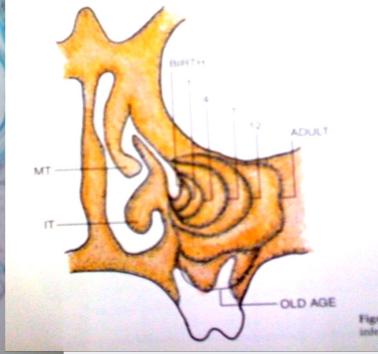
MAXILLARY SINUS

Maxillary sinus is 1st to develop.

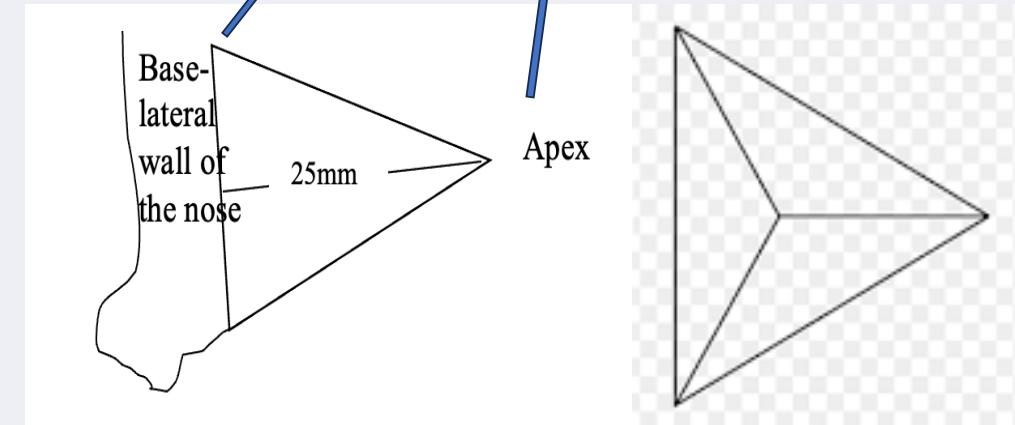
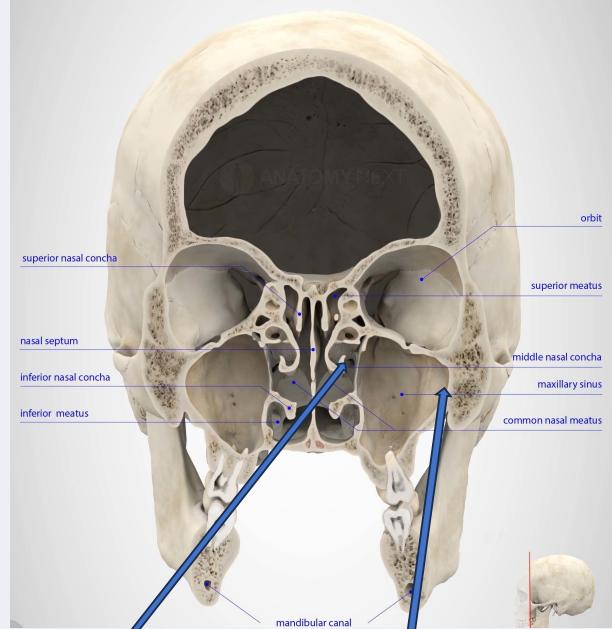
- These are usually fluid filled at birth.
- Growth of these sinus is biphasic i.e occurs during 0-3 years & 7-12 years.
- During the later phase pneumatization spreads more inferiorly as permanent teeth take their place.

❖STRUCTURE

- Tetrahedral structure / Pyramidal
- Volume of approx 15 ml
- Size 34x33x23 mm
- Lies within the body of maxilla
- Largest of all sinuses

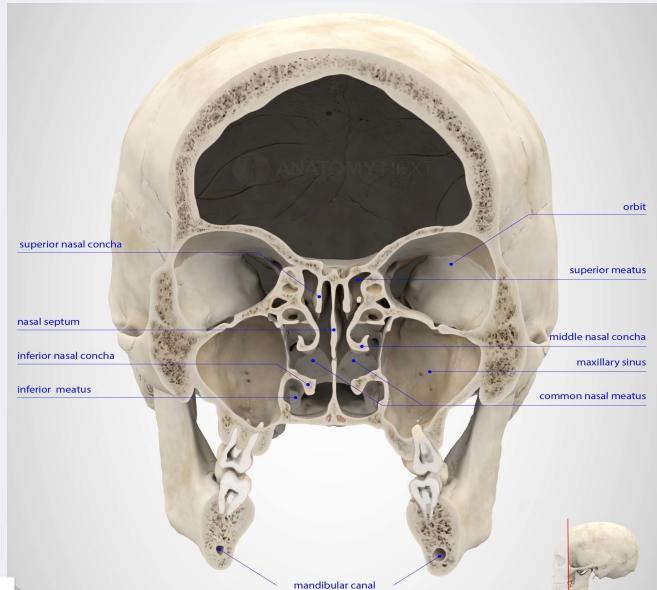
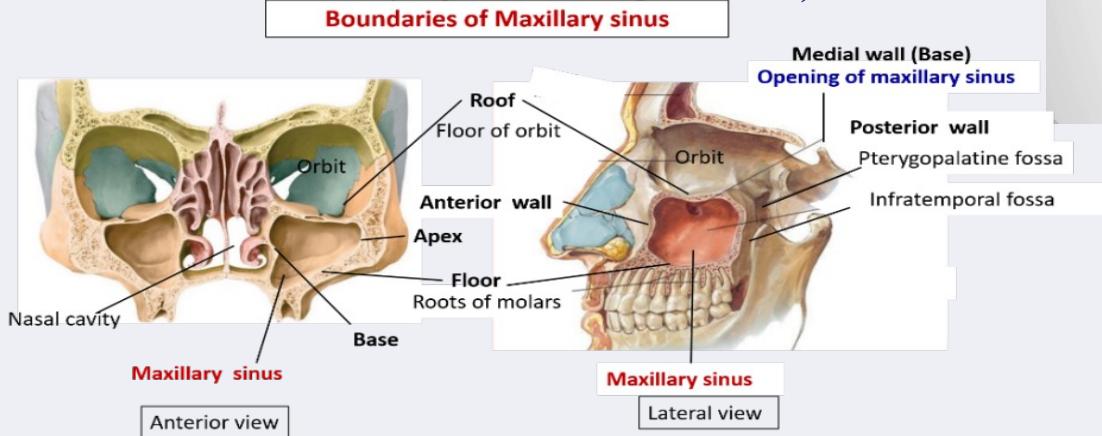


- **Base**: Lateral wall of nasal cavity – forms the **Medial Wall Of The Sinus**
- **Apex** :extends into the zygomatic process of the maxilla
- **Roof**: floor of the orbit.
- **Floor**: alveolar process of maxilla, often close to the apices of upper molars and premolars



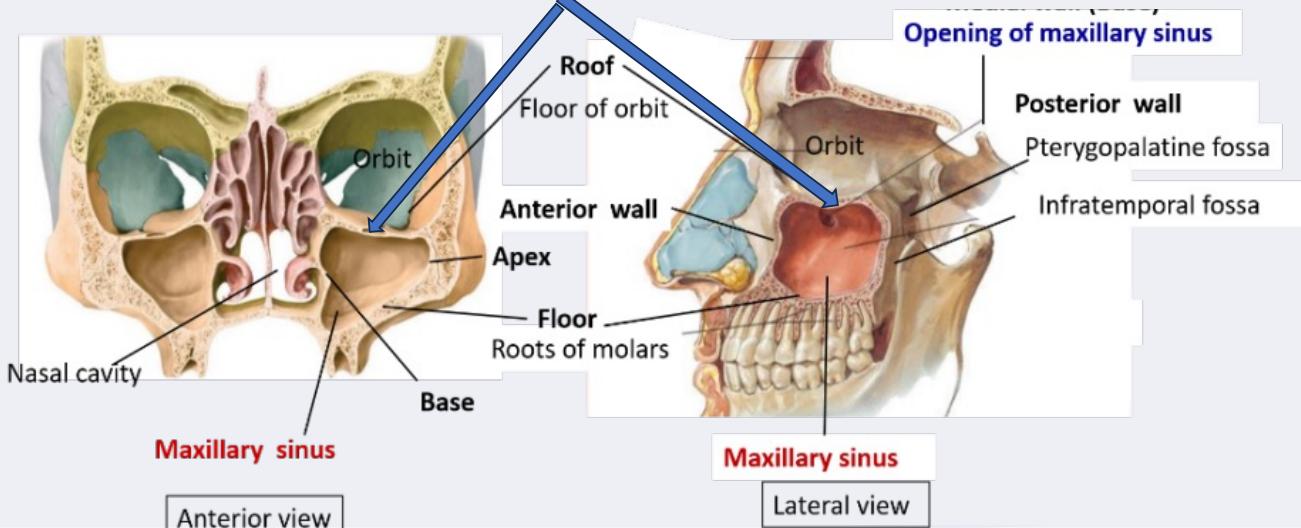
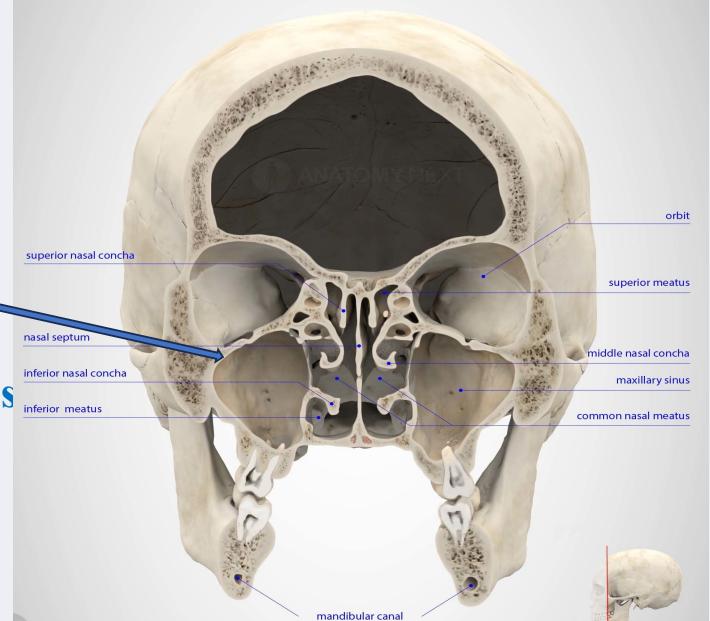
The walls of maxillary sinus are -

- Roof (Superior Wall)
- Floor (Inferior Wall)
- Anterior Wall (Facial Surface)
- Posterior Wall (Infratemporal Surface)
- Medial Wall (Base of Pyramid)
- Lateral Wall (Apex of Pyramid)



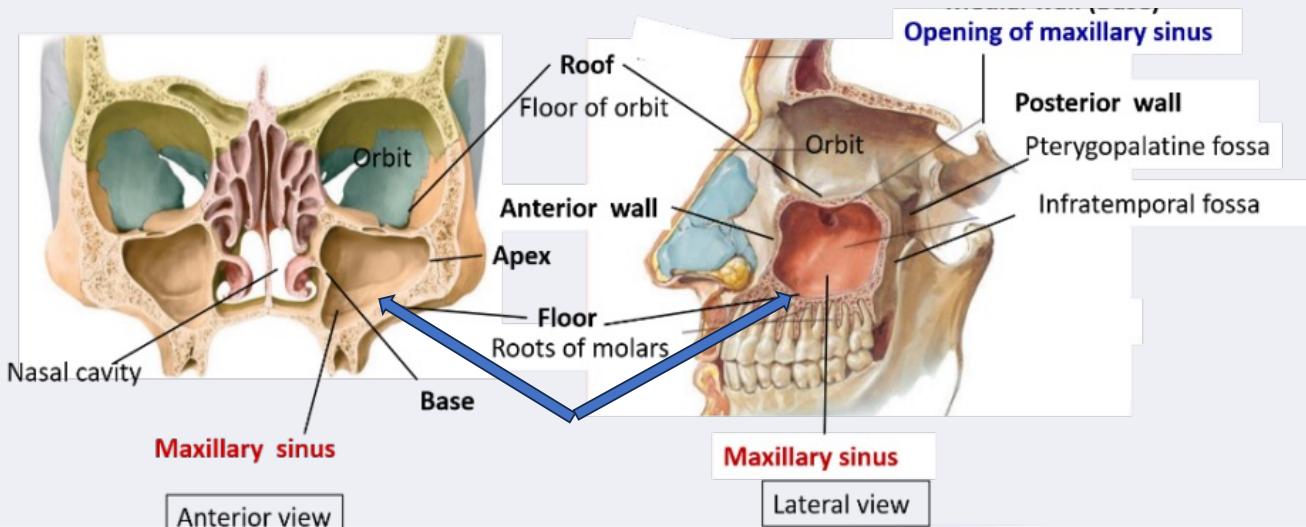
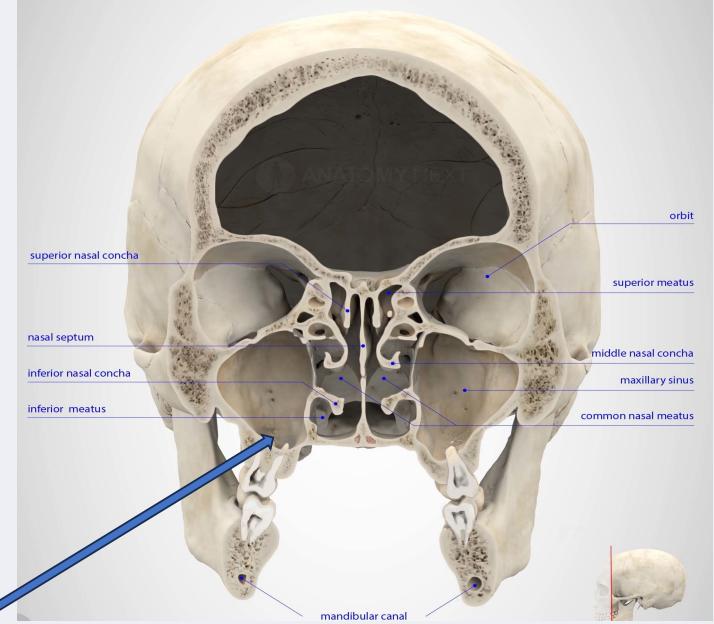
-Superior wall (ROOF)-

- Formed by Floor of the orbit
- Wall is thinnest and infra orbital canal runs along this wall,
- Canal contains the Infra orbital nerves and vessels.
- **Tumors of the maxillary sinus can erode this and neurologic symptoms**

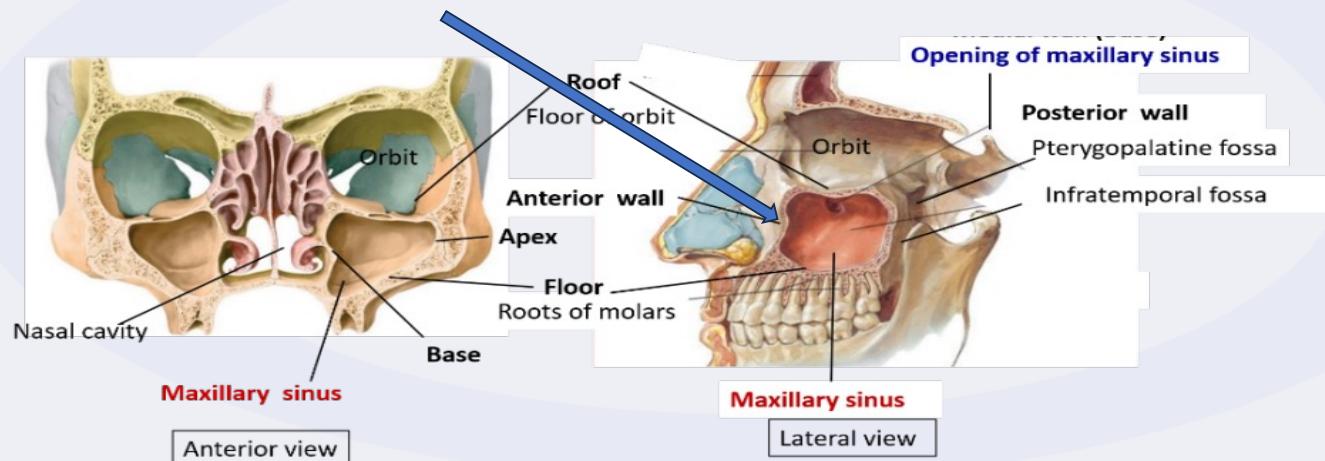
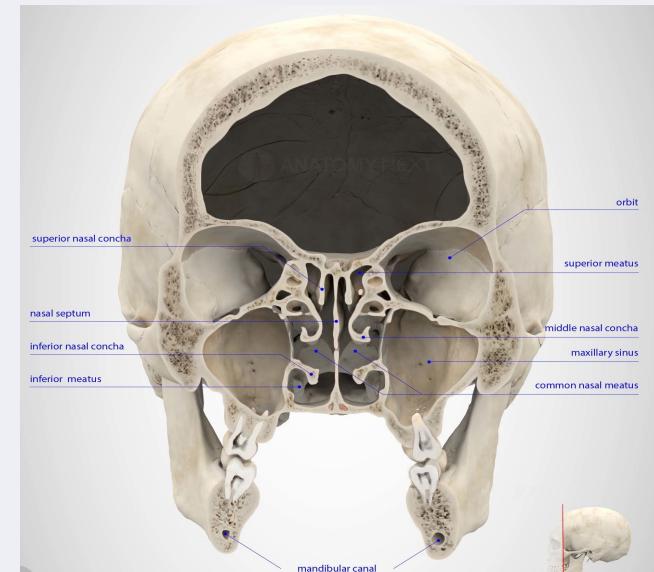


- Inferior wall(Floor)

- Floor of sinus is formed by the alveolar process and palatal process of maxilla

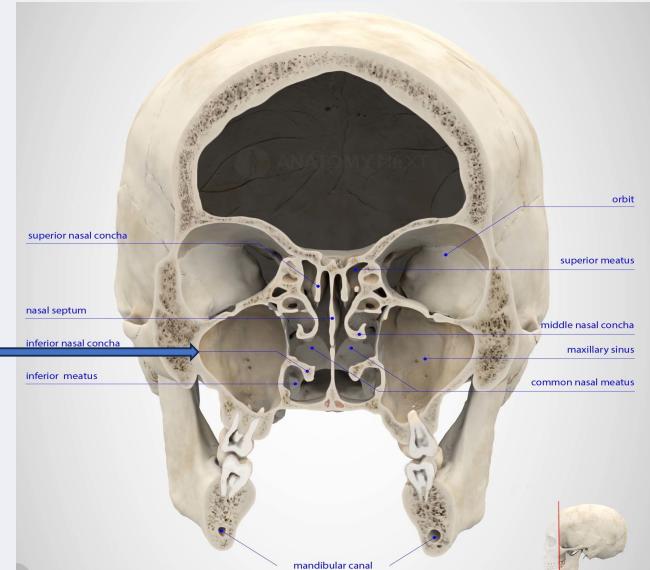


- **Anterior wall:**
- – facial surface of the maxillary bone
- Close to roots of upper premolars and molars (esp. 1st and 2nd molars).
- Dental infections can spread into sinus; extractions may cause **oroantral communication**.



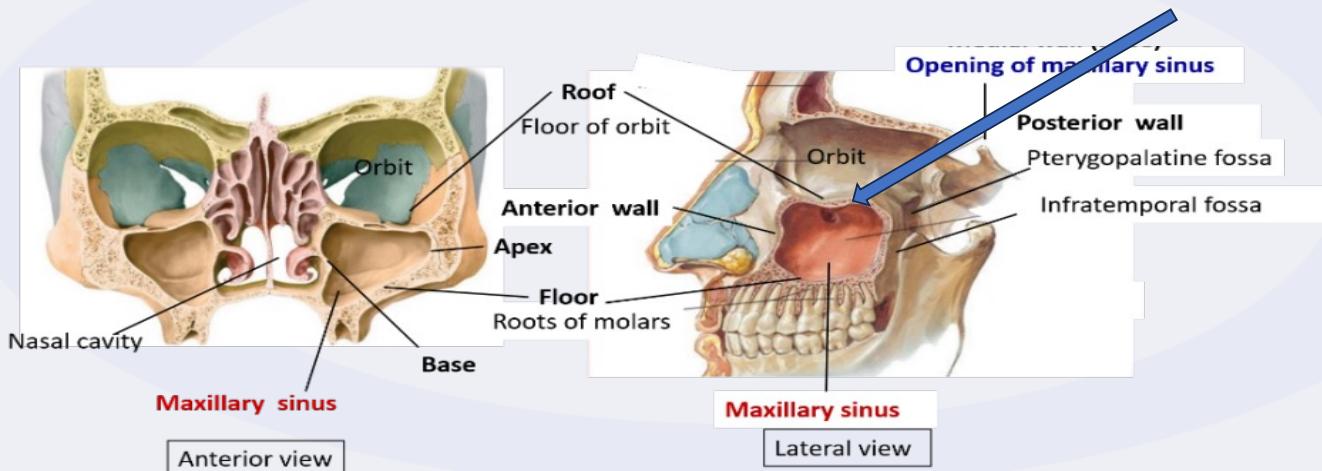
Posterior Wall (Infratemporal Surface)

- Formed by: **Infratemporal surface of maxilla.**
- -contains, postero superior alveolar canal which transmit postero superior alveolar nerves to supply the Maxillary molars.
- - Acute sinusitis can be accompanied by pain in multiple posterior maxillary teeth.



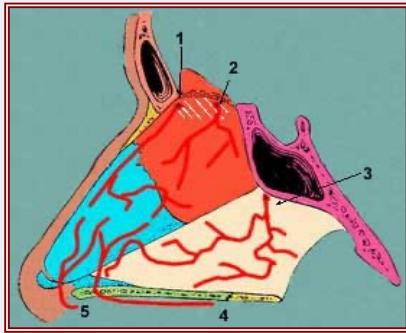
Medial wall-(Base of Pyramid)

Formed by: **Lateral wall of nasal cavity**



Maxillary artery: branches of maxillary artery provides main blood supply to maxillary sinus

BLOOD SUPPLY



- Infraorbital a -
- Greater palatine a
- Postero superior alveolar a
- Anterior superior alveolar a

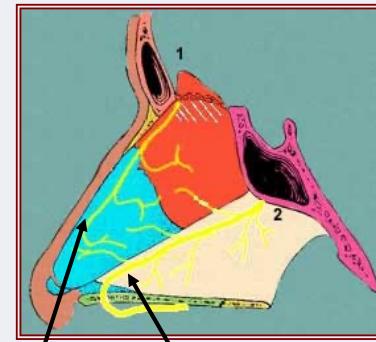
VENOUS DRAINAGE

Into the

- Facial vein &
- Pterygoid plexus of veins

(infections can spread via venous connections to **cavernous sinus** (dangerous pathway).

NERVE SUPPLY



- Infra orbital N
- Ant, middle, & posterior superior alveolar nerves.

- **Lymphatic Drainage of the Maxillary Sinus**

- Anterior part of sinus** : → Submandibular lymph nodes

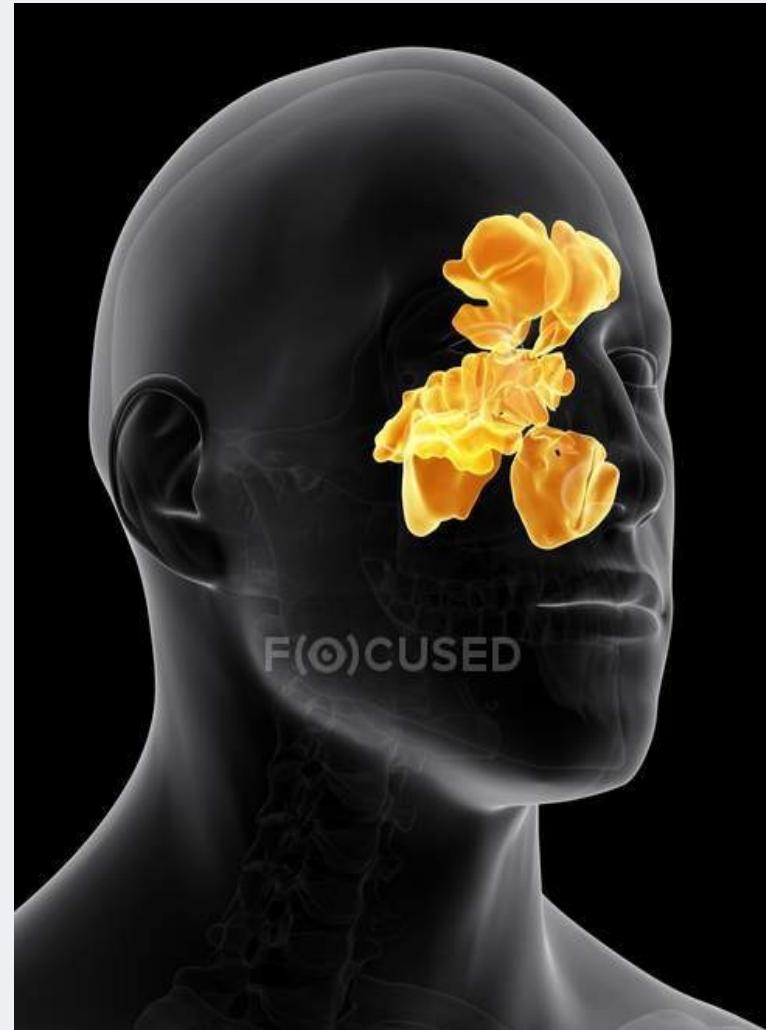
- Posterior part** : → Deep cervical nodes

- Floor of sinus** : → Submandibular nodes

- Roof / near orbit**: → Occasionally to preauricular or parotid nodes

FUNCTIONS OF PARANASAL SINUS

- **Helping to warm and humidify inhaled air**
 - The sinuses are lined with moist mucosa.
 - As air passes through, it gets **warmed and moistened**, making breathing more comfortable and protecting the lungs.
- **Acting as an air reservoir:**
 - hollow spaces that store and regulate airflow.
- **Ventilation.**
 - This allows air to **move in and out**, to avoid stagnation.
 - Aiding in **olfaction (smelling)**: direct air to the olfactory region
- **Decreasing the relative weight of the skull**
- **Increasing resonance of the voice**
- **Shock absorbers :Providing a buffer against blows to the face**
- **Immune Defense** : lining has cells that fight germs and infections.



Importance of the Maxillary Sinus in Dental Practice

Tooth extractions, endodontic treatments, and implant placements:,

The roots of maxillary posterior teeth are often very close to the floor of the sinus.

This proximity makes the sinus - there is risk of sinus perforation.

Sinus Lift Procedures - When the maxillary sinus floor is too low for implant placement, a sinus lift procedure may be necessary to augment the available bone volume.

Complications in Oral Surgery-

During extraction of maxillary posterior teeth, an **oroantral fistula** may occur if the sinus floor is perforated- chronic sinusitis.

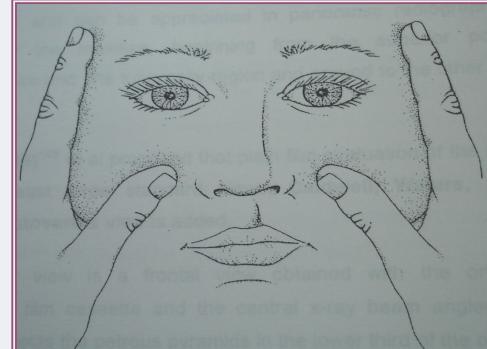


Clinical Examination And Diagnostic Imaging Of Maxillary Sinus



Physical Examination

- Inspection
- Palpation



Palpate the maxillary sinuses by applying light-~~B~~ pressure with the thumbs over the cheek bone.
Normally, palpation detects no tenderness

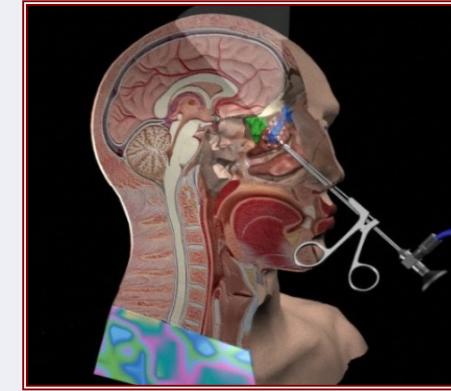


- History - symptoms,
- **Unilateral/ bilateral.** - Bilateral findings - allergy,
 - Unilateral more in space-occupying lesions and bacterial sinusitis.
- **Maxillary sinusitis** rarely produces visible soft-tissue swelling

Clinical Examination And Diagnostic Imaging Of Maxillary Sinus



- Rhinoscopy
- Nasal Endoscopy



Clinical Examination And Diagnostic Imaging Of Maxillary Sinus



- **Transillumination – as a screening tool for monitoring resolving sinuses**

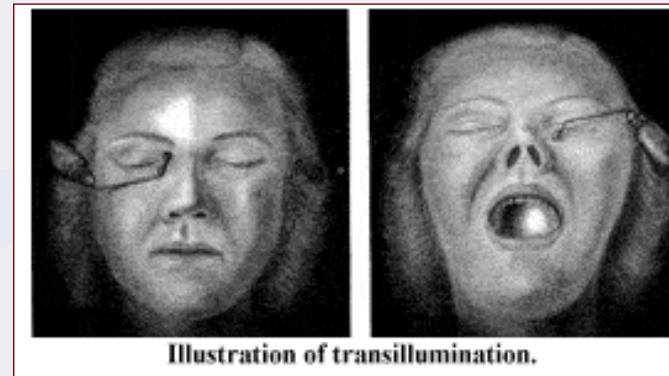


Illustration of transillumination.

- **Aspiration –sinusitis**
- **Nasal cytology - sinusitis**

Imaging Techniques for Evaluating the Maxillary Sinus

Standard Conventional radiographs-

- Intraoral Periapical Radiograph (IOPAR)
 - Maxillary Lateral Occlusal Radiograph
 - Orthopantograph (OPG)
 - Water's View
 - Posteroanterior View of Skull
 - True Lateral Skull View
 - Submentovertex View
-
- **ADVANCED:**
 - Computed Tomography**
 - MRI**

STANDARD RADIOGRAPH

- An antrum appears radiographically as a radiolucent cavity in the maxilla, with well-defined, dense, corticated radiopaque margins or walls.
- **Intraoral Periapical radiograph(IOPAR)-** as thin, delicate, tenuous radio opaque line.

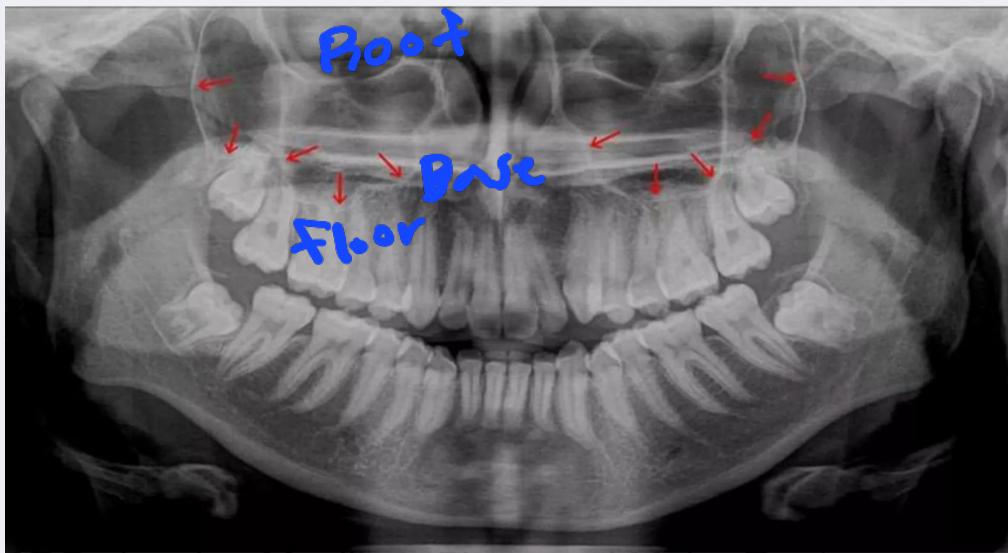
In adults- floor ,extend from distal aspect of canine to posterior wall of maxilla above the tuberosity.



Lateral occlusal

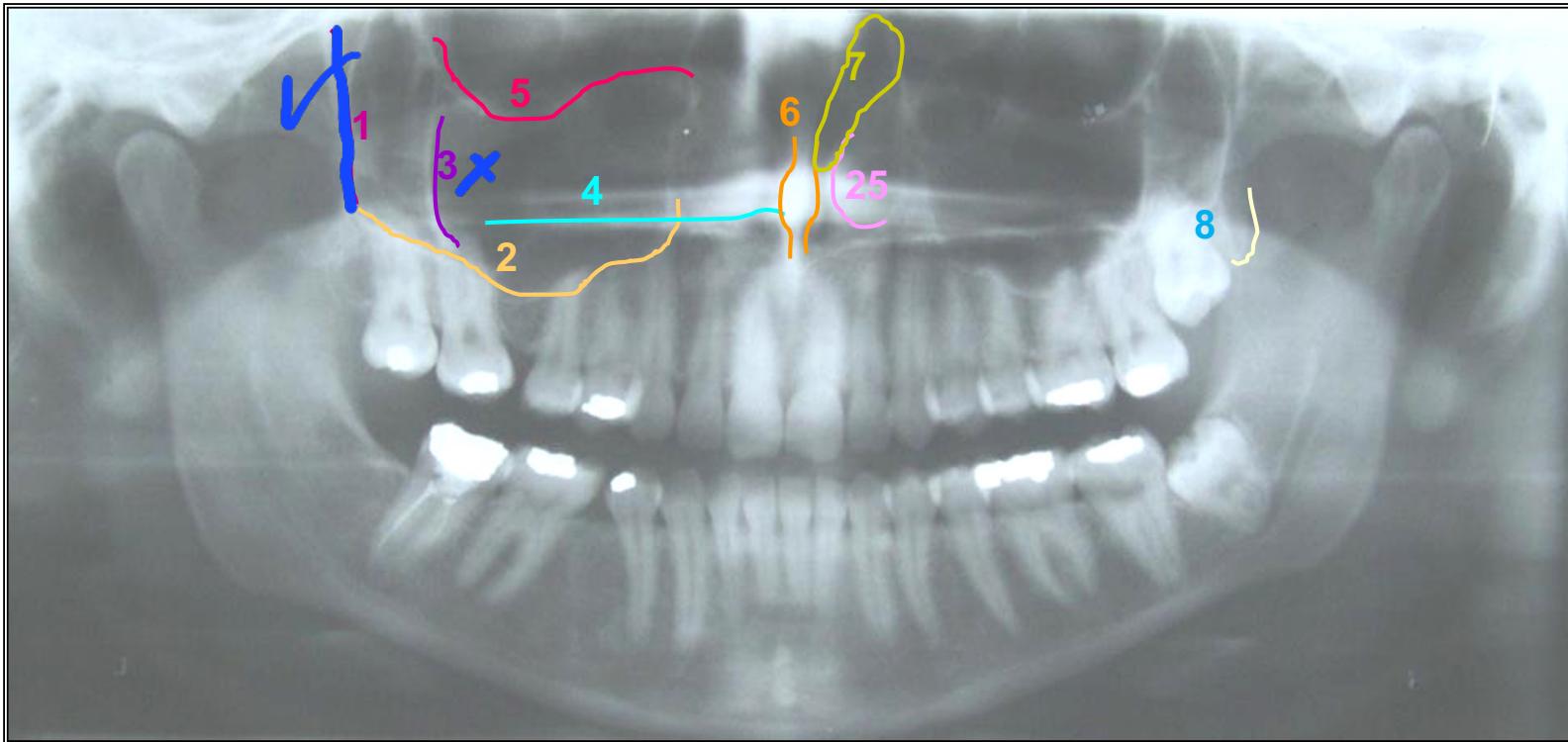


Panoramic radiograph(OPG)



Roots of the maxillary sinus can be misinterpreted as maxillary sinus pathology in OPG

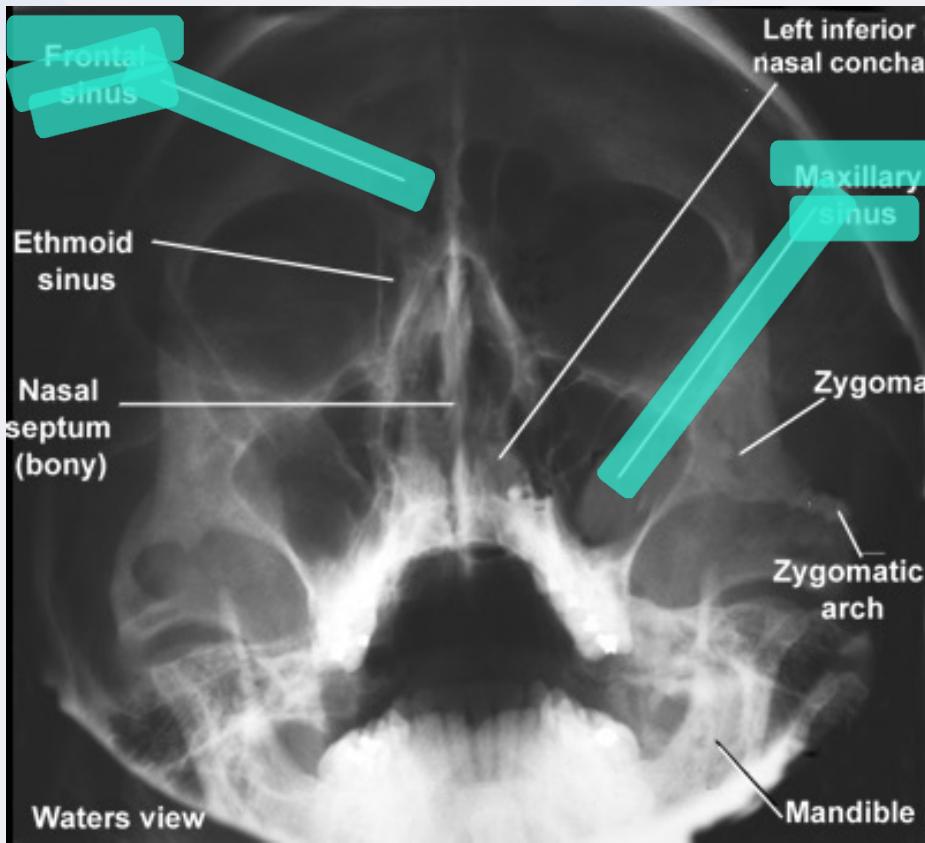
BONY LANDMARKS IN MAXILLA



1. Post. wall max. sinus
2. Floor of Max.Sinus
3. Post wall of Zygomatic process of maxilla(forming innominate line),
4. Hard palate
5. Floor of the orbit
6. Nasal septum
7. Meatus
8. Maxillary tuberosity

WATERS VIEW/PARANASAL SINUS VIEW

/Occipitomental view. -GOLD STANDARD VIEW



For fluid levels in maxillary sinusitis

True Lateral Skull View



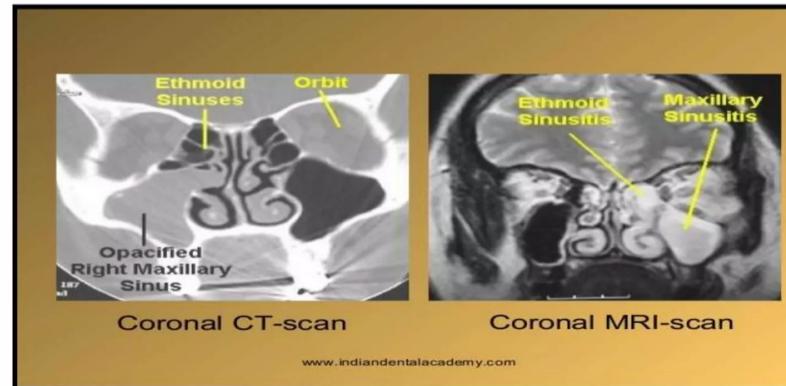
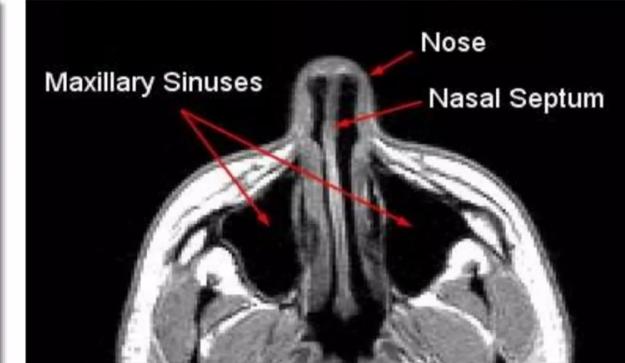
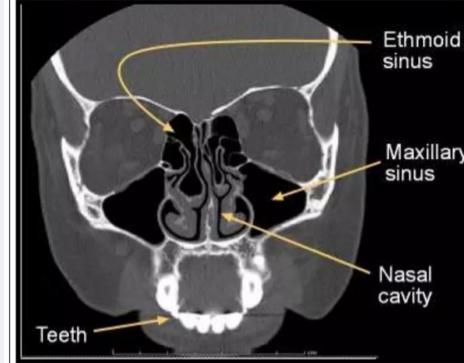
- Frontal, Sphenoidal And Maxillary Sinuses

Submentovertex View- Sphenoidal sinus



CT, MRI

CT SCAN OF MAXILLARY SINUS / MRI OF MAXILLARY SINUS 



REFERENCES:

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THANK U

