

MAXILLARY SINUS & ORAL HEALTH**Dr. Saravpreet Singh***

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ABSTRACT

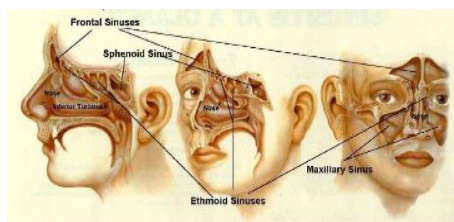
Maxillary sinusitis (acute or chronic) is defined as a symptomatic inflammation of the maxillary sinus, usually caused by viral, bacterial, allergic or fungal rhinitis. The maxillary sinus is of paramount importance for otolaryngologists, rhinologists, oral and maxillofacial surgeons, head and neck and dental and maxillofacial radiologists. There are four pairs of paranasal sinuses: the maxillary, ethmoid, frontal and sphenoid. They are air-filled, mucosa-lined spaces within the maxillofacial region and skull centred on and communicating with the nasal cavity. Odontogenic maxillary sinusitis (OMS) is a well-recognized condition in both the dental and otolaryngology communities. This review aims to provide better insight into various dental etiologic factors of OMS, clinical examination, radiographic examination and developmental anomalies & pathologic conditions of maxillary sinus to clarify diagnostic disease characteristics and present different treatment plans.

KEYWORDS: Oroantral fistula, Dental implants, Dental infection, direct sinus lift, maxillary sinus.**INTRODUCTION****Paranasal air sinus**

Paranasal air sinuses are the air filled mucosa lined cavities which develops in the cranial and facial bones.

These are the spaces which communicates with the nasal airway. These forms the various boundaries of the nasal cavity. The sinuses are named for the bones in which they are located.^[1-5]

Paranasal sinuses are present in a variety of animals (including most mammals, birds, and crocodile).^[6]

**Maxillary air sinus**

Frontal air sinus

Ethmoidal air sinus

Sphenoidal air sinus

Definition of maxillary sinus

“Maxillary sinus is the pneumatic space that is lodged inside the body of maxilla and that communicates with the environment by way of the middle meatus and nasal vestibule.”^[7,8]

Development

Maxillary sinus is first of the PNS to develop.

It starts as a shallow groove on the medial surface of maxilla during the 4th month of intrauterine life.

Expansion occurs more rapidly until all the permanent teeth have erupted.

It reaches to maximum size around 18 years of age.^[6,8,9,11,12]

Functions of the maxillary sinus

Humidification and warming of inspired air, Assisting in regulating intranasal pressure, Lightening the skull to maintain proper head balance, Imparting resonance to the voice, Absorption of shocks to the head, Filtration of the inspired air.^[13,14,15]

CLINICAL EXAMINATION**INSPECTION**

Middle third of the face should be inspected for the presence of asymmetry, deformity, swelling, erythema, ecchymosis or hematoma.

EXTRAORAL PALPATION

Include palpation of the facial wall of the sinus above the premolar where the bone is thinnest.

INTRAORAL EXAMINATION

Examination should be performed for tenderness, or paresthesia of upper molar and premolar region.

TRANSILLUMINATION TEST

It is performed in a darkened room by inserting an electrically safe light into the mouth (with the lip closed).

Good transillumination indicates presence of air in the sinus while the failure of transillumination indicates presence of pus, fluid, solid lesion or mucosal thickening.

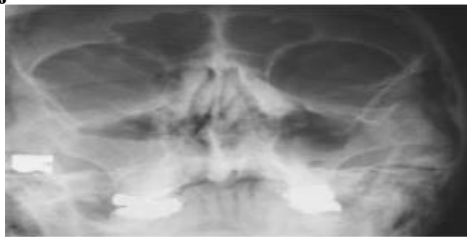
Radiographic examination

Radiography is the most important supplementary investigation to clinical examination of the sinuses.^[15,16,17]

2. Panoramic radiography

Provides an extensive overview of the sinus floor and its relationship with the tooth roots.

3. Water's projection



Computerized tomography (CT) & Magnetic resonance imaging (MRI)

These modalities provide multiple sections through the sinuses at different planes and therefore contribute to the final diagnosis and the determination of extent of the disease.

Ultrasound

Ultrasound is becoming the diagnostic tool of choice for more and more physicians in detecting sinusitis.

It offers a fast reliable and radiation free method for diagnosing sinusitis and has been used successfully in Finland for around 15 year.

Ultrasound beam sent out by the sinus ultra is reflected from the posterior wall of the sinus when the sinus contains fluid and from the anterior wall when sinus contains air.



Diagnostic endoscopy

It is an optimal method especially for the assessment of foreign bodies (such as root filling materials and root tips) that have penetrated into the maxillary sinus.

Transoral access via the canine fossa.

1. Periapical radiograph

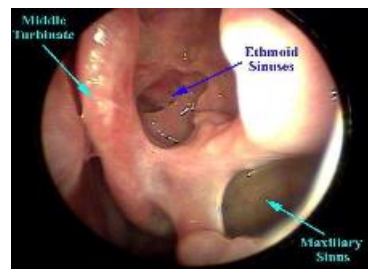
Border of the maxillary sinus appear as a thin, delicate radiopaque line.

In the absence of disease it appears continuous, but on close examination it has small interruptions in its smoothness or density.

The roots of maxillary molars usually lie in close apposition to the maxillary sinus and may project into the floor of the sinus, causing small elevations or prominences.

Transalveolar access via an already existing connection between the oral cavity and the antrum.

Access via the inferior meatus of the nose.



Developmental Anomalies and Pathologic Conditions Of Maxillary Sinus

Developmental anomalies

1. Aplasia
2. Agenesis
3. Hypoplasia

Pathologic conditions of maxillary sinus

Maxillary Sinusitis
Odontogenic cystic lesions of maxillary sinus
Tumors of maxillary sinus.

Maxillary Sinusitis

Acute Maxillary Sinusitis Sudden onset Duration of 4wks or less
Subacute Maxillary Sinusitis Duration of 4 – 12 wks
Chronic Maxillary Sinusitis Duration of atleast 12 wks
Etiology

1. Infectious causes
Bacterial
Viral
Fungal

2. Non infectious causes

Allergic
Non allergic
Pharmacologic
Irritants

3. Disruption of mucociliary drainage

Surgery
Trauma

Maxillary sinusitis of Dental Origin

1. Dental abscess (periodontal and periapical abscess)
2. Infected dental cyst
3. Dental material
4. Oro-antral communication

Clinical Considerations

Oro-antral communication and oro-antral fistula

Maxillary sinus perforation occurs occasionally during the extraction of a maxillary tooth, and it may be a cause of maxillary sinusitis or oro-antral fistula.

The chances of creating an oro-antral fistula in patient less than 15 yrs are comparatively lesser than in adults due to incomplete development of sinus.

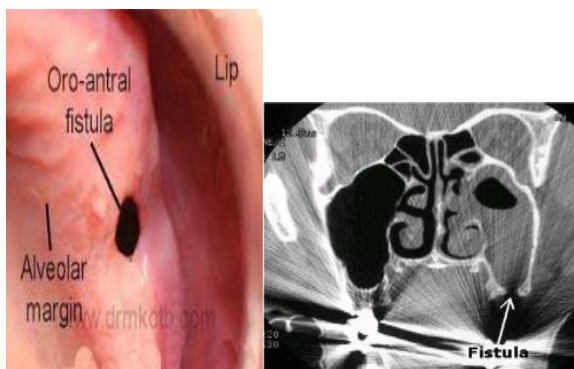
The distance between apical end of maxillary posterior teeth and floor of sinus is approximately 1-1.2 cm. In some cases the gap may be still lesser.

Root which is most close to the sinus is "palatal root of maxillary 2nd molar

Followed by

- 1st molar
- 3rd molar
- 2nd premolar
- 1st premolar canine

Lin et al. in 1991 reported that the maxillary sinus is more developed in female and therefore greater possibility of the occurrence of oro-antral communication and oro-antral fistula in female.

**Symptoms of fresh oro antral communication**

Escape of fluids

Epistaxis
Escape of air
Enhanced column of air.
Excruciating pain

Symptoms of established oroantral fistula

Pain.
Persistent purulent unilateral nasal discharge.
Post nasal drip.
Popping out of antral polyp.

Maxillary sinus pneumatization

The expansion of the sinus is larger following extraction of several adjacent posterior teeth, if dental implant placement is planned in these cases, immediate implantation and/or immediate bone grafting should be considered to assist in preserving the 3-dimensional bony architecture of the sinus floor at the extraction site.

**Implants in the maxilla**

Lack of sufficient bone height along maxillary sinus, produces significant difficulty for placement of implants in edentulous maxillary jaw, in that case, we go for sinus lift, which is a surgical procedure which aims to increase the amount of bone in the posterior maxilla.

SINUS LIFT

There are two main approaches to lift the maxillary sinus

1. Direct (Caldwell luc)
2. Indirect

Direct sinus lift - advantage

1. It is clear
2. Easy access
3. More efficient work is done.

Disadvantage

1. More painful.
2. More post operative discomfort
3. More time consuming
4. Needs highly efficient practitioner
5. More susceptible to infection

ADVANTAGE

1. Minimally invasive surgical procedure
2. Requires less time and expertise than direct technique.

DISADVANTAGE

1. Blind procedure
2. More chances of errors to occur.

Foreign body: Foreign body like GP, silver point, calcium hydroxide, sodium hypochloride, sealers, root piece may sometimes be accidentally forced into the maxillary antrum causing maxillary sinusitis.

Maxillary Sinusitis: Because of the thickened and inflamed sinus lining compresses the nerve supply of the maxillary posterior teeth causing tenderness of the maxillary teeth.

The infraorbital and superior alveolar vessels are frequently ruptured in maxillary fracture causing hemotoma formation in the antrum.^[18-21]

CONCLUSION

Due to close proximity of maxillary sinus to orbit, alveolar ridge, maxillary teeth, diseases involving these structures may produce confusing symptoms. Hence a precise information about the surgical anatomy is essential. Knowledge of the anatomical relationship between the maxillary sinus floor and the maxillary posterior teeth is important for the preoperative treatment planning of maxillary posterior teeth. Clinicians must be particularly cautious when performing dental procedures involving the maxillary posterior teeth.

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