Paranasal sinuses

Anatomy

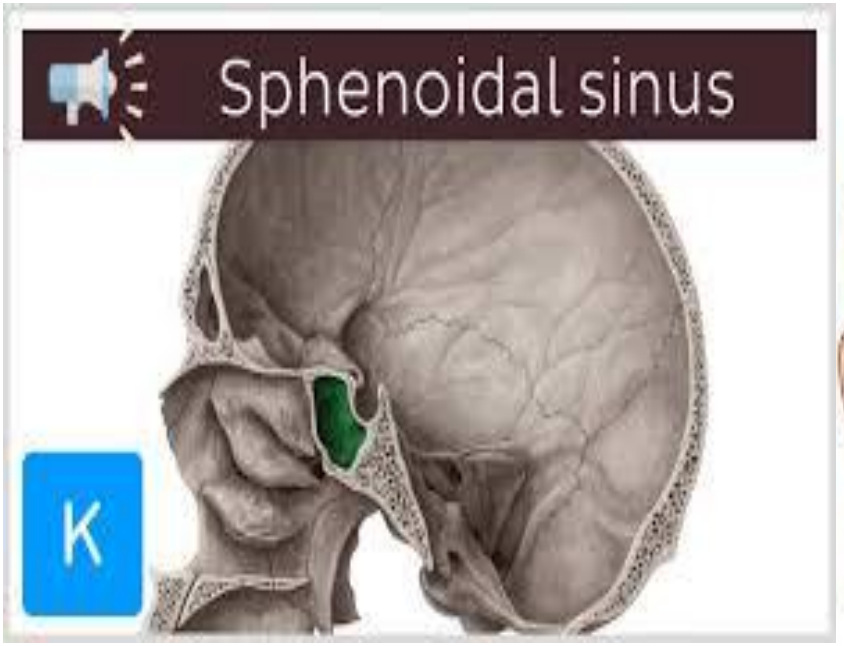
The paranasal sinuses are air-filled cavities that open into the nasal cavity, mostly into the middle meatus of the nose.

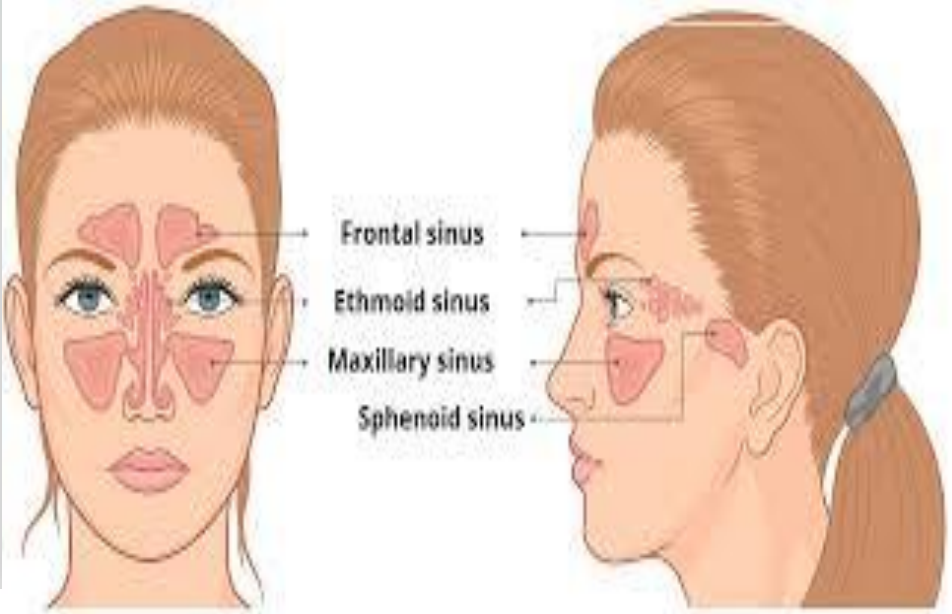
The maxillary sinuses occupy the cheeks .

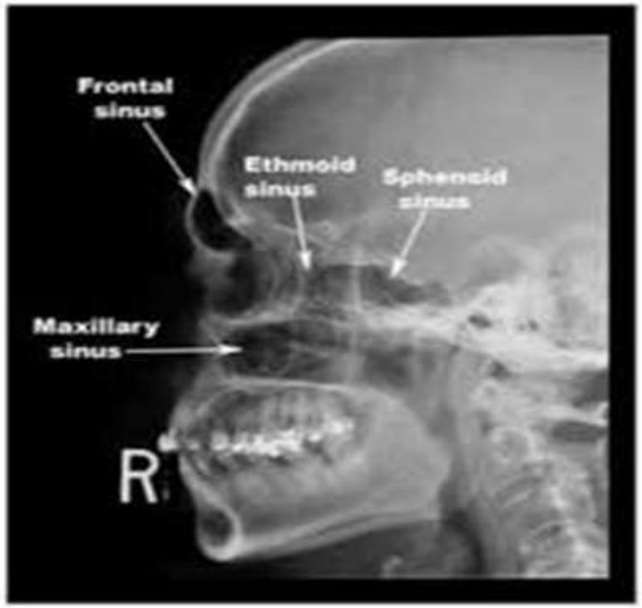
The ethmoid sinuses consists of a number of air cells lying between the orbit and the lateral wall of the nose.

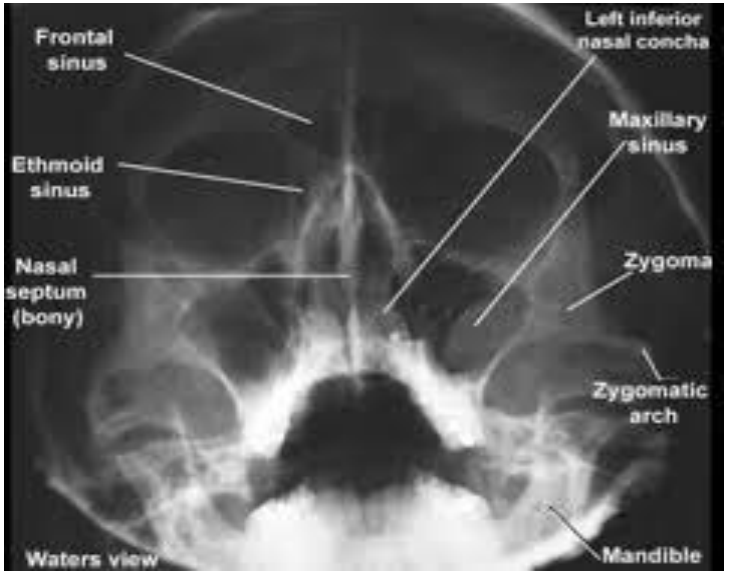
The frontal sinus into the frontal bone, and it is connected to the middle meatus of the nose via the frontonasal duct.

The sphenoid sinus is posterior to the ethmoid labyrinth, inferior to the pituitary fossa.


Sphenoidal sinus
K


Frontal sinus
Ethmoid sinus
Maxillary sinus
Sphenoid sinus


Frontal sinus
Ethmoid sinus
Sphenoid sinus
Maxillary sinus
R


Frontal sinus
Left inferior nasal concha
Ethmoid sinus
Maxillary sinus
Nasal septum (bony)
Zygoma
Zygomatic arch
Waters view
Mandible

Diseases of the paranasal sinuses

Acute sinusitis

Any sinus may become infected. The most commonly involved is the maxillary sinus.

most commonly caused by strept. pneumonae or H. influenza and typically follow upper respiratory tract infection.

The fungal infection is not uncommon.

Acute sinusitis is usually managed medically .

the site of pain caused by sinusitis as following:

Pain arising from the maxillary sinus is felt in the cheek.

Pain from ethmoid sinuses is felt over the nasal bridge.

Pain from frontal sinus is felt in the forehead.

Sphenoid sinus pain is said to be maximal at the vertex.

Chronic sinusitis :

result from failure of resolution of acute infection.

surgical treatment is frequently required and includes enlargement of the natural ostium of the maxillary sinus, often with clearance of infected ethmoid cells.

Frontal and sphenoid sinusitis are much less common.

Infection may spread from the sinuses, usually the ethmoid ,frontal or sphenoid sinuses to involve the cranial cavity or orbit .

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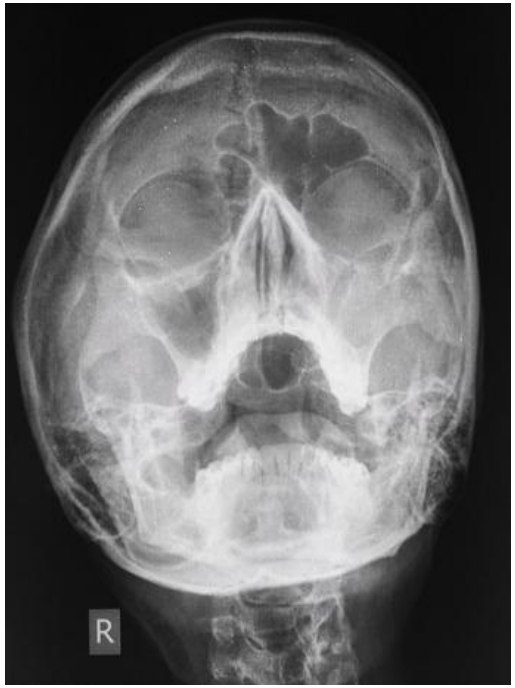
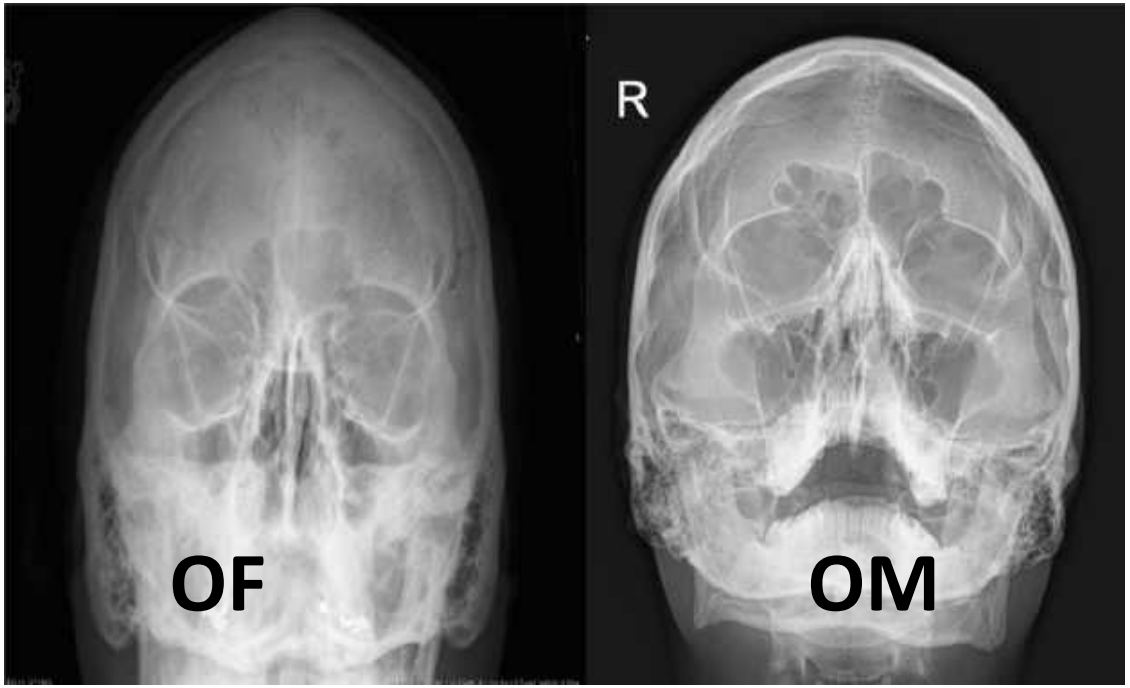
Plain radiograph (x-ray)

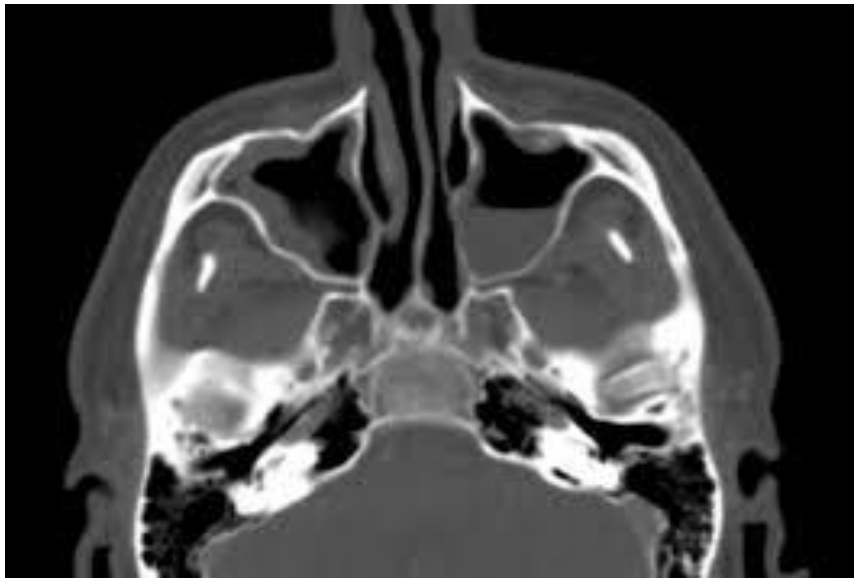
Basic radiographic features are occipitofrontal view (Caldwell view) , occipitomental (OM) or Waters view and lateral view



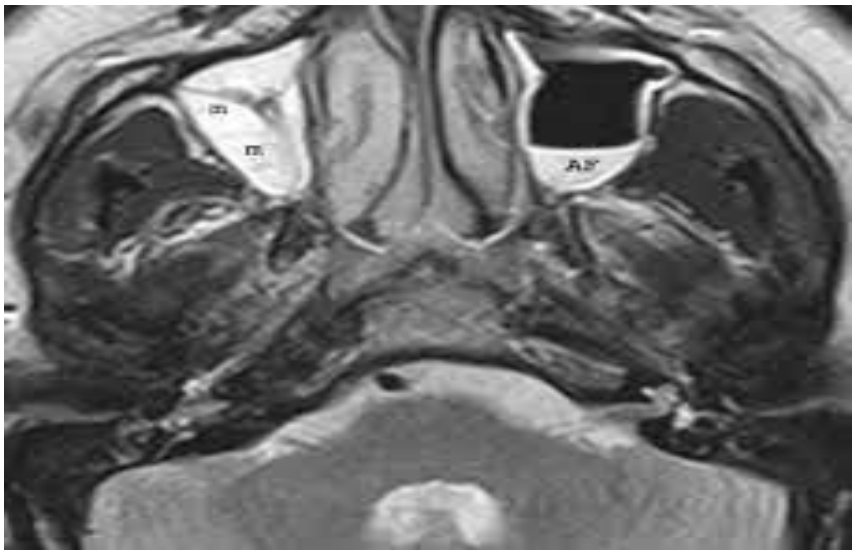


Imaging of sinusitis

CT



MRI



Tumors of Para nasal sinuses

The most common malignant neoplasm found in the paranasal sinuses is squamous carcinoma.

Adenocarcinomas are seen in workers in the furniture industry.

The most common sites of origin are the maxillary and ethmoid sinuses.

Managed by a combination of surgery and radiotherapy or chemotherapy.

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Imaging of the paranasal sinuses tumors

Imaging may be valuable or even necessary in:

1- helping to solve a diagnostic problems .

2- confirm a suspected diagnosis.

3- evaluate the extent of a known condition

4- assess for an underlying cause of the condition

X-ray , **Computed tomography (CT)** and **magnetic resonance imaging (MRI)** can be useful in providing additional information regarding **causes or complications**.

CT and MRI play complementary roles in evaluating the **rare tumors** that may involve the paranasal sinuses.

CT scan

The CT paranasal sinus protocol serves as an examination for the assessment of the mucosa and bone system of the sinonasal cavities.

Typical indications include the following:

1- inflammatory disease (acute rhinosinusitis , gas-fluid levels , mucosal disease , chronic sinusitis , cysts and polyps , mucoceles)

2-foreign body

3-malignancy

4- preoperative assessment

In neoplastic disease, CT scan of the paranasal sinuses is performed to demonstrate bony erosions and osteolytic lesions with the use of an intravenous contrast medium .

CT is also excellent for determining whether there is intra orbital extension of sino-nasal disease .

The real value of unenhanced CT if you see an opacified sinus with hyperdense contents, it is usually a sign of benign disease. Tumor is not hyper-dense

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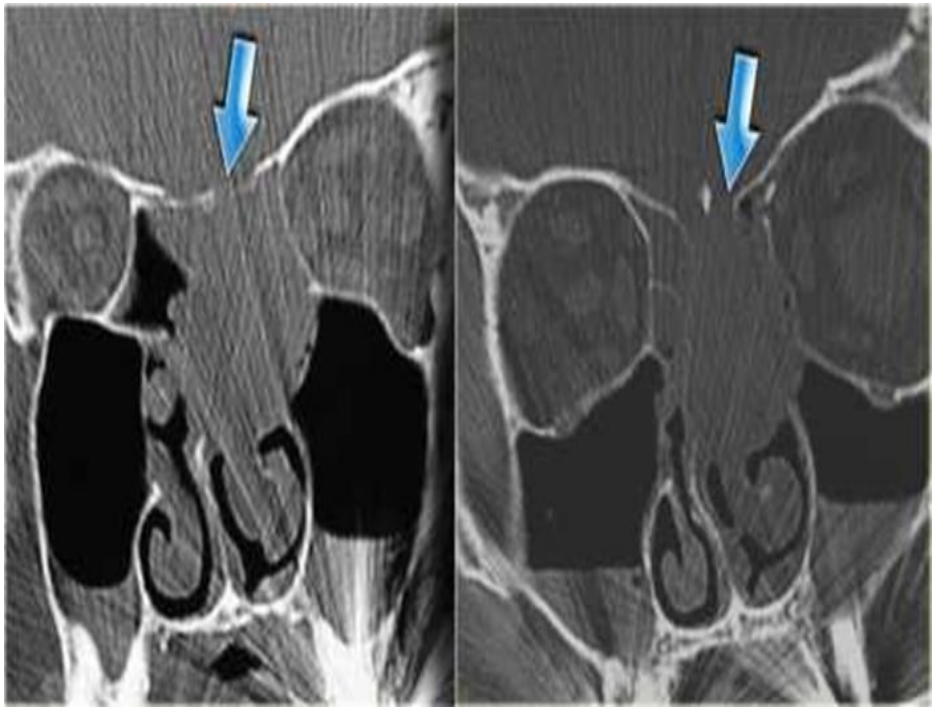
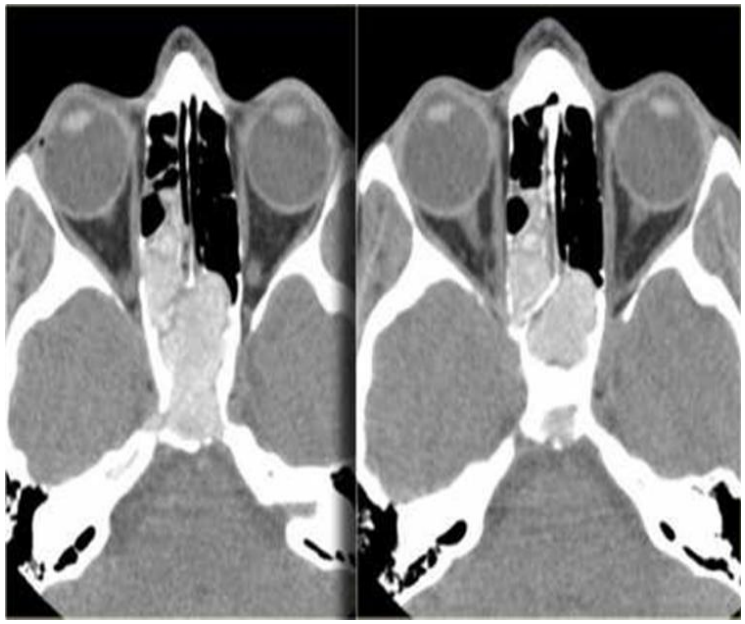
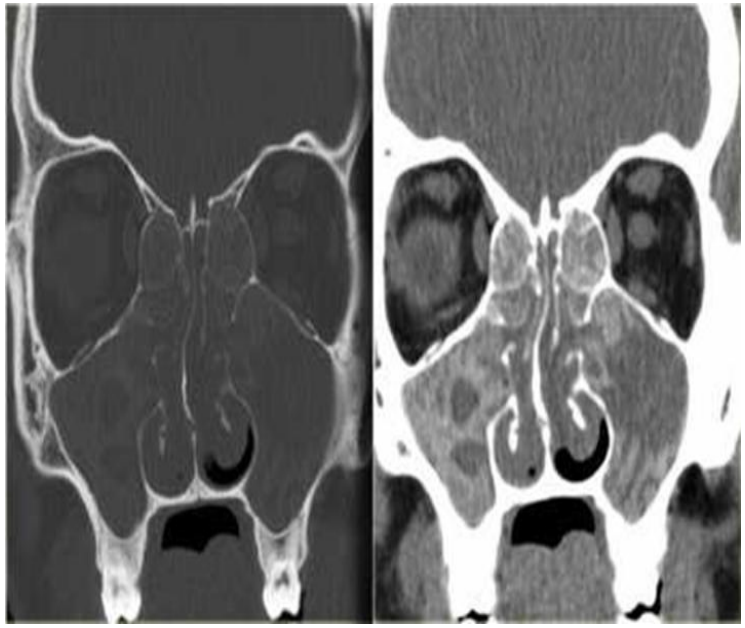
The hyperdensity is due to one or a combination of the following:

-inspissated secretions
-fungus
-blood







MRI

MRI is extremely helpful in complicated sinonasal disease.

MRI can distinguish secretions and mucosa from masses.

The signal intensity of secretions can vary and mainly depends on the ratio of water to protein and the viscosity.

Different protein contents result in different signal intensities on T1 and T2W-images

Fungus usually has a high protein content of more than 28% and can mimic an aerated sinus because it is low on T1- and T2WI.

Paranasal tumors in MRI seen hypo intense in T1 , hyper intense or heterogeneous intensity in T2 with significant contrast enhancement .

MRI is the study of choice for detecting intracranial extension of sinonasal tumors to the skull and brain