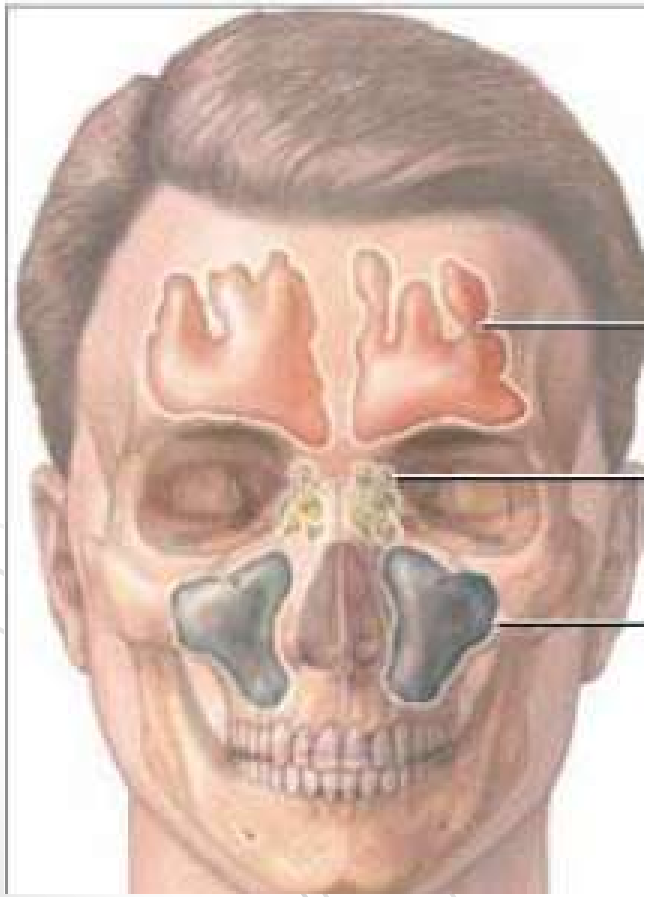
Dental Implications of the Maxillary Sinus

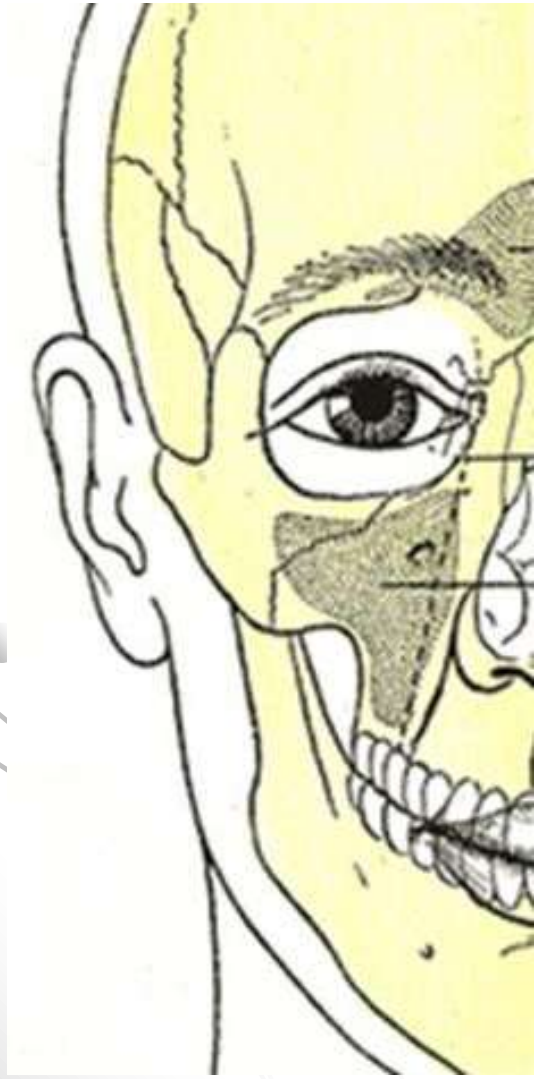
Ahmed Jan

Objectives

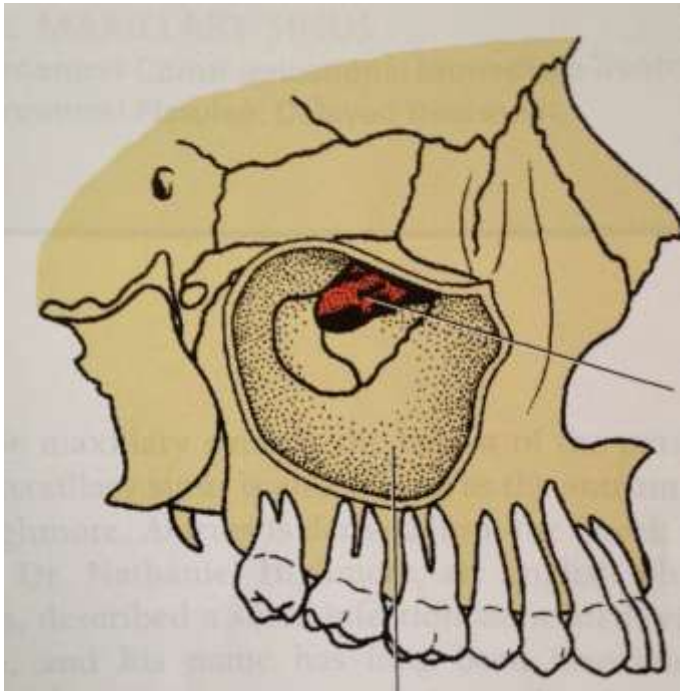
- Sinusitis of odontogenic origin
- Foreign bodies in the sinus
- Oro- antral communication and fistula



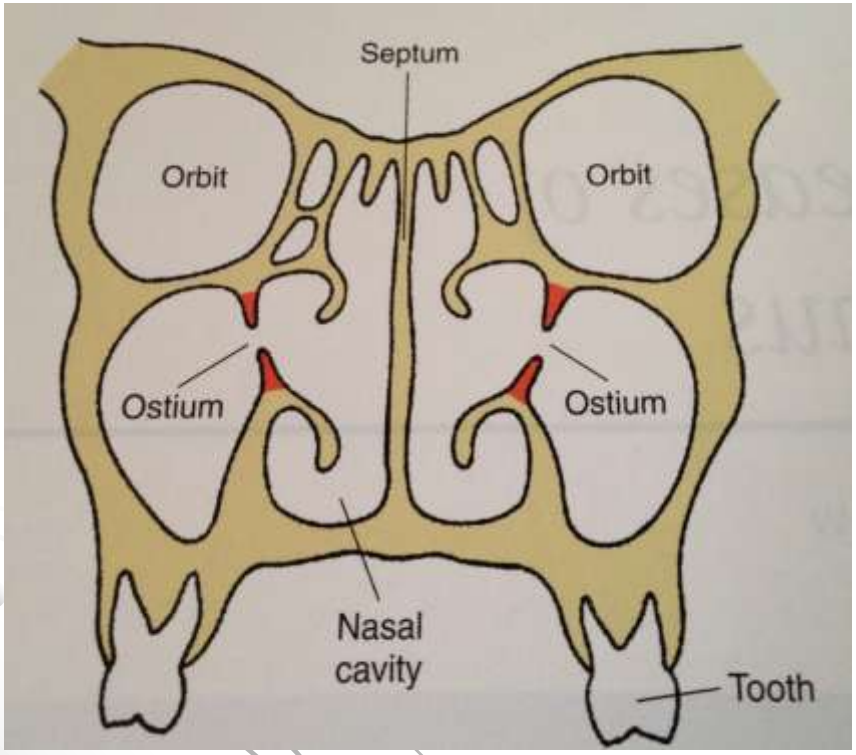
- Frontal sinus
- Sphenoidal sinus
- Ethmoidal sinus
- Nasal cavity
- Maxillary sinus



- Maxillary sinus is pyramidal air filled cavity occupies most of body of the maxillary bone.

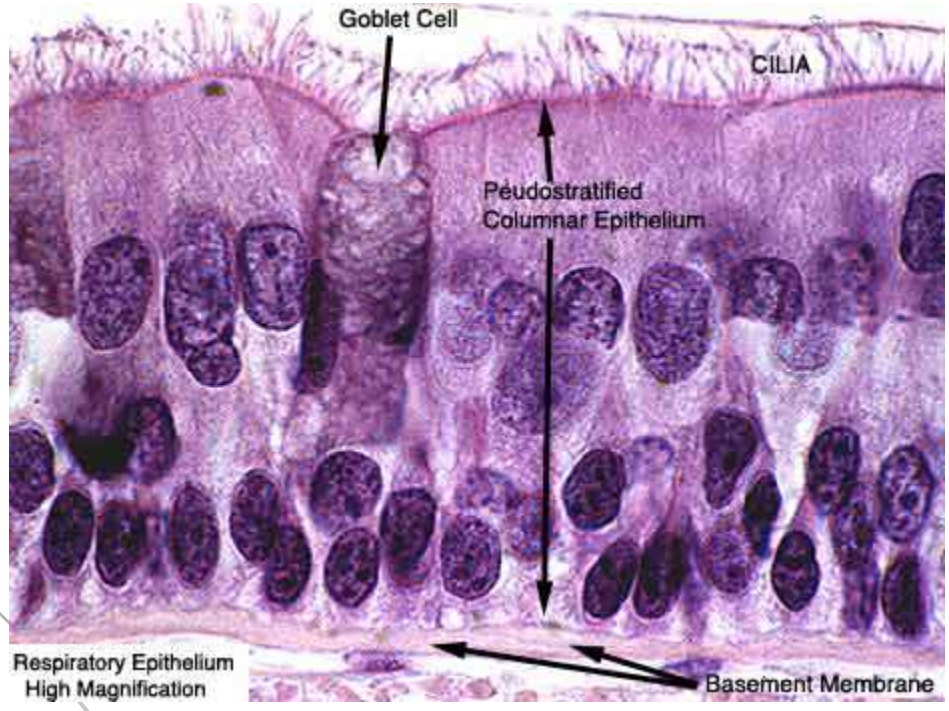


Maxillary Sinus Osteium



- Drains into middle meatues
- Opens into hiatus semilunaris
- High level of drainage contributes to fluid collection

Pseudo-startified ciliated columnar epithelium with goblet cells



Maxillary Sinus Embryology and development

- It begins in utero at 3 months as an evagination of the epithelium of the lateral wall of the nasal fossa.
- It's present at birth and look like a slit of a pea size.
- It grows rapidly by a process known as **pneumatization** during eruption of the deciduous teeth and reaches about half of its adult size.

Maxillary Sinus Embryology and development-Self Study

- The final size of the antra is very variable .
- At birth, has a volume of 6 ml to 8 ml
- In the adult, it measures 25 mm along the anterior limb of its base, 34 mm deep, and 33 mm high.
- The floor of the sinus will be usually 4 mm to 5 mm below the floor of the nose in the adult.

Maxillary Sinus Embryology and development

- As it develops, it enlarges downward into the alveolar process and laterally into the body of the Zygoma.

- The lateral wall contains canals or grooves for the nerves and blood vessels supplying the upper posterior teeth.

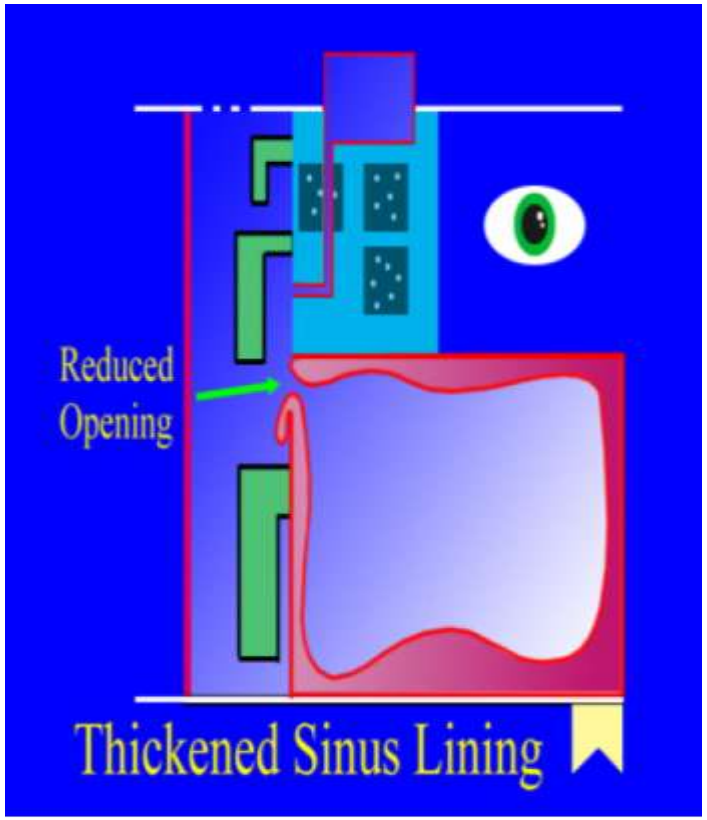
Relations, Arterial & Nerve supply

- Arteries
  - Infraorbital artery
  - Posterior superior alveolar artery
- Nerves
  - Posterior superior alveolar nerve
  - Middle superior alveolar nerve
  - Anterior superior alveolar nerve
  - Infraorbital nerve

Maxillary Sinusitis

Suppurative or non suppurative inflammation of the mucosal lining of the sinus. It involves one or both sinuses.

Maxillary Sinusitis



Inflammation of the mucosal lining of the sinus

Maxillary Sinusitis: inflammation of the mucous membranes with associated symptoms

DURATION

- ***Acute*** — 4 weeks or less with complete resolution
- ***Subacute*** — 4-12 weeks
- ***Chronic*** — 12 weeks or more
- ***Recurrent acute*** — 4 or more attacks per year

Maxillary Sinusitis
ETIOLOGY

- Allergic
- Infectious
- Dental sources
  - Periapical lesions
  - Traumatic extractions (Oro-antral fistula)

MAXILLARY SINUSITIS From DENTAL ORIGIN

1.Periapical abscess (Molars)

2.Periodontal diseases

3.Infected radicular cyst or dentigerous cyst

4. Foreign body in antrum : root , filling material

5.Oroantral communication

6. Involvement in facial fracture

7. Local lymphatics spread

Nathaniel Highmore (1613–1685)

Sometimes Sinus Mucosal Lining is the only Interposing Layer

"The Bone which encloses and which separates the Sinus from the Sockets of the Teeth does not much exceed a Piece of Wrapping Paper in Thickness"

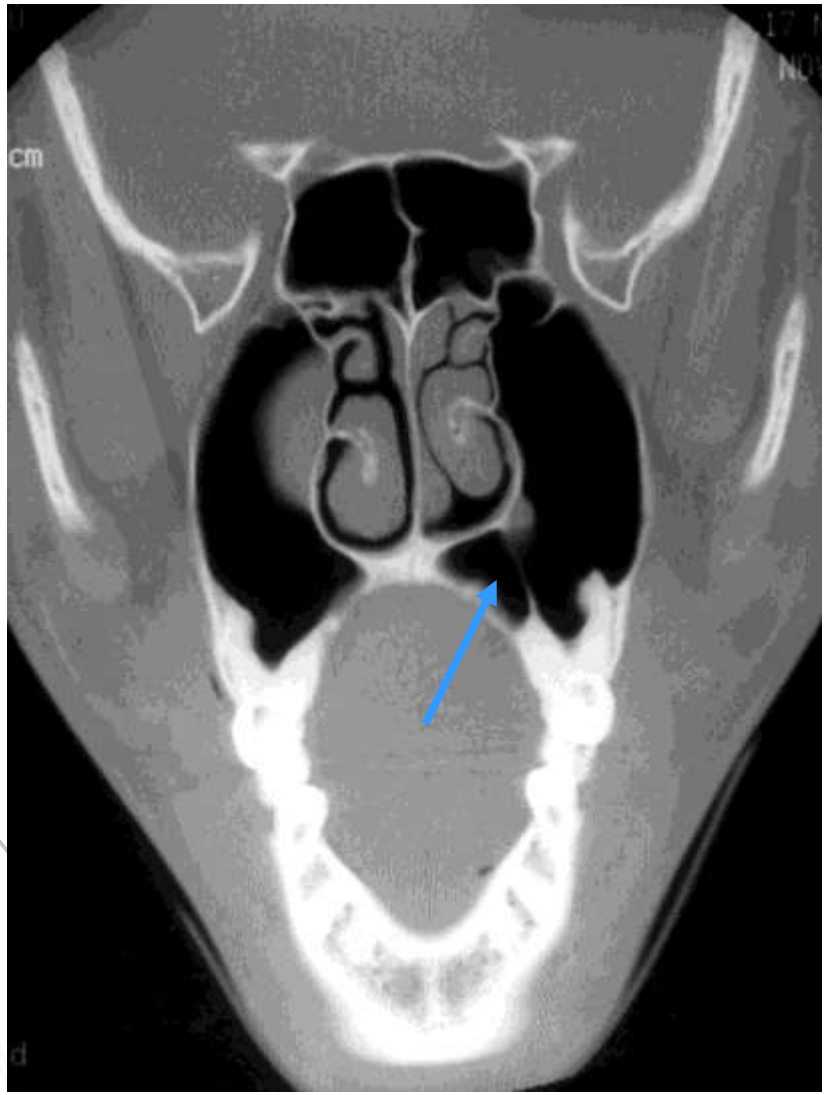
Nathaniel Highmore 1651

Sinus pneumatization - mild

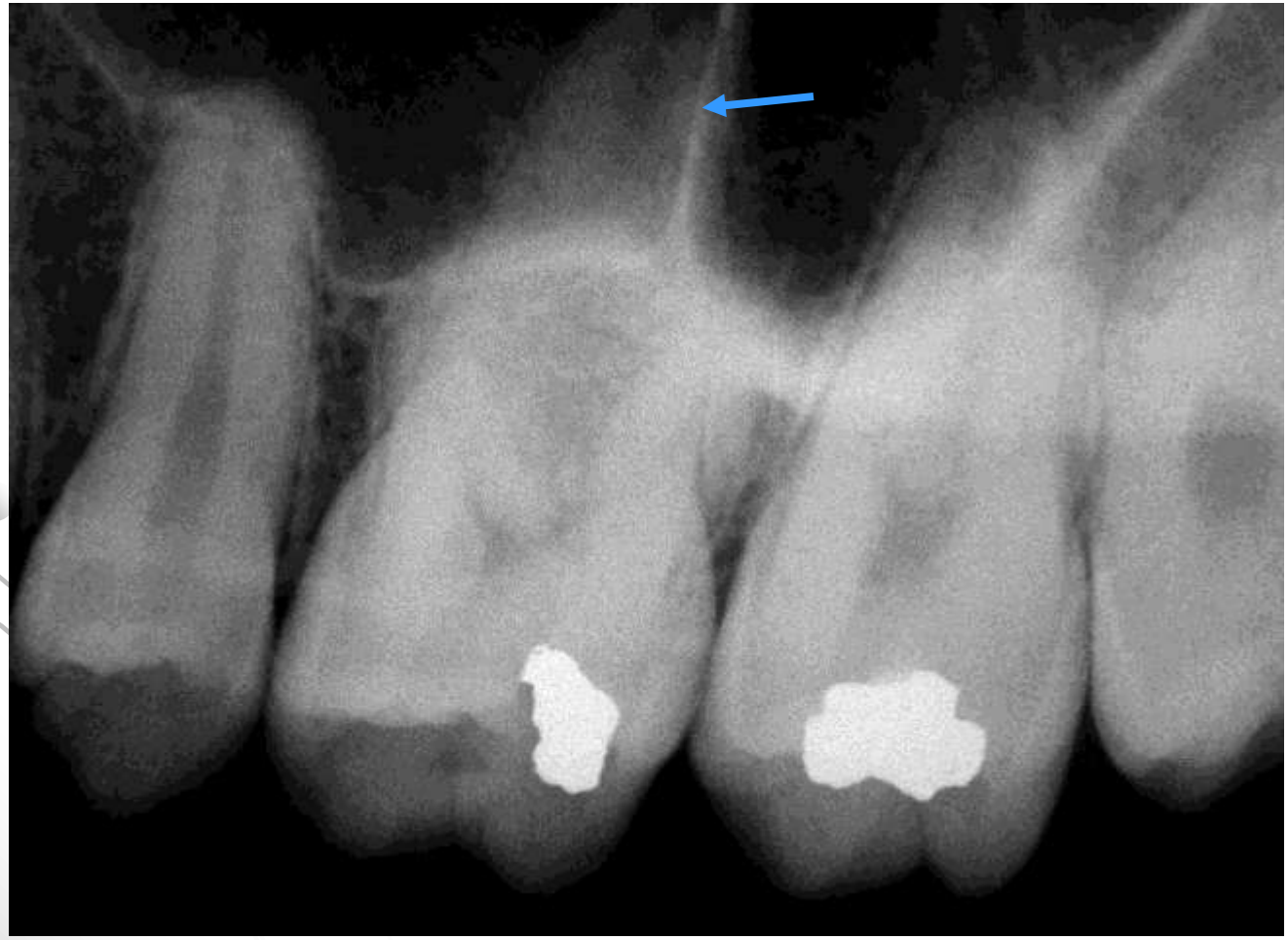
Sinus pneumatization - moderate

Sinus pneumatization - extensive

Palatal sinus recess



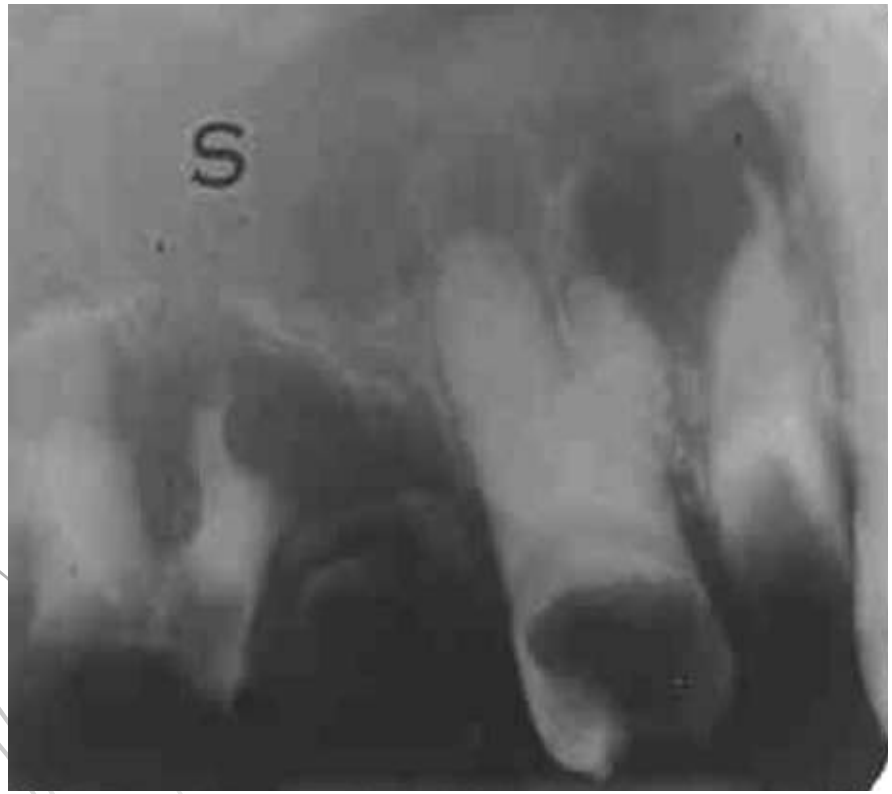
Sinus septum



Sinus Pneumatization

- Mucosal Thickening

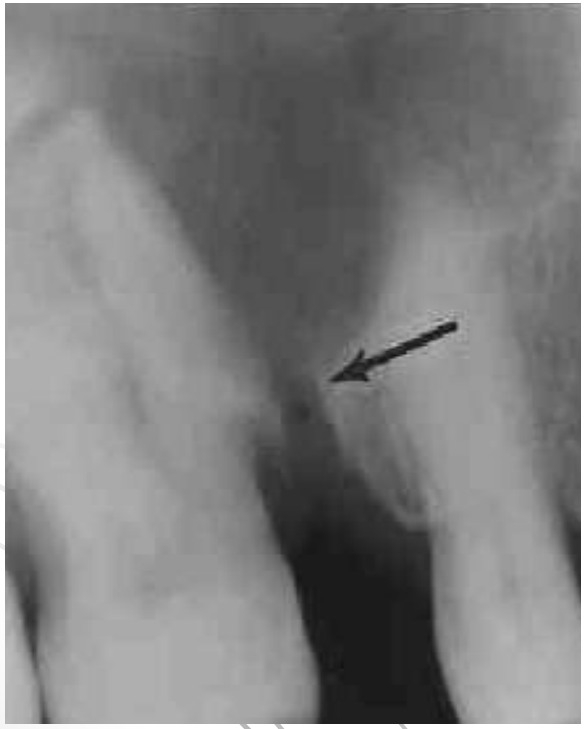
Periapical Pathology

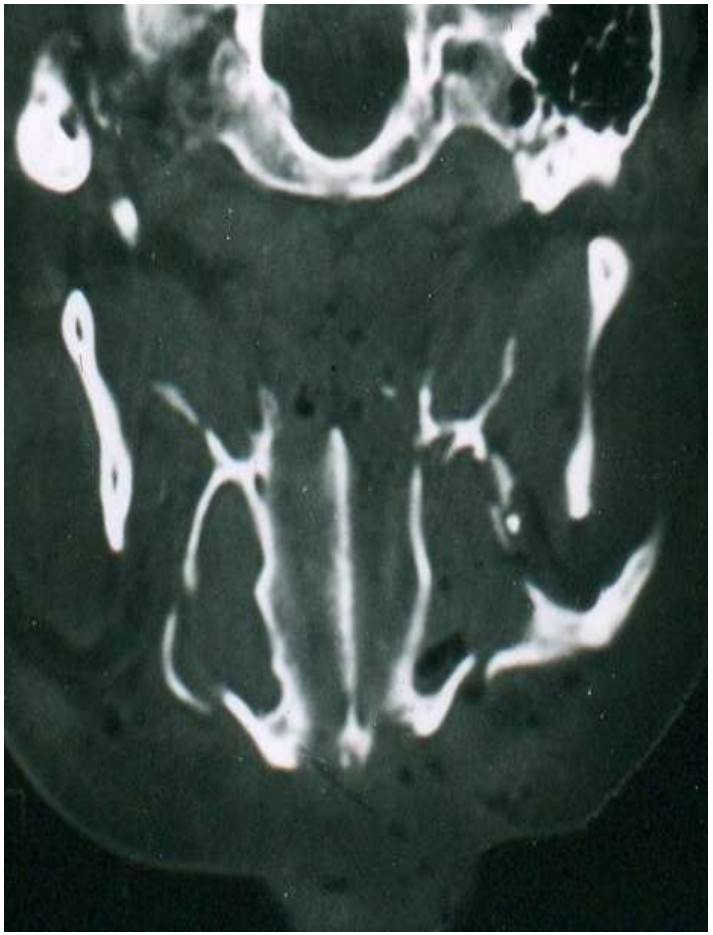


Pericoronal Pathology

- Obliteration of the sinus

Oro-Antral Fistula





SYMPTOMS

Nasal obstruction/blockage

Headache

Fever (acute sinusitis only)

Yellow or green-colored discharge from the nose

Postnasal drip Halitosis (bad breath)

Tenderness over sinus (increased by positioning)**)**

Aching teeth in the upper jaw (Multiple)

Loss of the sense of smell

Persistent cough

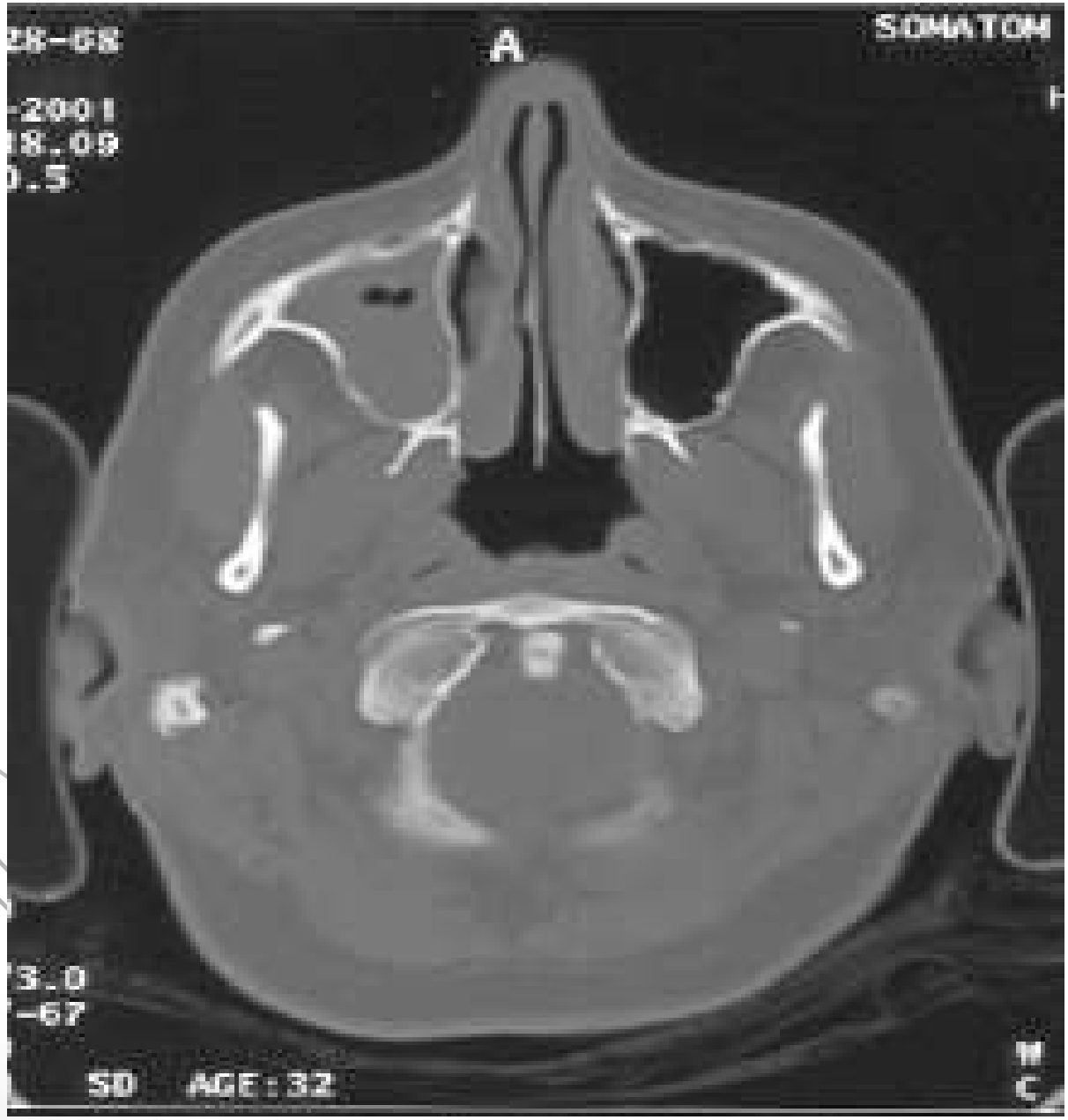
Generally feeling unwell

PAIN

- Maxilla
- Below the eyes
- Teeth and Gingiva

- Worsen when coughing, sneezing, or bending.

Fluid Level


A
SOMATOM
SD
AGE : 32

Sinusitis: Treatment

- Antibiotics:
  - Amoxicillin
  - Augmentin
  - Erythromycin
  - Clindamycin
  - Lovofloxacin, Moxifloxacin
- Analgesic
- Anti-inflammatory
- Decongestants

Maxillary Sinusitis: Treatment

- Adjunct methods: (other than antibiotics and surgery)
- Humidified air (normal saline sprays)
- Warm, moist compresses
- Systemic Decongestants
- Topical steroid sprays
- Nasal decongestant drops
- Mucolytics
- Antihistamines

Complications of sinusitis

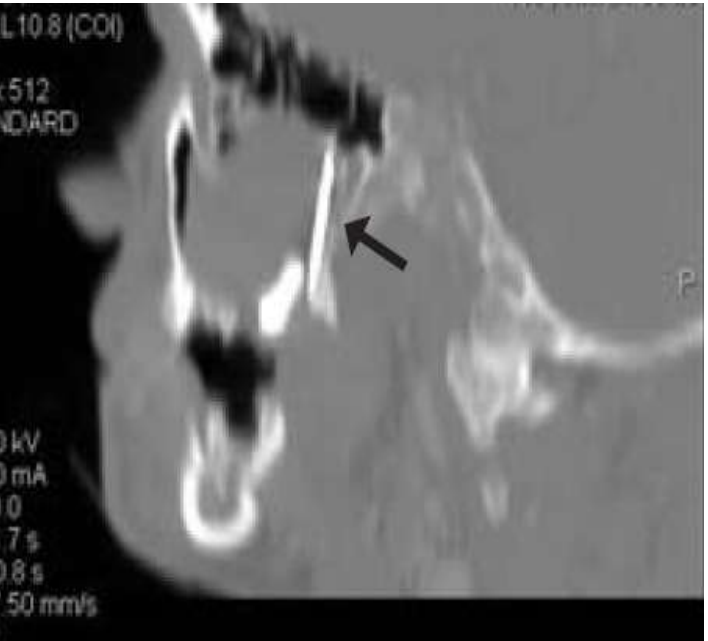
- Orbital abscess and orbital cellulitis.
- Intracranial abscess.
- Meningitis.
- Cavernous sinus thrombosis.
- Spread of infection to neighboring sinuses, structures and organs.(pan sinusitis)
- Osteomyelitis.
- Gastrointestinal disturbances.

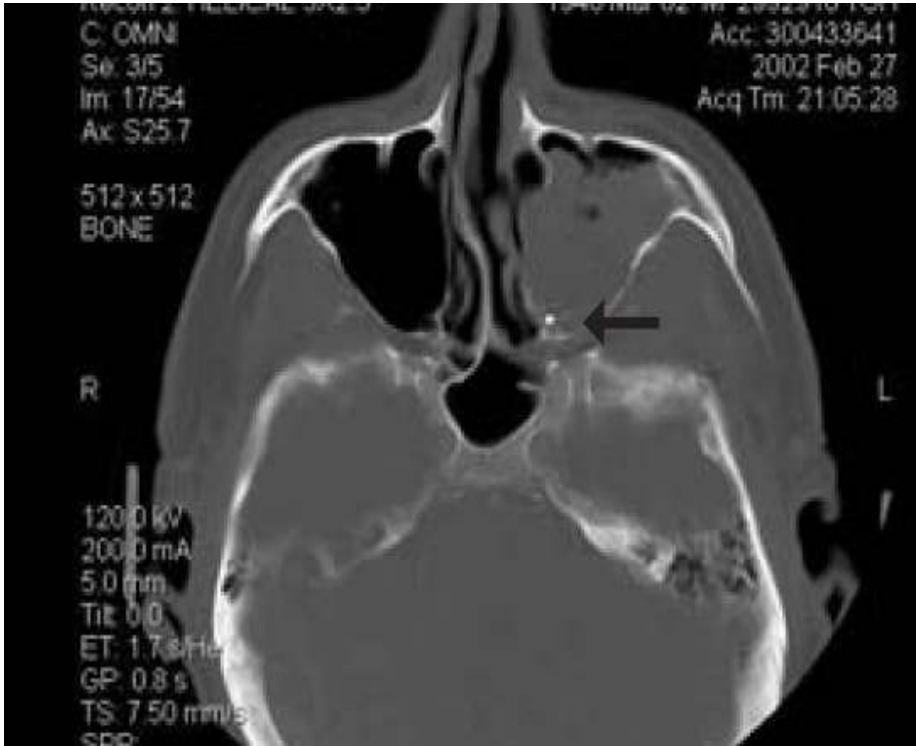
Displacement of root into the maxillary sinus

- Uncontrolled force by the operator when using elevators.
- 1^{st} , 2^{nd} molars and 2^{nd} premolar are at the most risk.
- Maxillofacial Trauma.

Foreign Objects in Sinus

Foreign Objects in Sinus





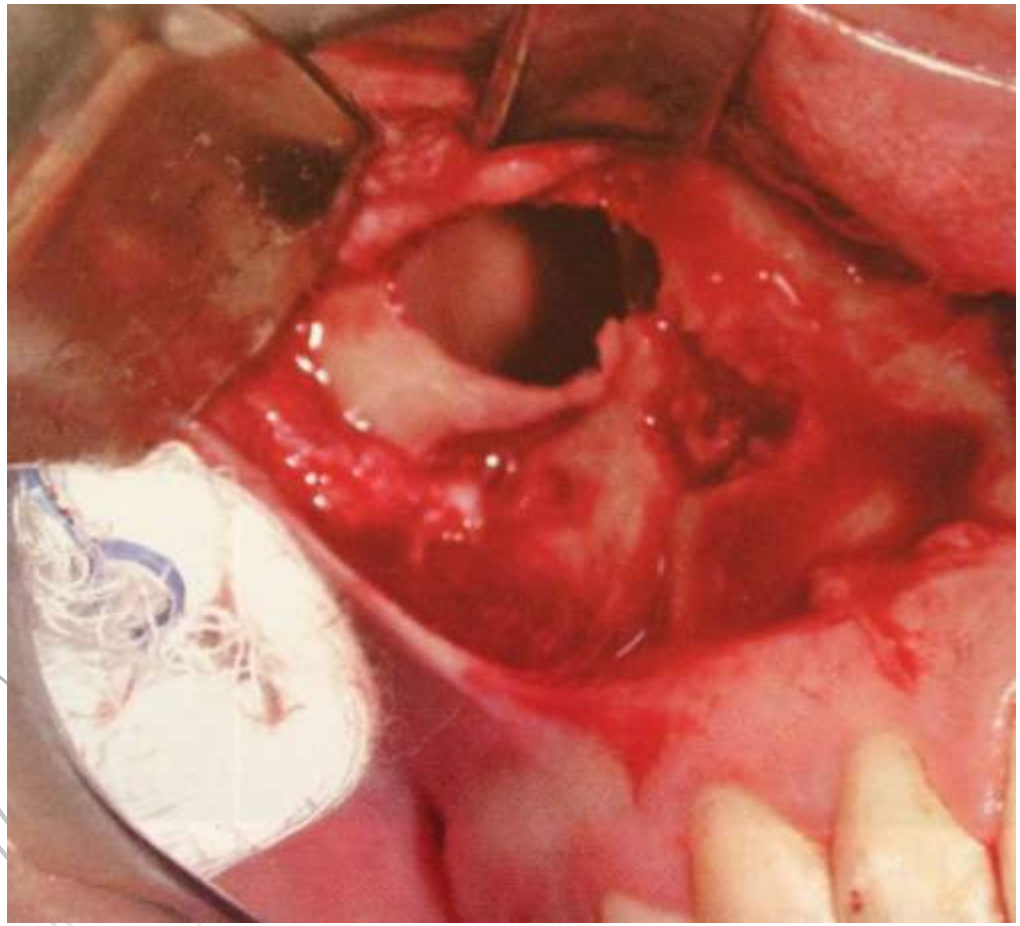
Root displaced into the sinus in Sinus

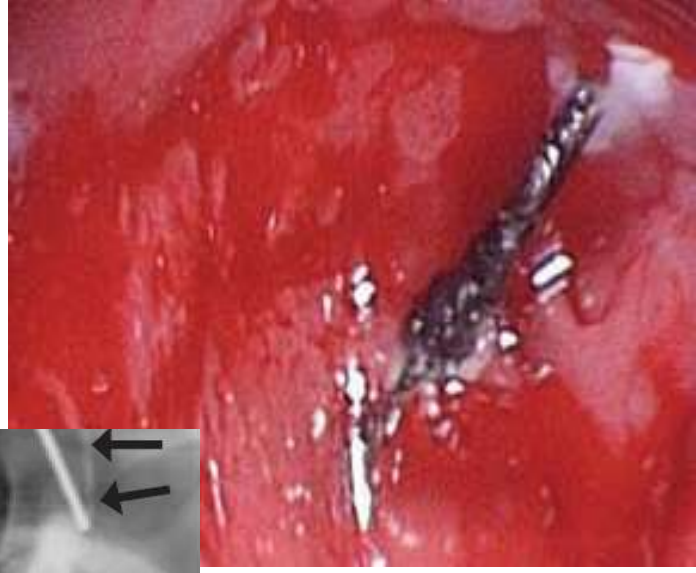
- Identify size of fragment
- Evaluate the tooth removed
- Compare pre and postoperative radiographs (PA)
- Infected tooth?

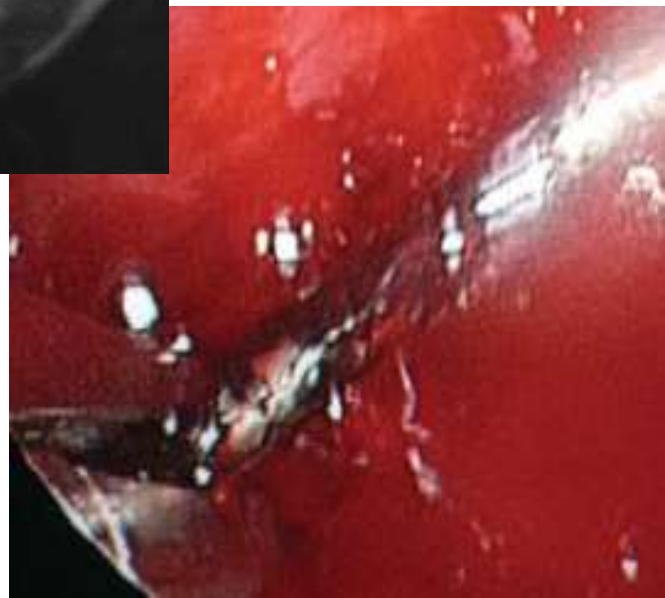
2-3mm root + non infected

- Radiographically document
- Attempt to remove
- Irrigate via the socket and suction if unsuccessful
- Leave in place
- Inform Patient
- Sinus precautions
- Nasal spray, decongestants, antibiotics
- OMFS Consult

Caldwell-Luc Procedure







Oroantral Communication
OAC

- Communication of the floor of the maxillary sinus in the area of premolar and molar region with the oral cavity.

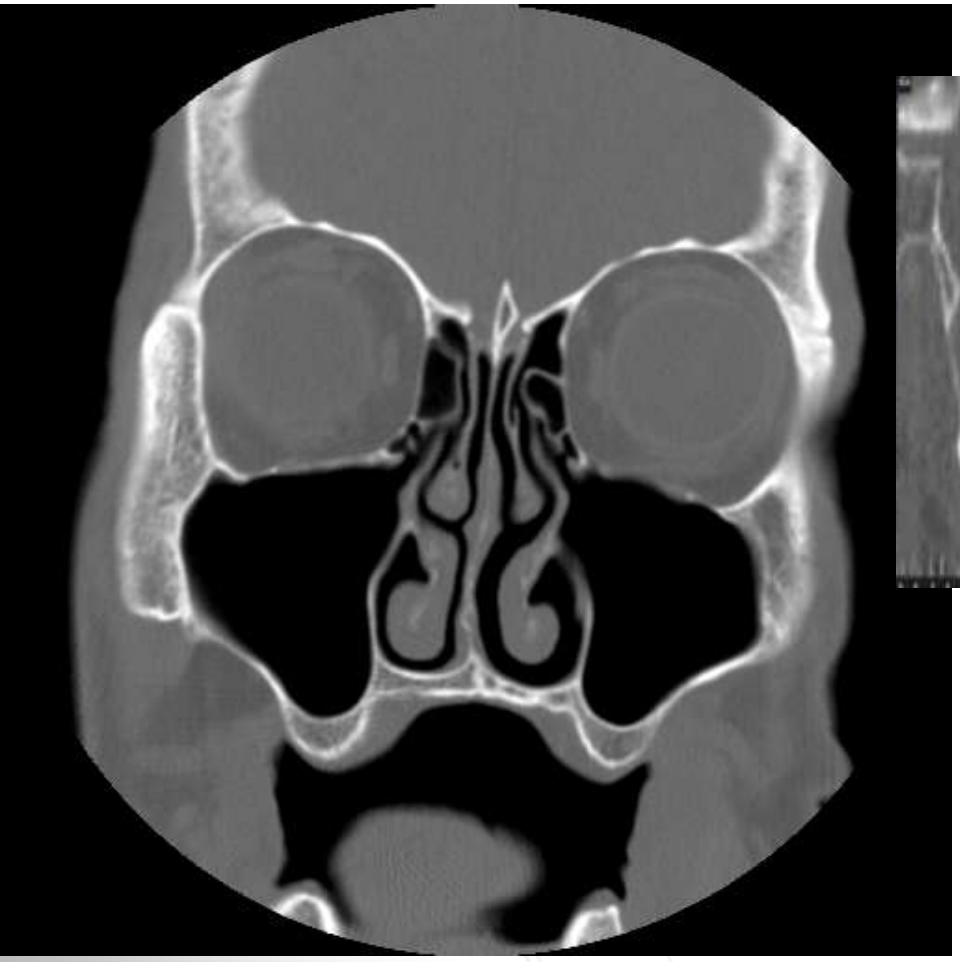
- It’s a clinical diagnosis and not radiographic

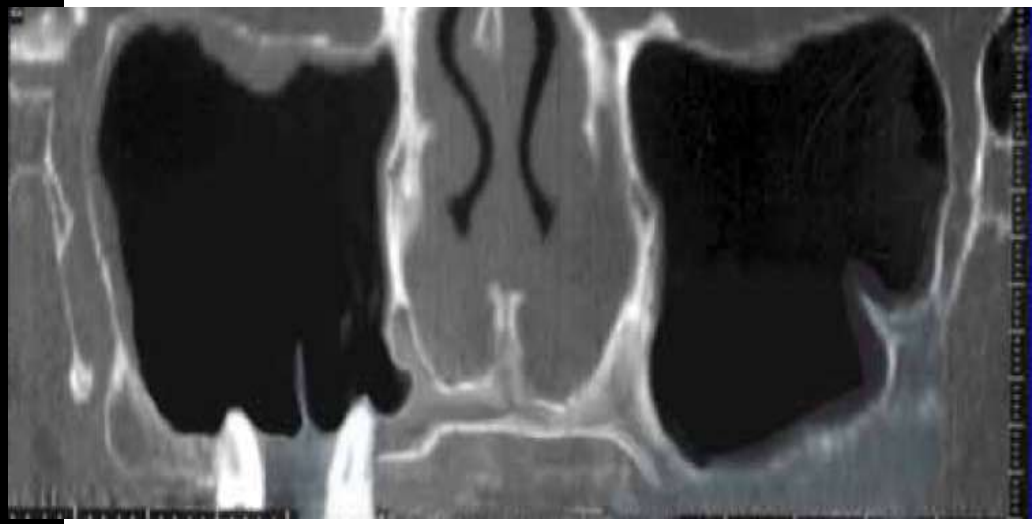
Signs and symptoms of newly created OAC:

- Antral floor attached to roots apices of extracted tooth or teeth.
- Fracture of the alveolar process or the tuberosity.
- Escape of fluids
- Epistaxis
- Evidence of air stream passing from nostril (blowing of cheeks).
- Bubbling of blood from the socket.
- Change in speech tone and resonance.
- Radiographical evidence of sinus involvement.

(OAC)

- Diagnosis
- Inspection:
  - Mucosal sinus visualized as purple hue
  - Instrumentation – not recommended
  - Radiopaque probe
  - Nose blow / mirror fog
  - Air bubbles
- Regurgitation of fluid through the nose





Management of Oroantral Communications (OAC)

- Best to avoid an OAC
- Section multirooted teeth
- If the sinus membrane is intact, keep it intact
- Sinus Precuations after tooth extraction

OAC Immediate Treatment

- **< 2 mm**
  - **Maintain the blood clot**
  - **Suture the socket**
  - **Sinus precautions**
  - Start Antibiotics -- use Amoxicillin for 7 – 10 days
  - Re –evaluate in one week
  - spontaneously resolve

OAC Immediate Treatment

- **2-4 mm**
  - **Maintain the blood clot**
  - **Gel Foam or Surgicel**
  - **Suture the socket**
  - **Sinus precautions**
  - Start Antibiotics -- use Amoxicillin for 7 – 10 days
  - Reevaluate in one week
  - spontaneously resolve

OAC Immediate Treatment

- **>4 mm**
  - **Buccal Advancement Flap**
  - **Palatal Rotation Flap**
  - **Buccal fat pad pedicled flap**
  - **Combination**

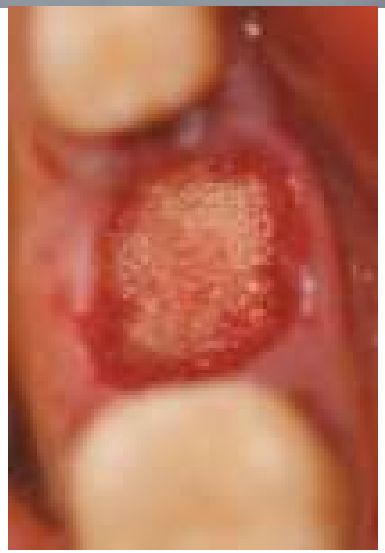
  - **Sinus precautions**
  - Start Antibiotics -- use Amoxicillin for 7 – 10 days
  - Reevaluate weekly

Oroantral Communications (OAC)

- Stabilize blood clot

- Gelfoam
- Surgicell
- Figure of 8 Suture

- Sinus Precauations



Sinus Precautions

- Avoid vigorous rinsing
- Avoid Nose blowing
- Avoid bending
  - Positive pressure
- Avoid smoking, Avoid drinking with a straw
  - Negative pressure
- Keep your mouth wide open when coughing or sneezing

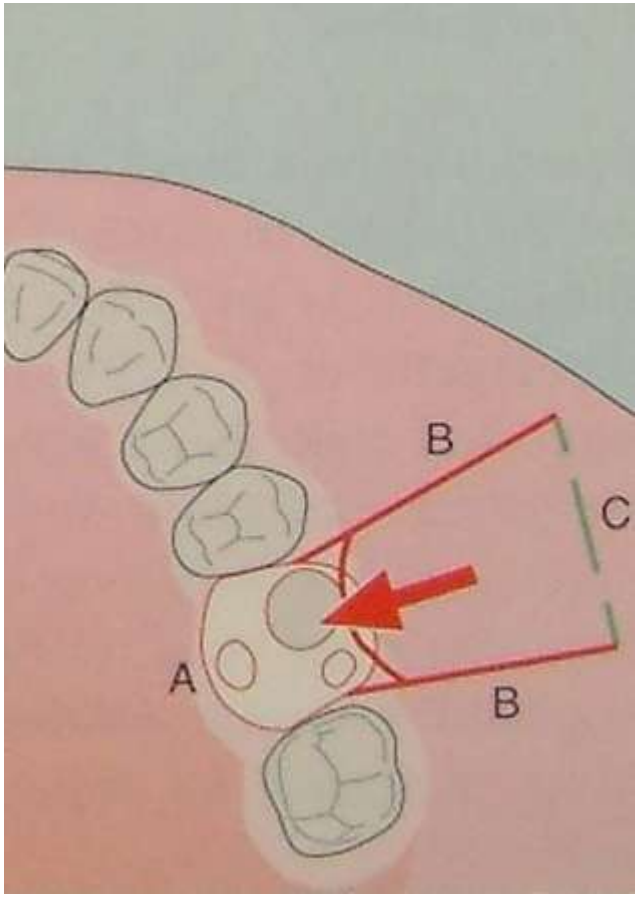
Closure of oroantral fistula

Excision of fistula

reflection
Buccal flap

Buccal flap advancement

Extending the mucoperiosteal flap

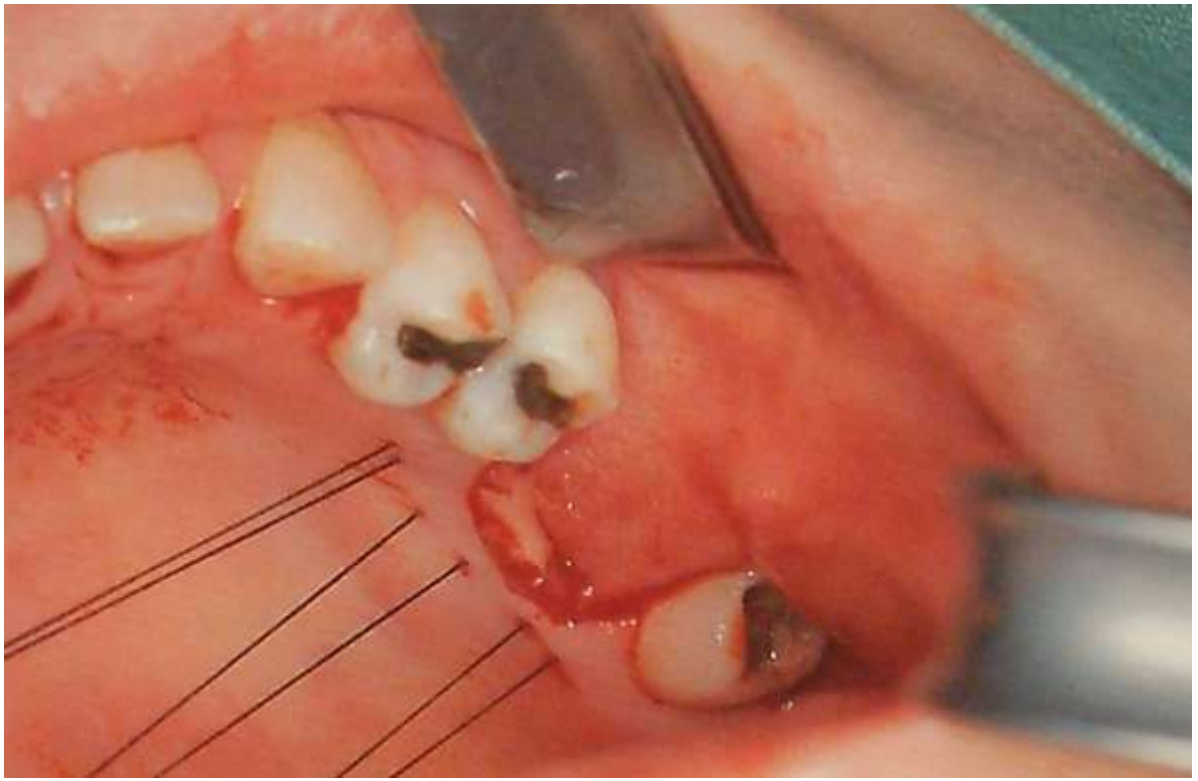


Internal periosteal releasing incision

Buccal advancement flap

Smooth the bony edge

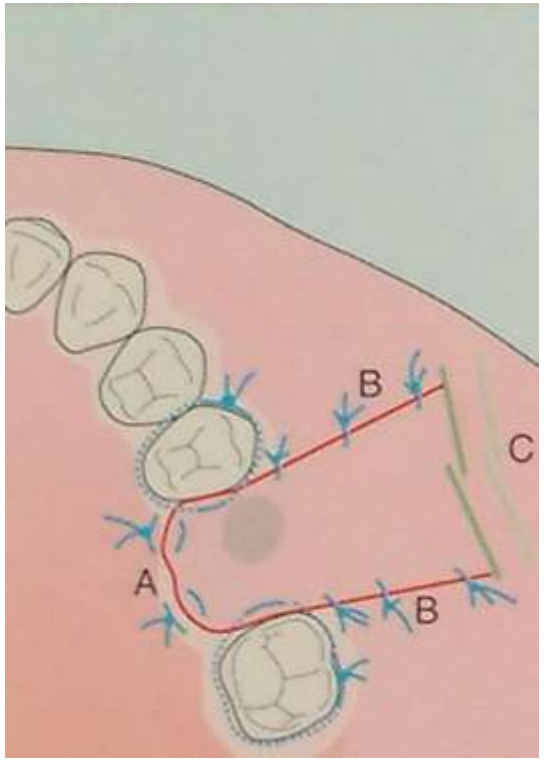
Buccal advancement flap

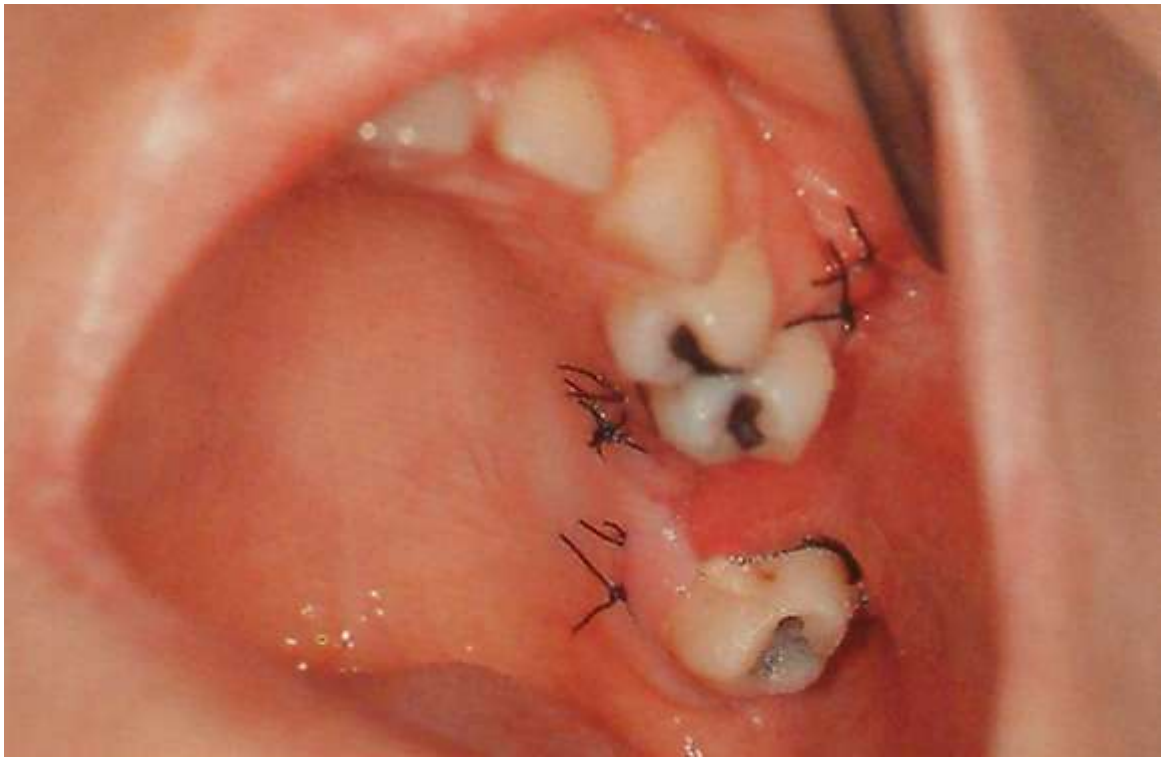


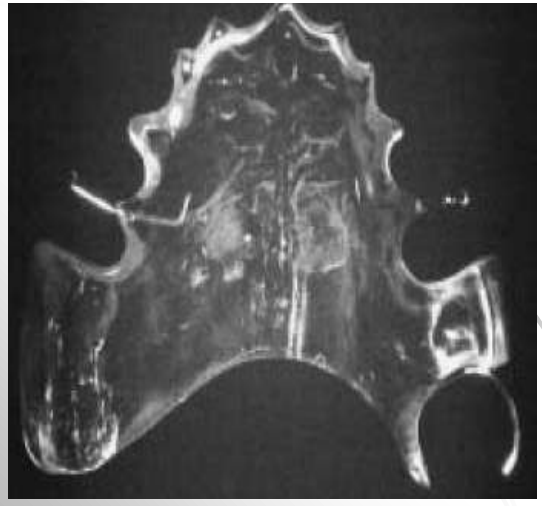
Suturing with mattress suture

Buccal advancement Flap

- Mattress suture
- Interrupted suture

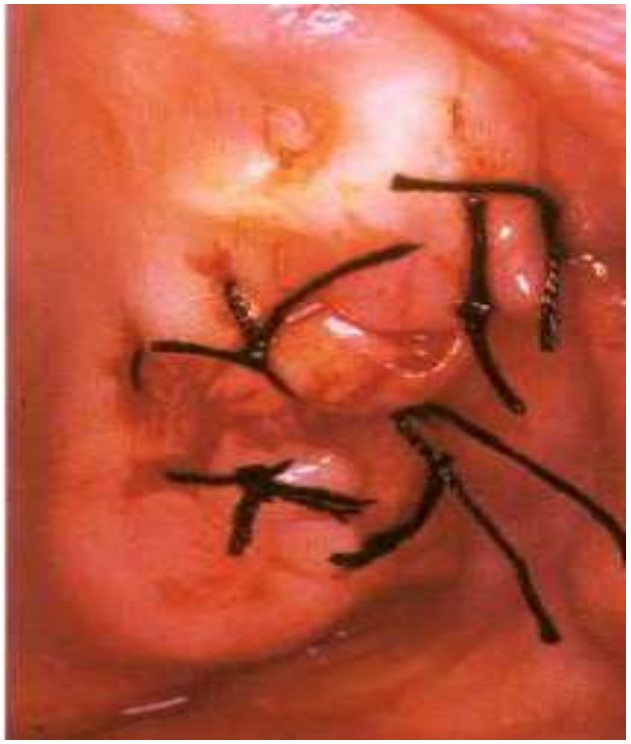


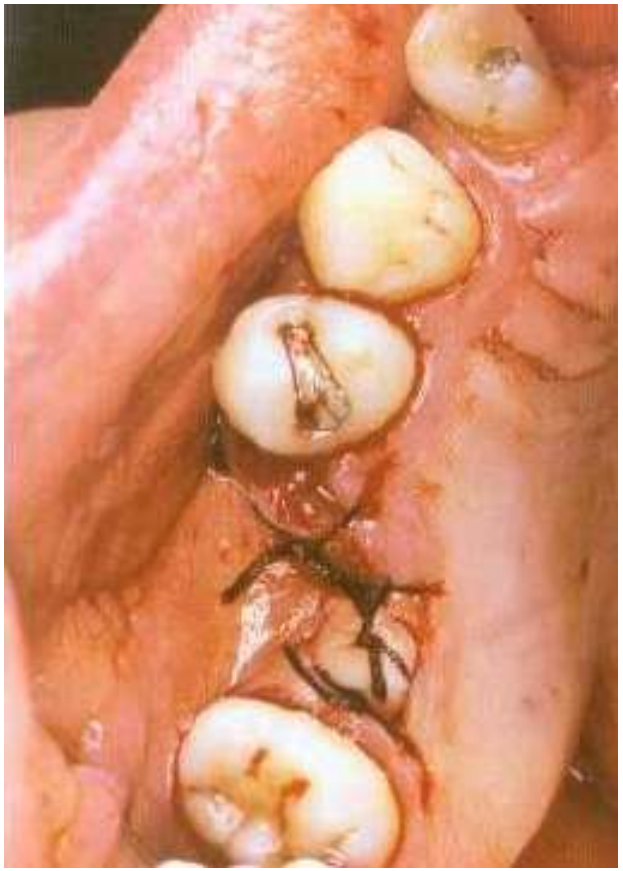




Buccal flap advancement

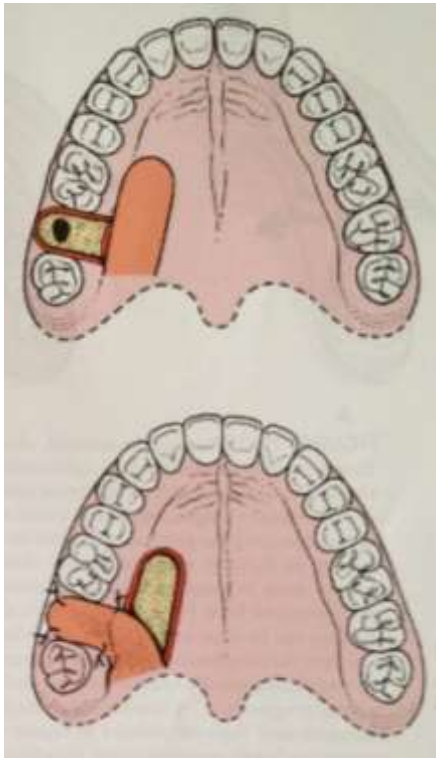
3 months post-op



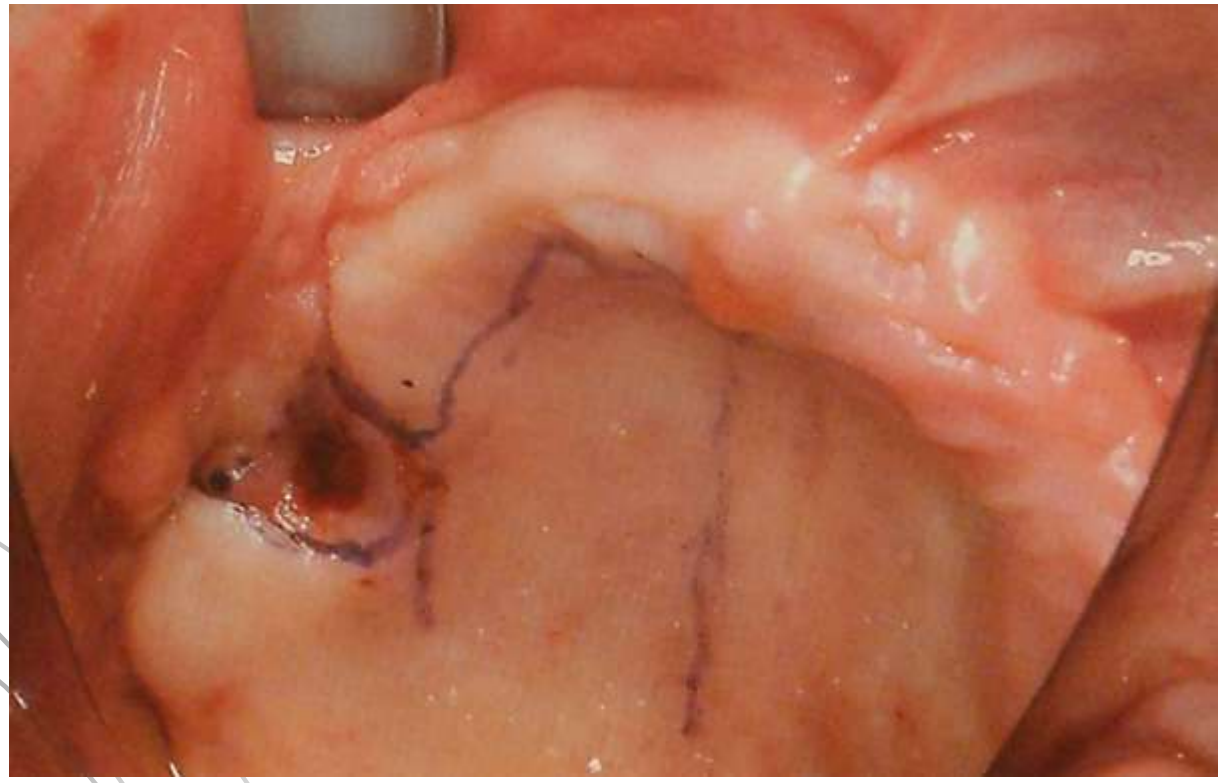


Palatal Rotation Flap

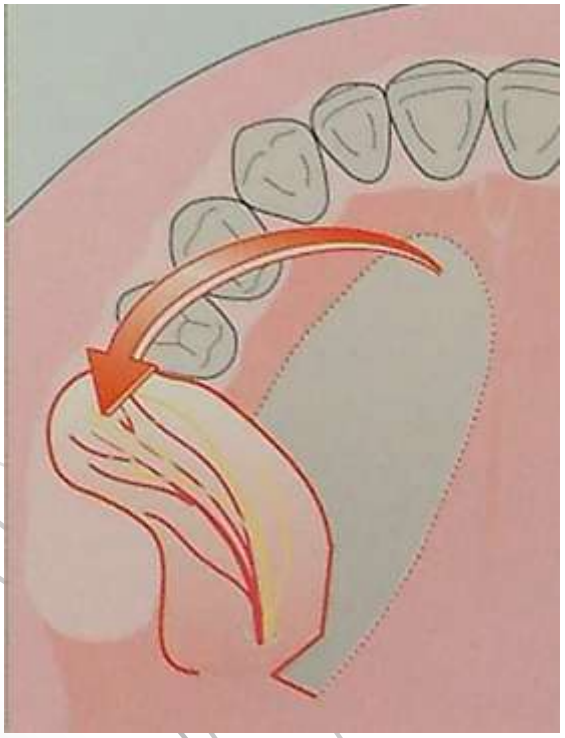
Greater Palatine Artery

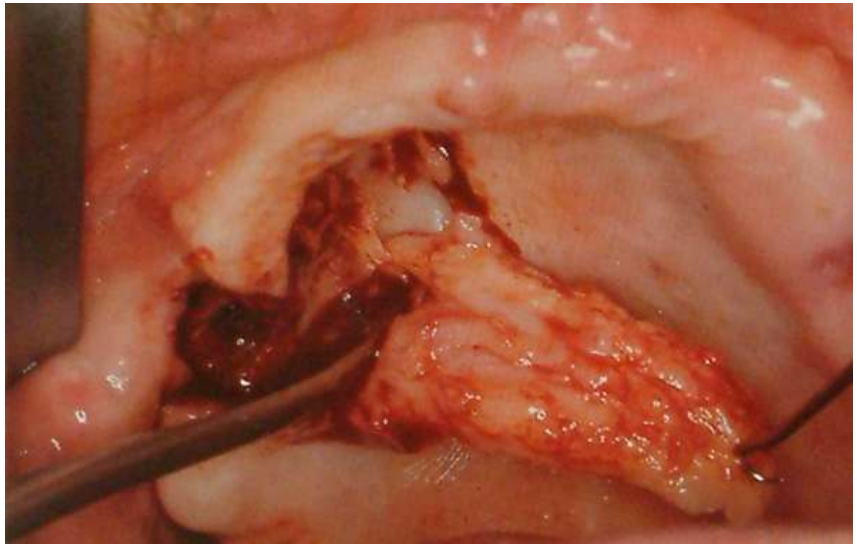


Palatal rotational flap

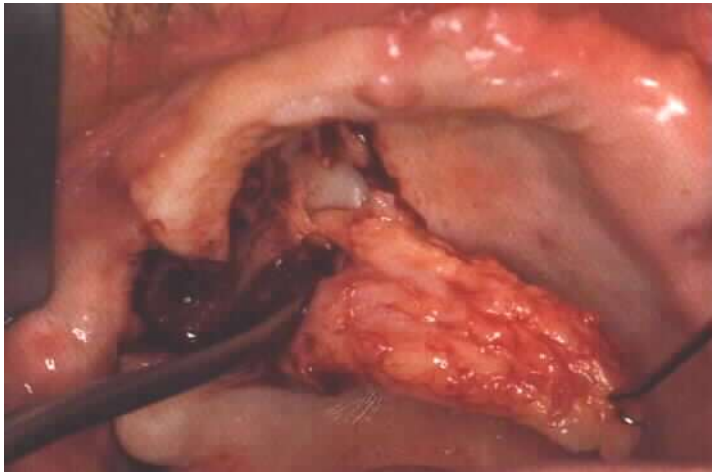


Palatal rotational flap



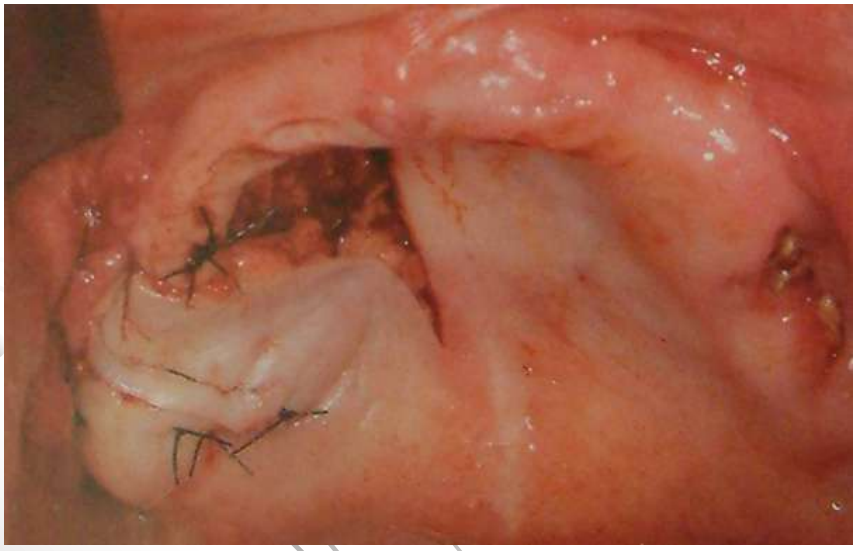


Palatal rotational flap



Palatal rotational flap

Adapt and suture



Dress the donor site

Palatal rotational flap

Fix Palatal stent

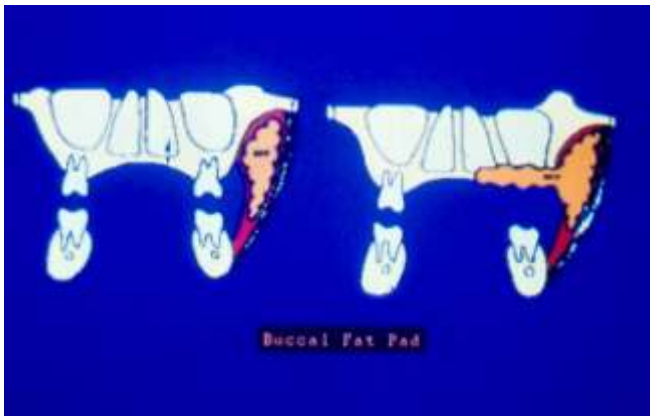
1 week post op

Palatal rotational flap

- 3 months post op

Buccal Fat Pad (BFP)

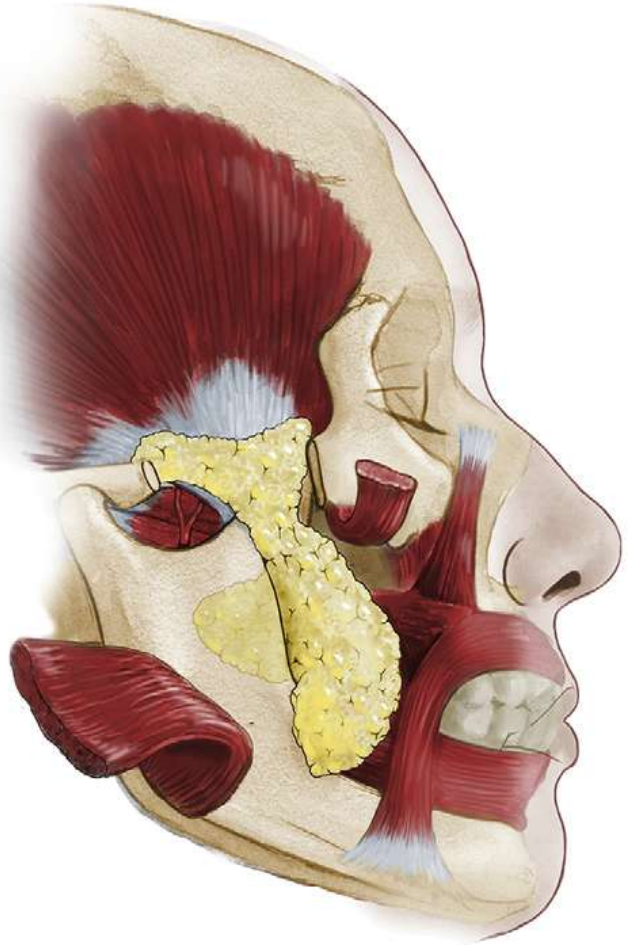
- Proximity to posterior maxilla
- Axially-based blood supply
- Resilient tissue
- Large quantity of freely mobile fat in the cheek
- BFP Sutured to cover the OAC.
- Metaplasia into mucosa, secondary epithelialization



Buccal Fat Pad (BFP)

Buccal Fat Pad (BFP)

Buccal Fat Pad



Obturator

Obturator