CYSTS OF THE JAWS

ORAL MEDICINE & RADIOLOGY

GDCHA

Introduction

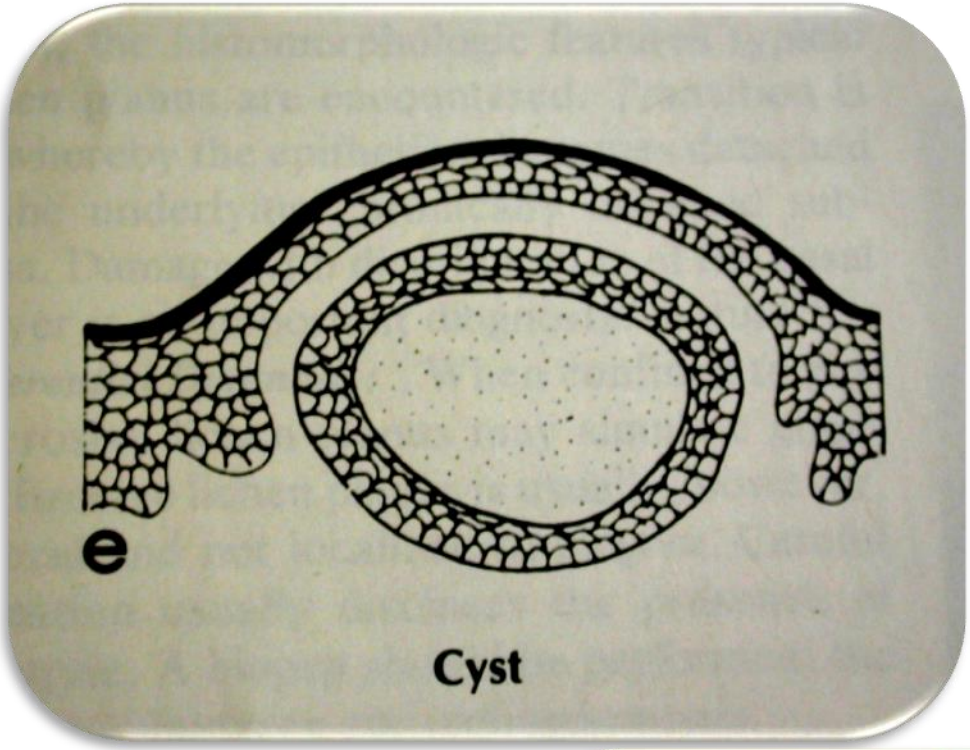
Definition

Cyst is defined as a pathologic epithelium lined cavity usually containing **fluid or semisolid material.**

-Shafer W G

A cyst is a pathological cavity having fluid, semi fluid, or gaseous contents and it is frequently, but not always lined by epithelium.

-Kramer, 1974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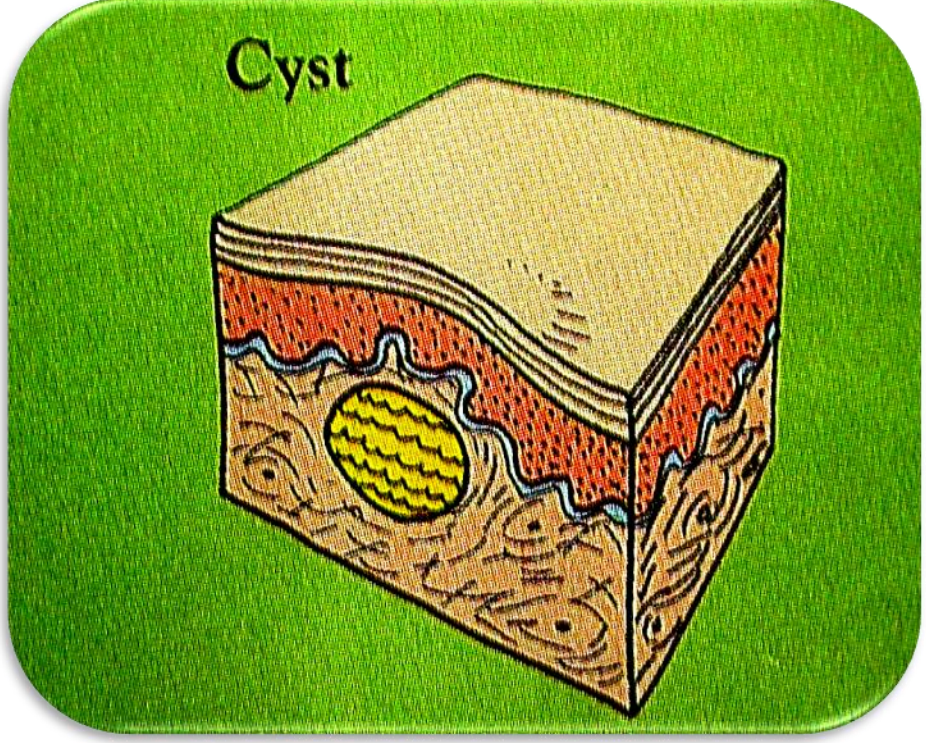
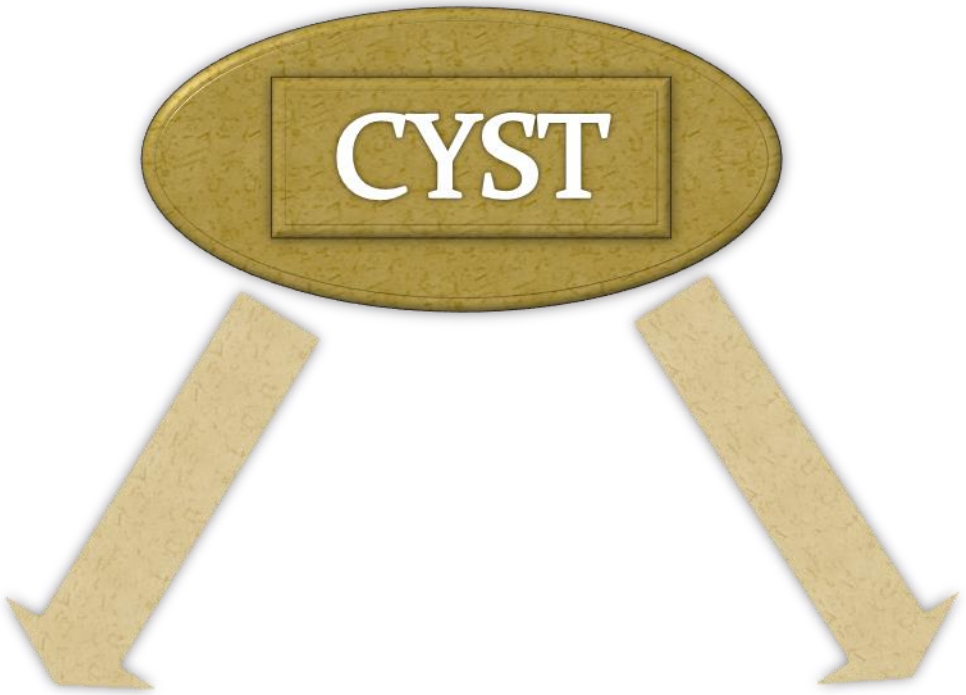
Cyst


Cyst



True Cyst

Lined by epithelium

Pseudo Cyst

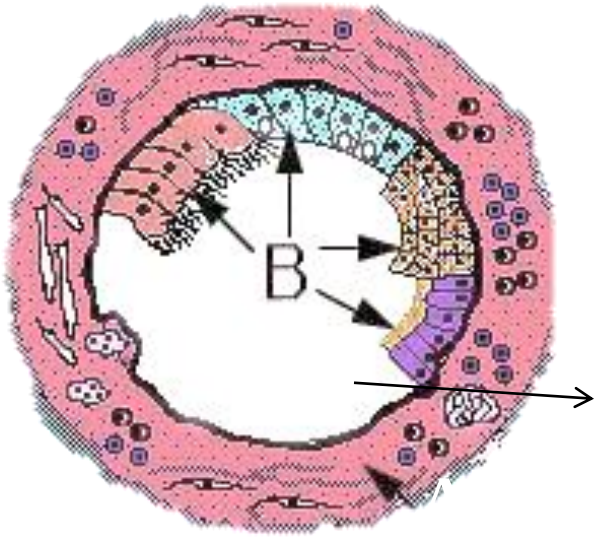
Not lined by epithelium

PARTS OF A CYST

(A) Cystic Wall or Capsule – Fibrous Connective Tissue

(B) Cystic Epithelial lining –Straited Sqamous type

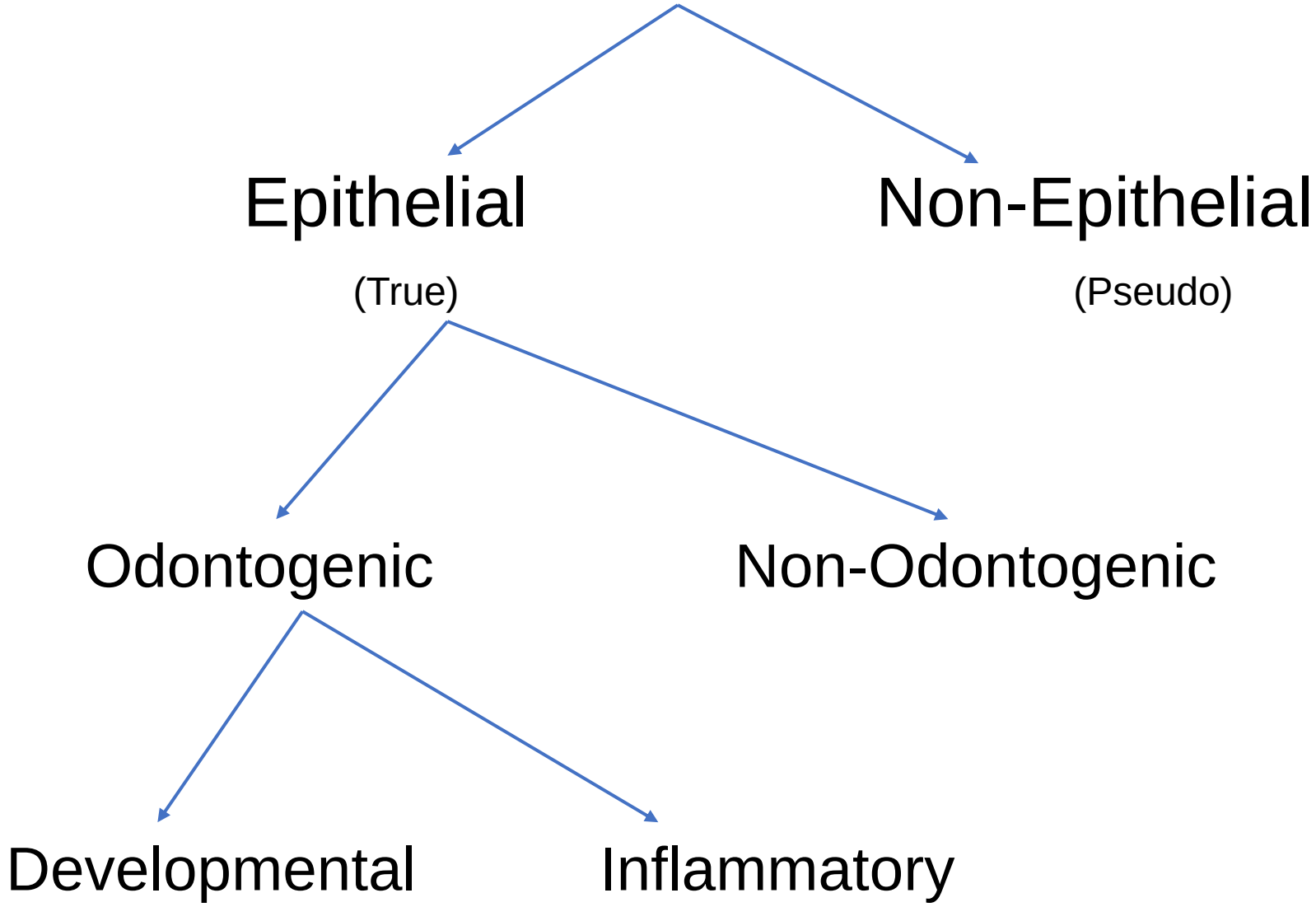
(C) Cystic Lumen - Central cavity - Fluid, semifluid, Gas, Empty



CLASSIFICATION

- **Cysts of the jaws**
- **Cysts associated with maxillary antrum**
- **Cysts of the soft tissues of the mouth, face and neck**

I. CYSTS OF THE JAWS



1. Odontogenic Developmental Epithelial (True) Cyst

1. **Odontogenic Keratocyst (Primordial Cyst)**
2. **Dentigerous Cyst (Follicular Cyst)**
3. **Eruption Cyst**
4. **Lateral Periodontal Cyst**
5. **Gingival Cysts of Infants**
6. **Gingival Cysts of Adults**
7. **Calcifying odontogenic cyst**

2. Odontogenic Inflammatory Epithelial (True) Cyst

1. **Radicular Cyst**
2. **Residual Cyst**
3. **Inflammatory Collateral Cyst**
4. **Paradental Cyst**

3. Non-Odontogenic Epithelial (Fissural) Cyst

1. **Nasopalatine duct (incisive canal) cyst**
2. **Median palatine cyst**
3. **Median alveolar cyst**
4. **Median mandibular cyst**
5. **Globulomaxillary cyst ?**
6. **Nasolabial (Nasoalveolar) cyst**

4. Non-epithelial Non-Odontogenic Cyst

1. **Simple bone Cyst (Traumatic, Solitary haemorrhagic bone cyst)**
2. **Aneurysmal bone cyst**
3. **Staphne`s bone cyst**

CLASSIFICATION OF THE CYSTS OF THE JAWS - modeled of Lucas (1964)

I.) Odontogenic Cysts

1) Periodontal cysts.
a. Apical periodontal cyst (Radicular cyst)
b. Residual cyst.
c. Lateral periodontal cyst.

Inflammatory

2) Dentigerous cyst.
3) Odontogenic keratocyst.
4) Calcifying odontogenic cyst.

Developmental

[II] Non-odontogenic (Fissural) Cysts

1) Nasolabial cyst
2) Nasopalatine cyst — Variants of Nasopalatine
3) Median alveolar cyst — Variants of Nasopalatine
4) Median palatal cyst — Variants of Nasopalatine
5) Globulomaxillary cyst
6) Median mandibular cyst

[III] Non-epitheliased Bone Cysts (Pseudocysts)

1) Solitary (Simple/Traumatic) bone cyst
2) Stafne's idiopathic bone cavity
3) Aneurysmal bone cyst

II. CYST ASSOCIATED WITH THE MAXILLARY ANTRUM

1. Mucocele
2. Retention cyst

III. CYST OF THE SOFT TISSUES OF THE MOUTH, FACE AND NECK

1. Dermoid and Epidermoid Cysts
2. Branchial Cleft (Lympho-epithelial) Cyst
3. Thyroglossal duct Cyst
4. Cystic Hygroma
5. Nasopharyngeal Cysts
6. Thymic Cysts
7. Cysts of the Salivary Gland – Mucocele, Ranula
8. Parasitic Cysts

Classification of Odontogenic Cysts

- according to Tissue of Origin

[I] Derived from Rests of Malassez

1) Periapical cyst
2) Residual cyst

[II] Derived from Reduced Enamel Epithelium

1) Dentigerous cyst
2) Eruption cyst

[III] Derived from Dental Lamina (Rests of Serres)

1) Odontogenic keratocyst
2) Gingival cyst of the newborn
3) Gingival cyst of the adult
4) Lateral periodontal cyst
5) Gladular odontogenic cyst

[IV] Unclassified

1) Paradental cyst
2) Calcifying odontogenic cyst

General Features of Jaw Cysts

Clinical Features

- Intraosseous
- Odontogenic cyst associated with teeth- periapical or impacted
- Solitary / Multiple
- Biologically – Innocuous, symptomless, slow growth, mucosal changes
- Bone expansion – Facial asymmetry, ill fitting dentures
- Initially- smooth, hard, painless
- Egg shell cracking- thinning of cortical plate
- Soft, fluctuant swelling with bluish color mucosa- perforation of plate

- **Teeth**

- **Non-vital tooth associated with radicular cyst**
- **If a sinus present with a fissural cyst salty taste**
- **Secondary Infection - Abscess, Osteomyelitis, Sinus Formation, Cellulitis, Pathological Fracture, Anaesthesia**
- **Carcinomatous Change**

Radiographic Features

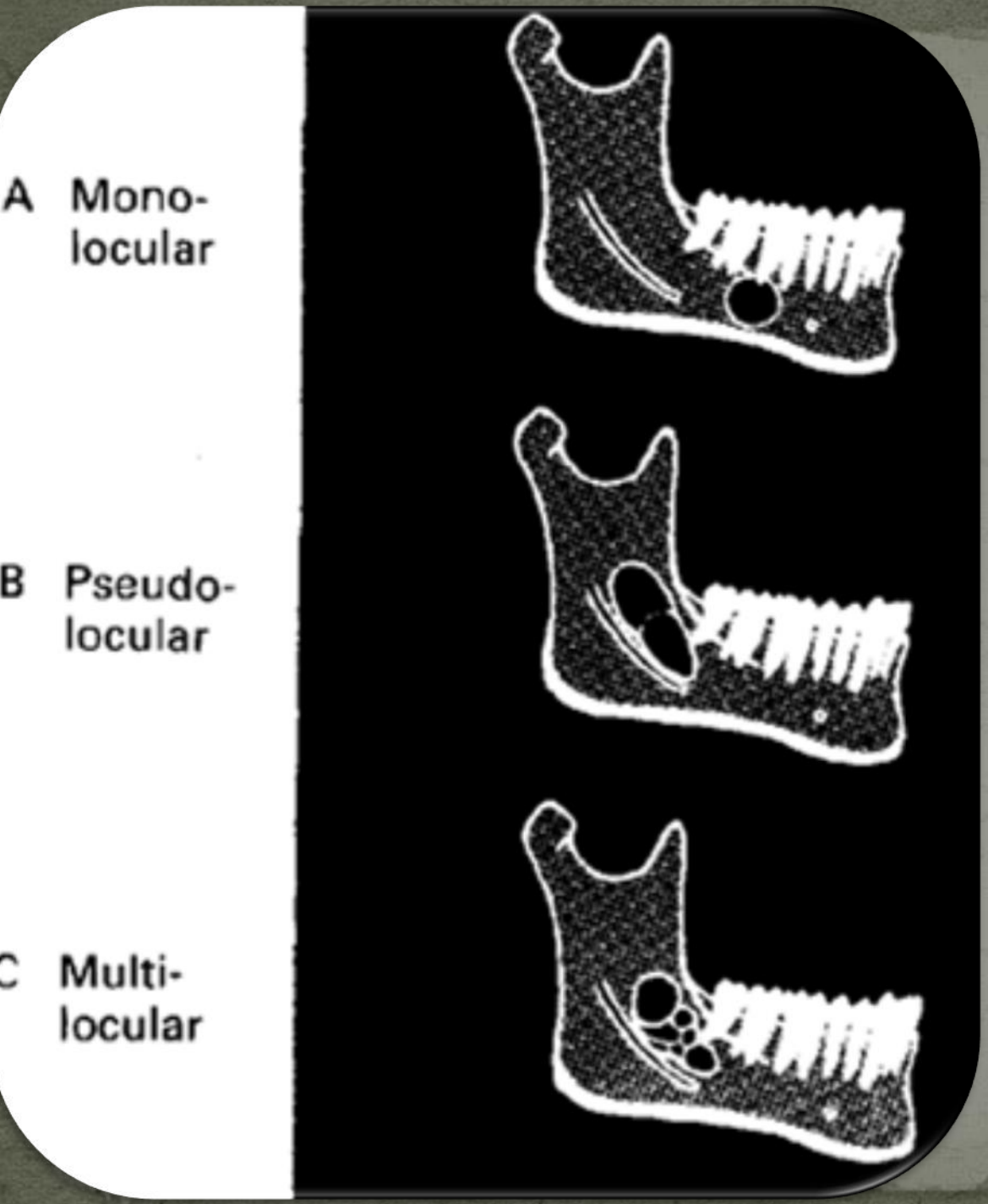
- **Minimum two radiograph taken at right angles to each other**
- **Shape: Round or ovoid radiolucency (> 1 cm)**

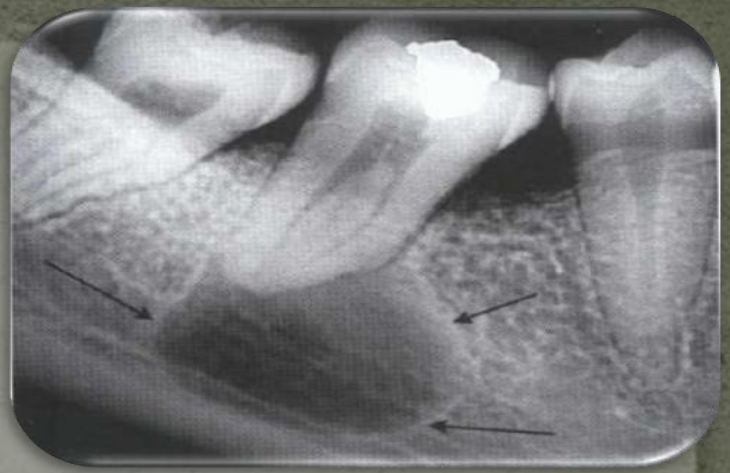
  - Unilocular / Multilocular
- **Periphery: surrounded by a narrow radio-opaque cortical border.**
- **May be associated with tooth**
- **If secondarily infected- cortical border destructed or altered in to more sclerotic border**

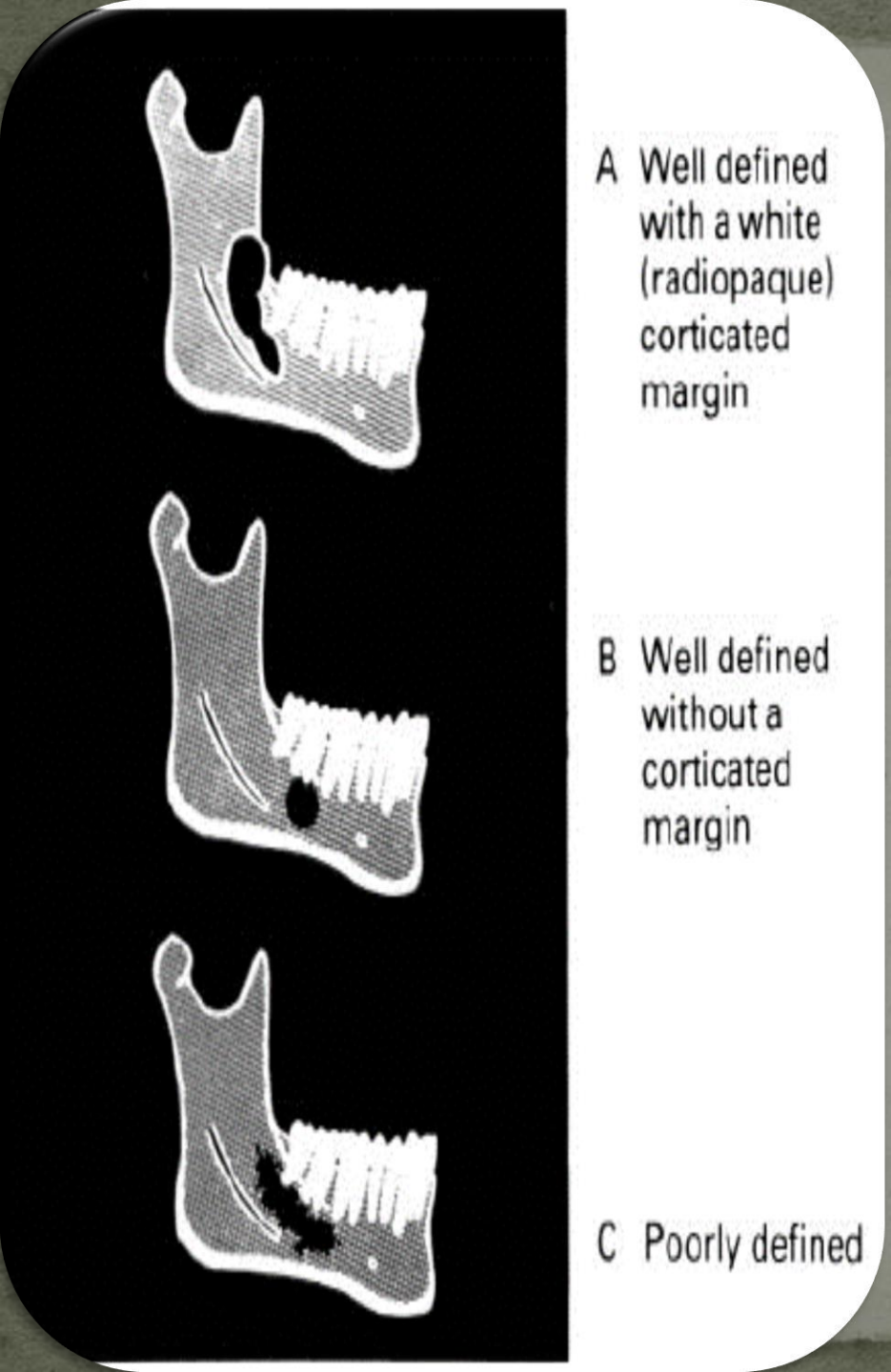
A Mono-
locular

B Pseudo-
locular

C Multi-
locular







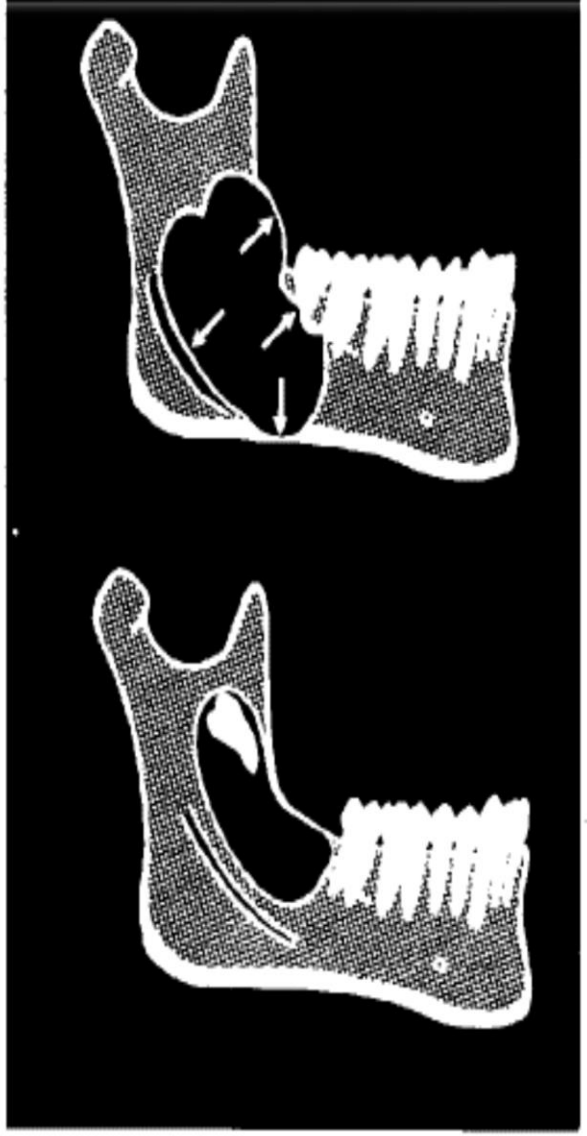
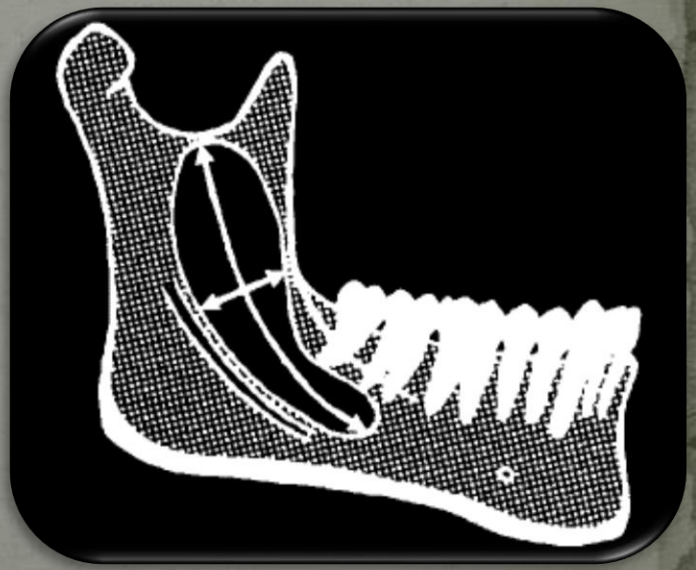


Fig. 24.4 Diagrams showing the radiographic appearance of some of the typical effects that a lesion can have on adjacent structures. **A** Expansion, displacement of ID canal, tooth and bone resorption. **B** Tooth displacement.

- **Internal structure** : mostly radiolucent
- **Effects on surrounding**: resorbs adjacent teeth, rarely related tooth, expands cortical plates, pathological fracture, invaginate the antrum or displace mandibular canal in inferior direction.



Radiographs indication

- **Occlusal -**
  - Bucco-lingual expansion of cortical plates
  - Involvement of hard palate
  - Position of an impacted tooth in palate
- **Lateral Oblique -**
  - A cavity encroaching or perforating lower border,
  - involvement of ramus,
  - displacement of inferior alveolar canal,
  - migration of teeth

- **Lateral skull view -**
  - localizing a high, unerupted tooth
  - Determining upper margin of cyst invading antrum
- **PNS –**
  - **Cyst invaginating maxillary sinus**
  - **Tooth displaced high near the sinus**
- **OPG -**
  - Multiple cysts
  - Extension of cyst

Pathology

- **Luminal contents** – Aspiration
  - Macroscopically – Color
    Cholesterol Crystals
  - Microscopically - Cholesterol Crystals
  - Biochemical - Protein Estimation
- **Color** - Amber with Shimmering Gold Surface (Radicular/Inflammatory Cyst)
  -Thick Creamy/ White Cheesy material (OKC)
  - Blood (Anuerysmal Bone Cyst)
  - Empty (Traumautic Bone Cyst)
- Biopsy and Histological Examination

Treatment and Prognosis

- Good Prognosis
- Enucleation
- Marsupulization
- Removal of teeth
- Hemimandiblectomy with bone reconstruction
- Recurrence if incomplete removal

Cyst Formation

Cyst Initiation

Enlargement

Cyst Initiation

- Proliferation of the epithelial lining and formation of a small cavity
- Stimulus for proliferation is not known except for inflammatory type where it is infection
- From layer of primordium of tooth germ or bud/dental organ before the formation of any hard tissue (found in place of tooth.) - **Odontogenic Keratocyst**

- Reduced Enamel Epithelium (associated with unerrupted/ impacted tooth) - **Dentigerous cyst)**
- Dental Lamina (Rest cells of Serrae)-**Lateral Periodontal Cyst**
- Hertwig`s Epithelial Root Sheath (Rest cells of Malassez)-**Radicular Cyst**
- Basal Cell layer of Oral Epithelium - **Odontogenic Keratocyst**
- Entrapped Epithelium between the fusion of two embryonic bony processes - **Fissural Cyst**

Cyst Formation

Factors responsible for Cyst Formation

- Proliferation of epithelium
- Fluid accumulation within the cavity
- Resorption of the surrounding bone (**PGE_2, PGE_3,Collagenases**)

Cyst Enlargement

- **A**ttraction of Fluid into Cyst cavity
- **R**etention of Fluid
- **P**ressure Increase
- **R**esorption of the surrounding bone with increase in the size of the cavity

Theories of Cyst Enlargement

- **Hydrostatic Enlargement**
  a. Secretion
  b. Transudation/Exudation
- **Mural Growth**
  a. Peripheral cell division
  b. Accumulation of cellular debris
- **Bone Resorbing factors**

Hydrostatic Enlargement

- Secretions: Mucous secreting cyst
- Transudation/Exudation:
  - → Inflammatory cyst- release of prostaglandins
  - → Epithelial cells breakdown products
  - → Hyperosmolar fluid
  - → Accumulation of fluid from surrounding tissue
- Increased osmolarity of cystic fluid
  - → Increased osmotic pressure
  - → Cystic expansion

Mural Growth

Surface area of sac increases by:

- Peripheral cell division
- Accumulation of cellular debris
  - Proliferation of local group of cells: a multicentric pattern in OKC
  - Collagenase activity : increased collagenolysis in Radicular cyst
  - Unremitting growth : growing certain epithelial linings due to high mitotic values in OKC

Bone Resorption

- Release of bone resorbing factors from capsule e.g. PGE_2, PGI_2 and Leucotrienes
- Stimulates osteoclastic activity
- Differences in size of various cysts depends upon quantity of release of prostaglandins and other bone resorbing factors

Relative Frequency Of Different Jaw Cysts

• Radicular	65 - 70 %
• Dentigerous	15 – 18 %
• OKC	03 – 05 %
• Nasopalatine	05 – 10 %
• Lateral Periodontal Cyst	< 01 %

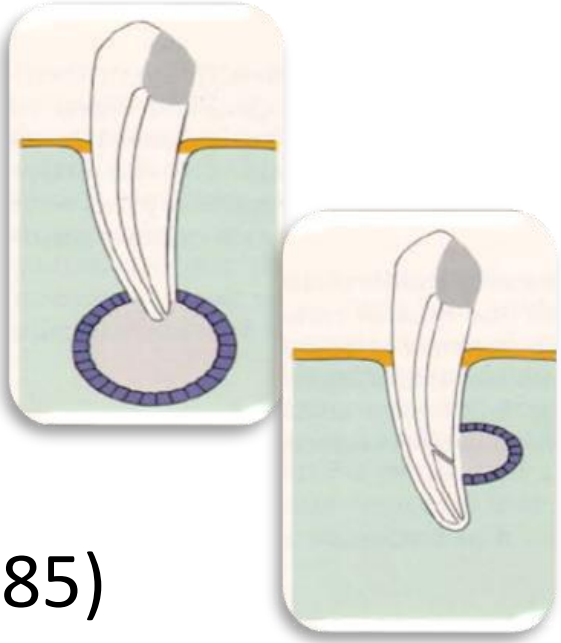
ODONTOGENIC CYSTS

Radicular Cyst

- **Synonyms**: - Apical periodontal cyst,
  - Periapical cyst,
  - Dental root end cyst, etc.
- **Definition**:

  A cyst arising from the epithelial residues (rests of Malassez) in the periodontal ligament as a consequence of inflammation, usually following the death of the dental pulp
- Most common cyst of jaws
- **Non-vital tooth**

1] Initiation (stimulation and proliferation)



- Pulpal inflammation spreads to the periapical or lateral radicular area
- Formation of an apical or lateral granuloma from proliferation of cell rests of Malassez in form of strands, arcades or rings (Malassez 1885)
- Stimulus - inflammation.
- Epithelium also be derived from maxillary sinus, a fistulous tract, or from a periodontal pocket.

2] Phase of cyst formation

- Cells in the central portion become separated from source of nutrition, the eventually degenerate, become necrotic, and liquefy.
- Central epithelium cells desquamate, other orient toward the source of nutrition
- Epithelial cells orient toward periphery to isolate central necrotic zone

3] Phase of enlargement

- Mural growth
- Cyst fluid is inflammatory exudates (soluble protein levels higher than those of serum > 6 gm/100ml)
- Cyst wall semi-permeable membrane;
- Osmosis increase in the size of cyst
- Osteolytic bone resorption is stimulated

Caries, trauma, periodontal disuse

↓

Death of dental pulp

Necrotic debris is inflammatory stimulus

↓

Apical bone inflammation

↓

Dental granuloma formation

Composed of granulation tissue, scar, inflammatory cells

↓

Stimulation of epithelial rests of Malassez

↓

Epithelial proliferation

↓

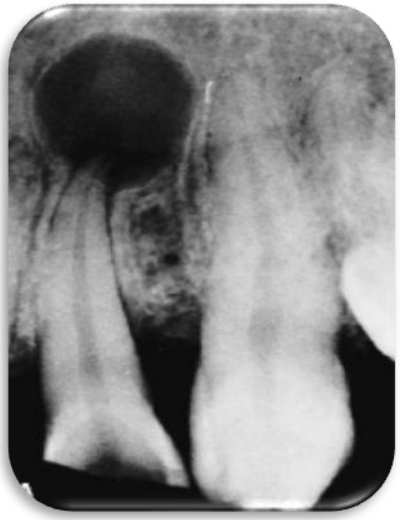
Periapical cyst formation

Cyst wall separates pulpal irritation from bone

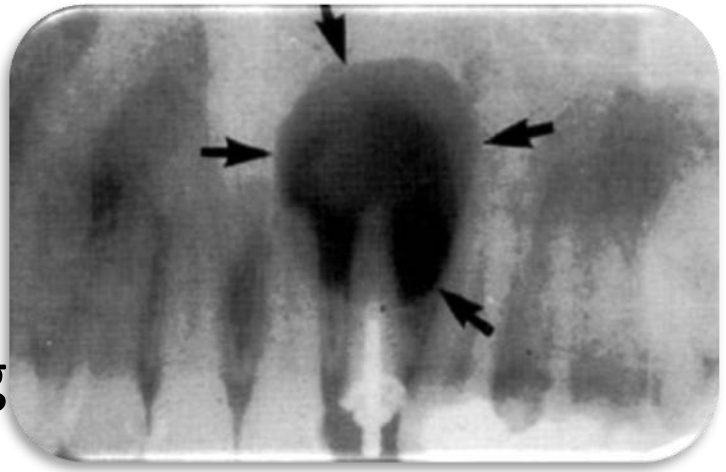
- Most common type (above 50%).
- Age - 3rd to 6th decade
- Sex - Slight male predominance.
- Site - Most common in the maxilla (60%), around incisors and canines. Very rare in deciduous teeth.
- Asymptomatic
- Discovered during taking routine radiograph.

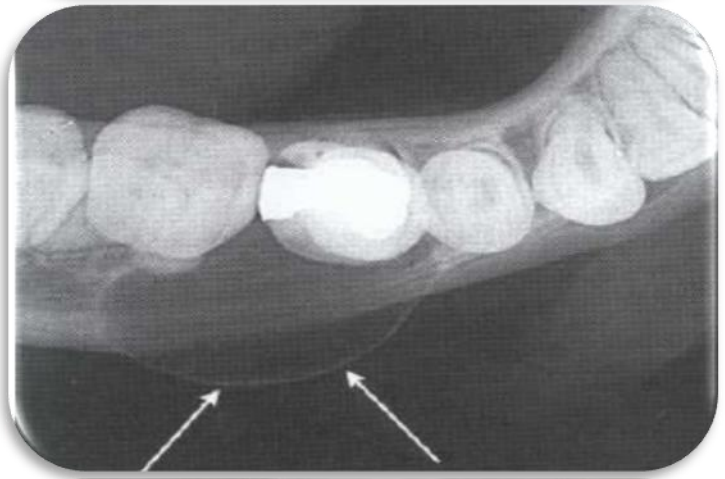
- Non-vital teeth, either discoloured, fractured, or with failed root canal treatment
- Occasionally painful to percussion.
- Expansion in maxilla more on lingual side and in mandible more on buccal side
- Bony and hard if the cortex is intact,
- Crepitant as the bone thins
- Rubbery and fluctuant if bone destruction
- Painful if infected
- Long standing cyst may undergo an acute exacerbation into an abscess, cellulites or a draining fistula or sinus.

- **Location**: Epicenter at the apex of a nonvital tooth. Sometimes on lateral aspects of root at the opening of lateral canals
- **Shape**: Round or ovoid radiolucency (> 1 cm)
- **Periphery**: surrounded by a narrow radio-opaque cortical border which extends from the lamina dura of the involved tooth.
- Secondarily infected – cortical border destructed or altered in to more sclerotic border.



- **Internal structure** :
  - Mostly radiolucent
  - Long standing cysts show dytrophic calcifications appearing as sparsely distributed small particulate radiopacities
- **Effects on surrounding**:
  - Resorption and displacement of adjacent teeth,
  - Resorption pattern may have a curved outline
  - Expand cortical plates, displace mandibular canal in inferior direction, invaginate the antrum



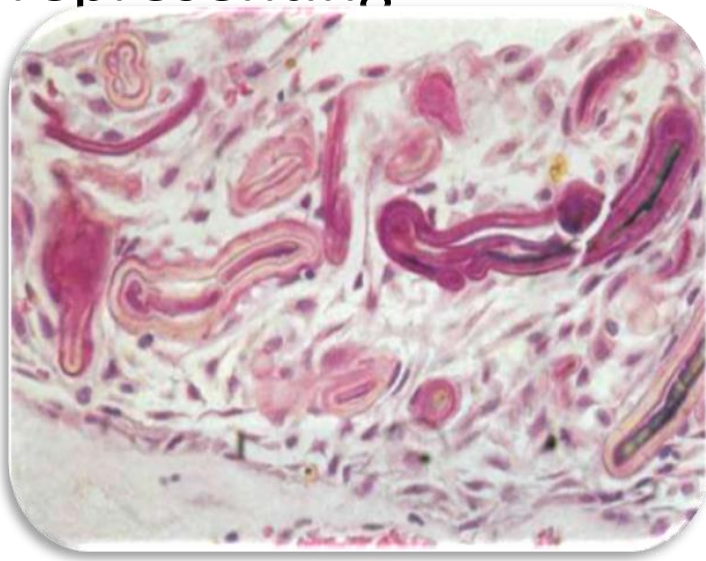


Differential Diagnosis

- Periapical Granuloma
- Periodontal Abscess
- Periapical cemental dysplais
- Periapical scar

Pathology

- Aspiration Contents:
  - Light, straw-colored fluid or brownish
  - containing cholesterol crystals
  - If infected, a dirty-white caseous material or pus
- Histopathology:
  - Lined by nonkeratinized stratified squamous epithelium
  - Plasma cell infiltrates and associated refractile and spherical intracellular *Russell bodies,* representing accumulated gamma globulin
  - Hyaline bodies or *Rushton bodies,* within the epithelial lining seen as a hairpin or slightly curved shape, concentric lamination, basophilic



- **Treatment:**
  - **Involved tooth extracted and the periapical tissue is curetted.**
  - **Root canal therapy (RCT) with apisectomy**
  - **Large radicular cyst – surgical removal (enucleation) or marsuperization.**

- **Prognosis:**
  - **Does not recur.**
  - **“Residual cyst”.**
  - **Rarely squamous cell carcinoma**

Residual Cyst

- **Definition:**

It is a radicular cyst which remains after or develops subsequent to extraction of a tooth; although this same term can be applied to any cyst of the jaw which remains following a surgical procedure.

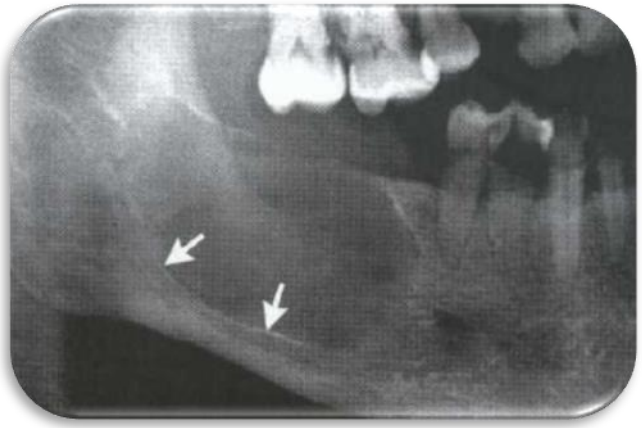
- **Etiology:**
  - Incomplete removal of a periapical granuloma or cyst
  - Cyst related to impacted tooth where tooth is removed
  - Extraction of a tooth having a cystic lesion without knowledge of underlying pathology

Clinical Features

- Older patients
- Males with higher incidence in maxilla
- Asymptomatic & mostly discovered on routine radiographic examination of an edentulous area
- Ill-fitting denture
- Pathologic fracture or signs of encroachment on associated structures if enlarged
- History of previous infected tooth
- Some expansion of the jaw or pain in case of secondary infected.

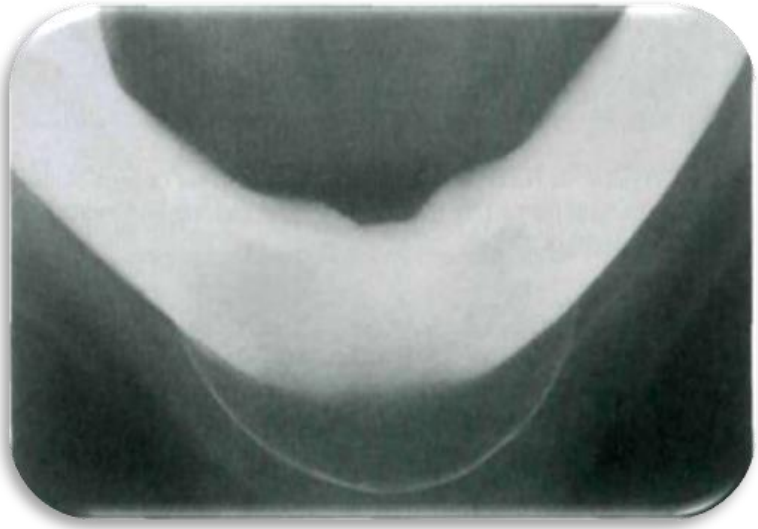
Radiographic Features

- **Location:** Epicenter is found in a periapical location (if adjacent teeth are still present) in mandible always above the inferior alveolar canal**.**
- **Shape:** Oval or circular.
- **Internal structure:** Radiolucent.
- **Periphery:** Cortical margin unless secondarily infected.



- **Effects on surrounding:** Can cause tooth displacement or resorption.
  - May expand the outer cortical plates of the jaws.
  - May depress the inferior alveolar nerve canal or may invaginate the maxillary antrum.
  - Dystrophic calcifications in long standing cysts

- **Differential Diagnosis:**
  - Mental Foramen
  - Maxillary sinus
  - Odontogenic Keratocyst



- **Treatment:**
  - Surgical removal (enucleation) or marsupialization, or both.

Lateral Periodontal Cyst

- **Definition:**

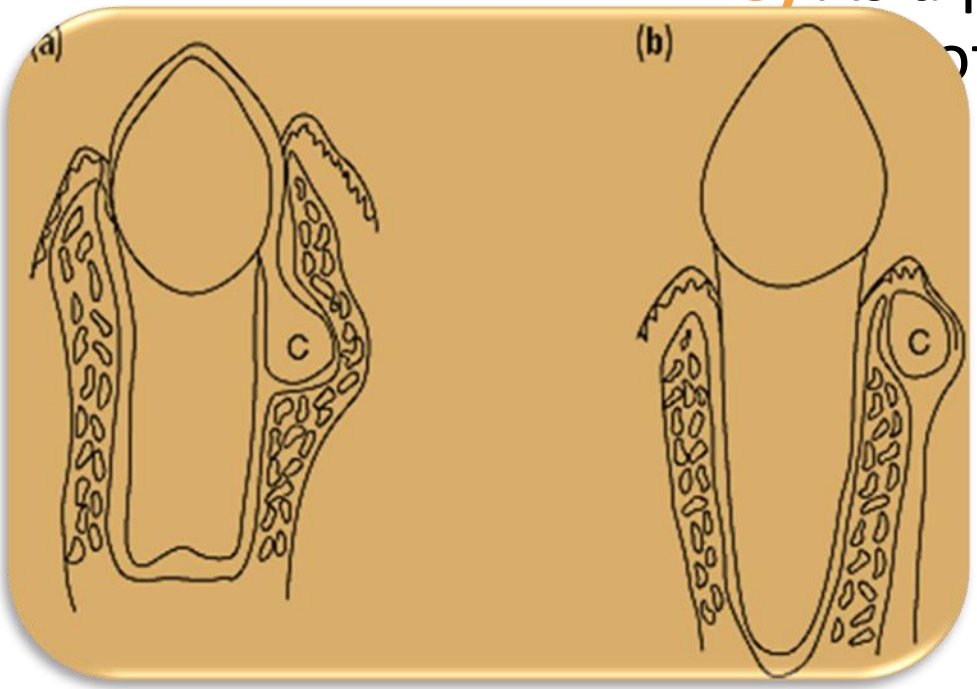
  A lateral periodontal cyst is a nonkeratinized developmental cyst occurring adjacent or lateral to the root of a tooth

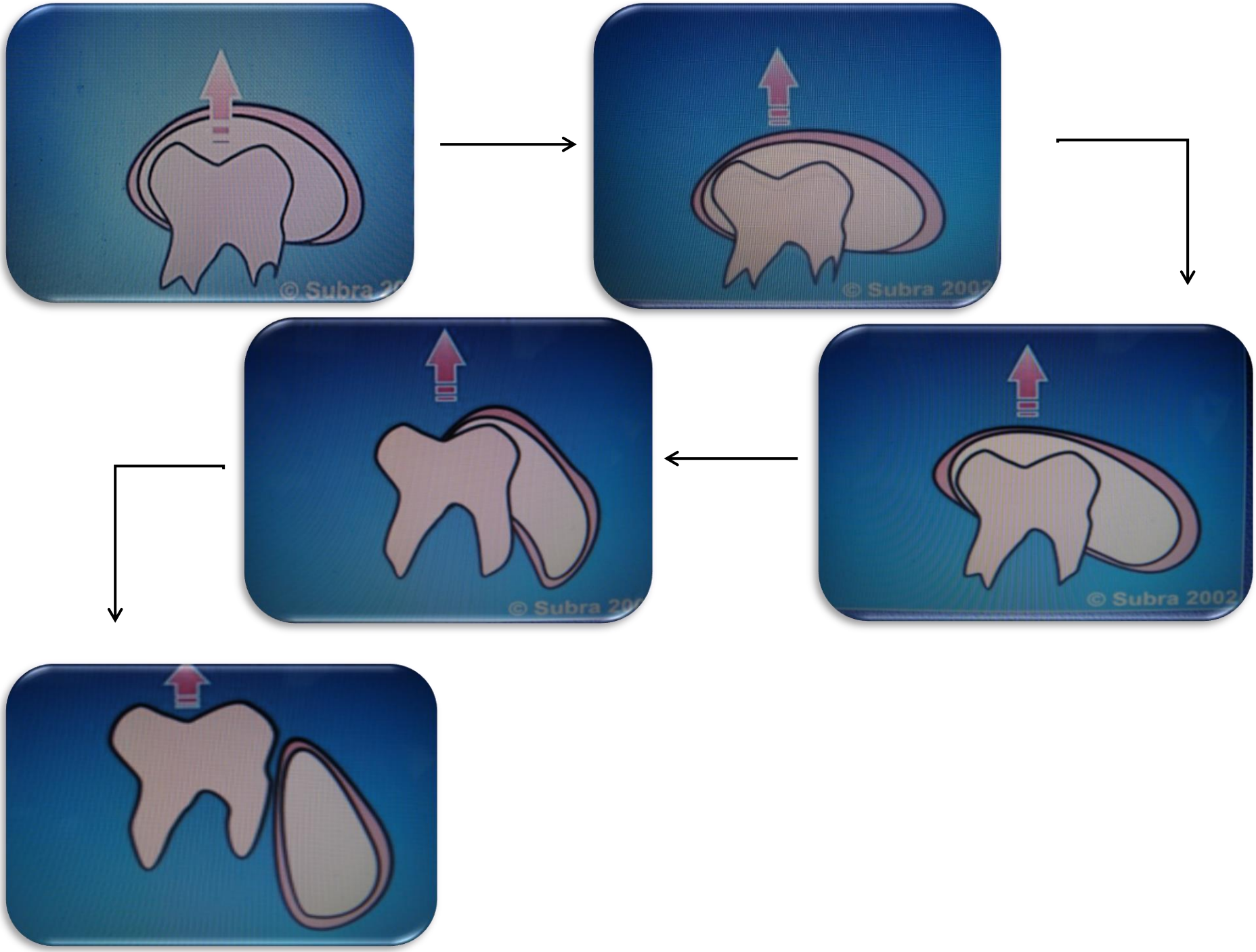
- Arising in intimate association with the lateral root surface of an erupted tooth.
- Situated adjacent to the cementoenamel junction & tends not to expand much beyond the apex.
- Usually is unicystic, but may appear as a cluster of small cysts, a condition referred to as botryoid *odontogenic* cysts
- May be of 2 types: Inflammatory

  Developmental

Pathogenesis / Origin:

1) As a dentigerous cyst developing along the lateral surface of the crown &, as the tooth erupts, assumes a position in lateral surface of root;
2) From proliferation of cell rests of Malassez in the periodontal ligament by unknown stimulus;
3) As a primordial cyst of a
oth germ ; &
of dental

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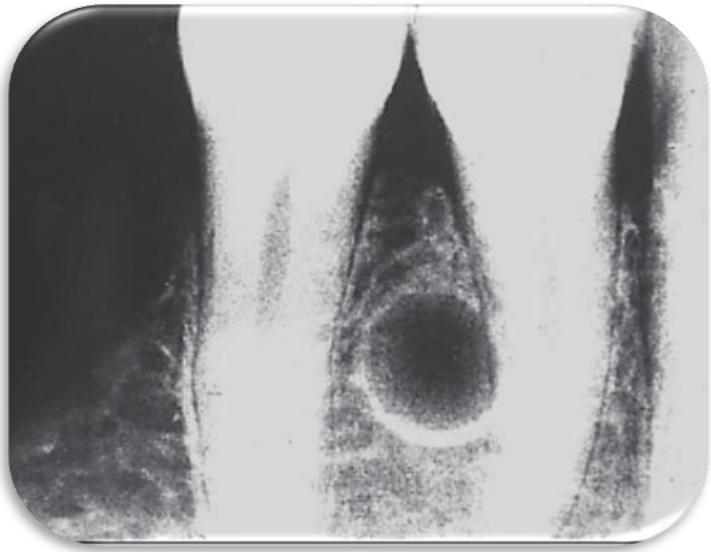
Clinical Features

- Uncommon (0.7 % of all jaw cysts).
- Age- occurs chiefly in adults (mean age 50 years).
- Sex- predilection for males.
- Site- 50 to 70 % in the mandible,
  - Mostly in lateral incisor to second premoloar region.
- Usually asymptomatic

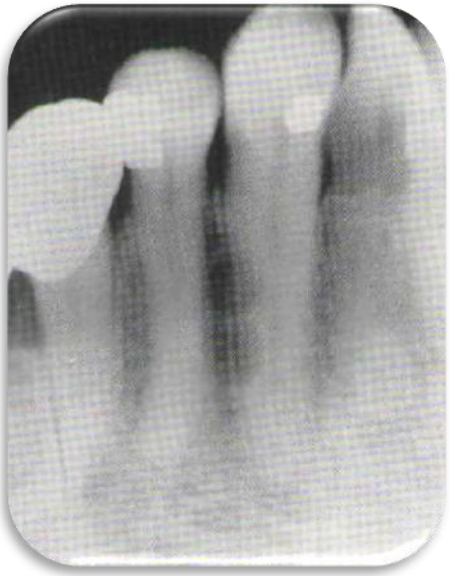
- Less than 1 cm in diameter
- Discovered during routine radiographic examination
- Sometimes, a slight mass, with normal overlying mucosa
- Associated tooth is vital.
- If secondarily infected, mimic a lateral periodontal abscess.

Radiographic Features

- **Location: 75%** in the mandible, from the lateral incisor to the second premolar
  - ➢In the maxilla, between the lateral incisor and the cuspid.
- **Periphery and shape:**
  - ➢ well-defined, small, round to ovoid, radiolucent area in apposition to the lateral surface of a tooth root with a prominent cortical boundary.
  - ➢ Usually small, seldom > 1 cm



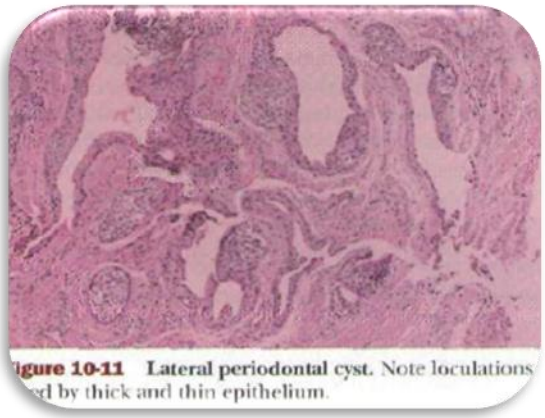
- **Internal structure**
  - ➢usually is radiolucent.
  - ➢The botryoid variety has a multilocular appearance.
- **Effects on surrounding structures**
  - ➢Small cysts may affect the lamina dura of the adjacent root.
  - ➢Large cysts can displace adjacent teeth and cause expansion.

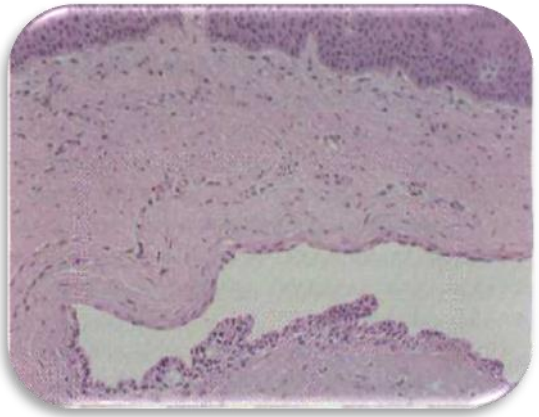




Differential Diagnosis

- Lateral Periodontal Abscess
- Residual cyst of a deciduous tooth
- Lateral Dentigerous cyst

- **Aspiration :**
  - Serous or caseous content. (serosanguinous fluid).
- **Histopathology:**
  - lined by a thin, nonkeratinized epithelium.
  - Clusters of glycogen-rich, clear epithelial cells noted in nodular thickenings of the cyst lining.
- **Treatment:**
  - Surgically removed (enucleated) if at all possible without extracting the associated tooth.
  - No reported recurrence following surgical excision.


igure 10-11 Lateral periodontal cyst. Note loculations
ed by thick and thin epithelium.



Other Associated Cysts

- **Botryoid odontogenic cyst-**
  - A polycystic variant of the lateral periodontal cyst developing through cystic transformation of multiple islands of dental lamina rests.
  - It has a multilocular radiographic appearance with thin fibrous connective tissue septa
  - High rate of recurrence after removal

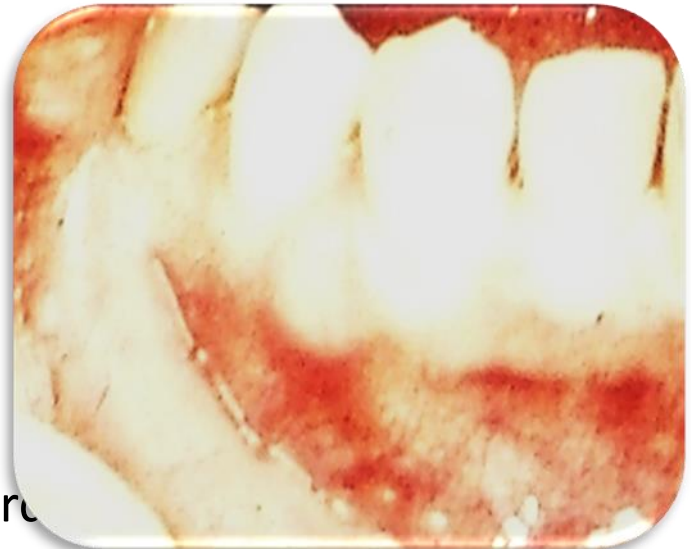
Gingival cyst of Adults

- **Definition**:

  It is an uncommon cyst occurring either on free or attached gingival, from degenerative changes in the epithelium or from the remnants of dental lamina, enamel organ or epithelial islands of periodontal membrane, traumatic implantation of epithelium or from post functional rests of dental lamina

- Soft tissue counterpart of Lateral Periodontal Cyst

- Age- At any age, 5th to 6th decade
- No gender predilection
- Mandibualr canine-premolar region
- Associated with vital teeth
- Slowly growing, soft, fluctuant,
  painless swelling
- Less than 1 cm in size, in attached gingiva or interd
  papilla
- May appear as smooth, bluish red,
  when filled with blood due to trauma
  - Superficial saucerizations or erosions
    in the cortical bone that may or may not
    be radiographically apparent.
  - Surgical excision



Dentigerous Cyst

- **Synonyms:** Follicular cyst,
  Pericoronal cyst.
- **Definition:**

It is a common type of developmental odontogenic cyst that forms around the crown of an unerupted tooth.

- Encloses crown of an unerupted tooth,
- Developed by expansion of its follicle
- Attached to the neck of the tooth

Pathogenesis

- **Initiation**: Unknown.
- **Formation**: origin from tooth follicle which is a mesodermal structure
- Fluid accumulation in the layers of reduced enamel epithelium or between the epithelium and the crown of the unerupted tooth.
- Another possibility, degeneration of stellate reticulum at an early stage of development, associated with enamel hypoplasia

Enlargement:

- The pressure exerted by a potentially erupting tooth on an impacted follicle obstructs the venous outflow, thereby inducing rapid transudation of serum and increase in hydrostatic pressure
- Then the cyst enlarges by unicentric expansion from the hydrostatic pressure of its contents.
- Probably mechanical disturbances during the eruption process may cause transduction or exudation of fluid from the follicular vessels in to the space between reduced enamel epithelium and surface of the crown

- Second most common (20% of all jaw cysts).
- Age - Second to third decade of life.
- Gender - Equal in both gender
- Site - mandibular third molars and maxillary canines [most commonly impacted (10 %) teeth]
- Dentigerous cysts around supernumerary teeth account for about 5% of all

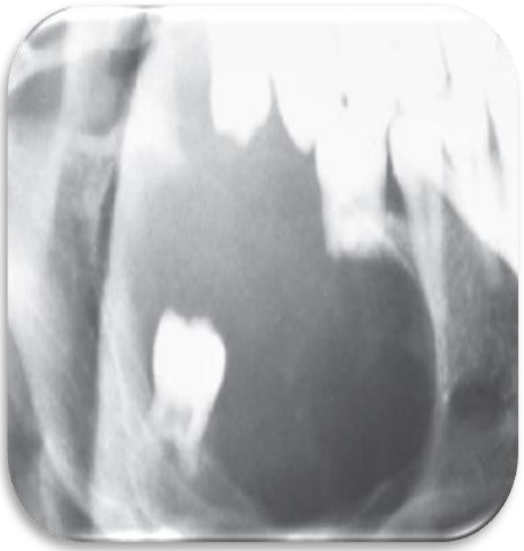
  dentigerous cysts, most

  developing around a mesiodens

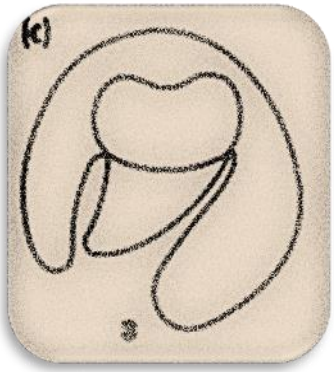
- Clinically missing tooth, most are found during radiographic examinations for unerupted tooth
- Potential to expand and becoming an aggressive lesion.
- Painless expansion of jaw bone with subsequent facial asymmetry, egg shell crackling
- Extreme displacement and severe root resorption of adjacent teeth.
- Compress sensory nerve causing pain or headache
- No pain or discomfort unless secondarily infected.
- Multiple dentigerous cysts associated with cleido-cranial dysplasia

Radiographic Features

- **Location:** Just above the crown of the involved unerupted tooth
- Mandibular third molar or maxillary canine.
- **Periphery:** well-defined radiolucency (> 5 mm), usually with a hyperostotic cortical border, with a curved or circular outline, associated with the crown of an unerupted tooth.
- Mostly unilocular, occasionally multilocular due to ridges in bony wall



- **Internal Structure:** Completely radiolucent except for the crown of the involved tooth.
- If infection is present, cortex may be missing
- There are three Radigraphic types (By Thoma)
  a) Central dentigerous cyst,
  b) Lateral dentigerous cyst,
  c) Circumferential dentigerous cyst.

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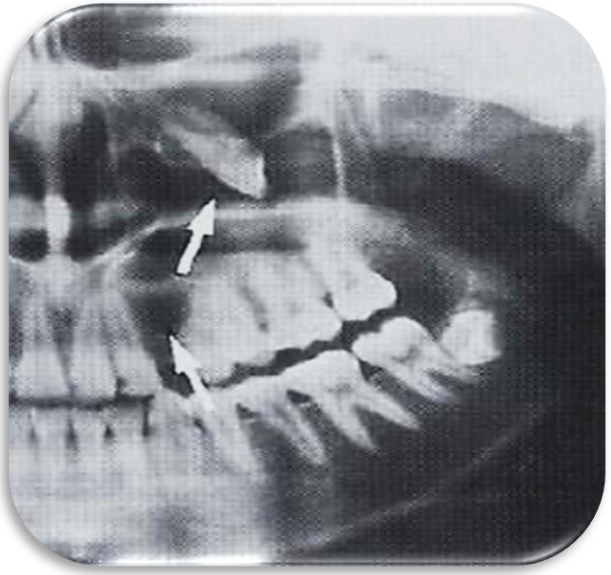
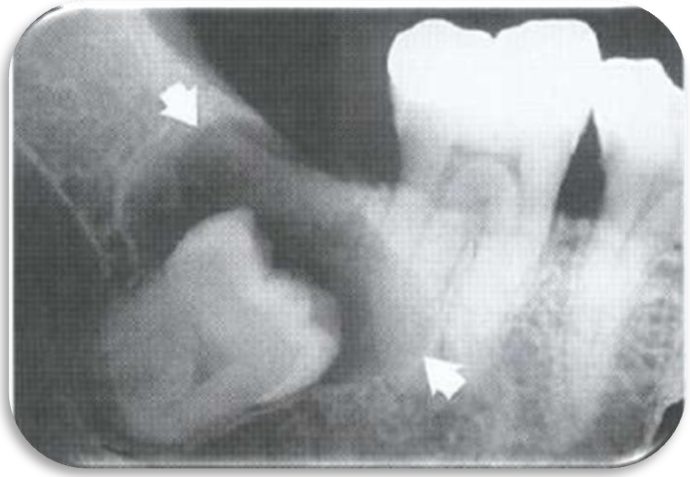
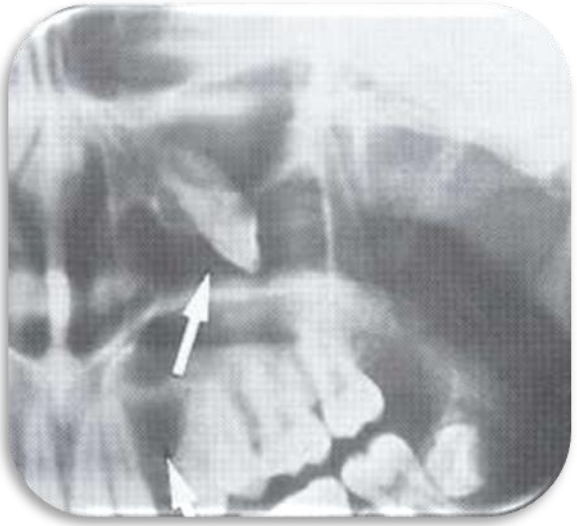


- **Effects on Surrounding:**

- Commonly displaces the associated tooth in an apical direction.
- Displaces & resorbs adjacent teeth.
- Often expands the outer cortical boundary of the involved jaw.
- May invaginate & displace the floor of the maxillary sinus & inferior alveolar canal.



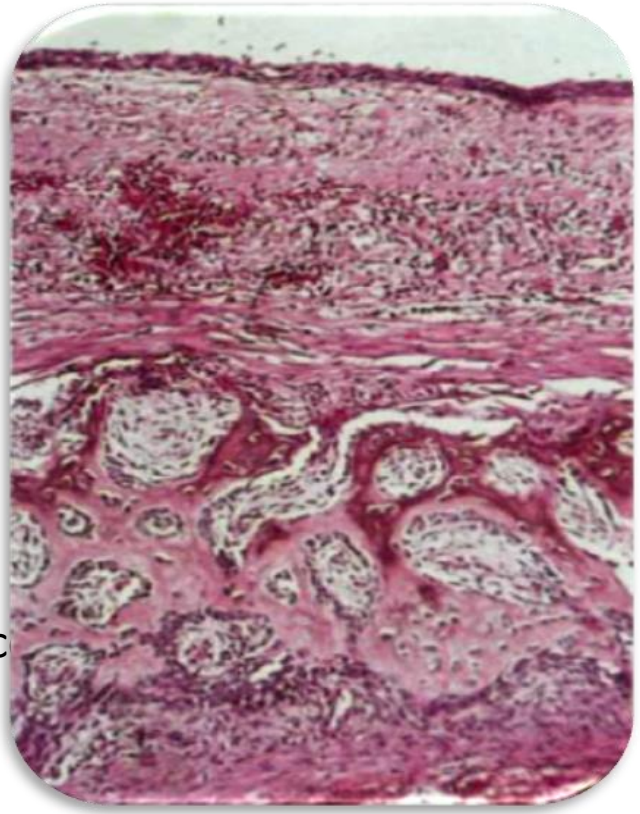


Aspiration / Contents:

- Thin, watery, yellowish (straw-colored) fluid.
- Sometimes purulent or blood-tinged,
  then called as **Blue doomed cyst**
- Cholesterol crystals may be identified.

Histopathology:

- Epithelial lining is of the stratified
  squamous epithelium usually
  shows no keratinization
- 2-6 cells thick
- The basement membrane is flattened
  or may show very poorly formed retepegs.
- The connective tissue capsule is usually thin being c
  cellular fibrous tissue containing few inflammatory cells



- **Treatment:**
  - Complete enucleation & microscopic examination of the cyst wall is the ideal treatment.
  - Marsupialization is used in younger individuals & very large cyst.
- **Prognosis:**
  - Recurrence is relatively uncommon.
  - Complications include development of-
    - Ameloblastoma,
    - Epidermoid carcinoma,
    - Mucoepidermoid carcinoma.
  - Has the greatest potential for ameloblastic transformation than all other jaw cysts.

Differential Diagnosis

- Enlarged dental follicle
- Odontogenic Keratocyst
- Ameloblastoma

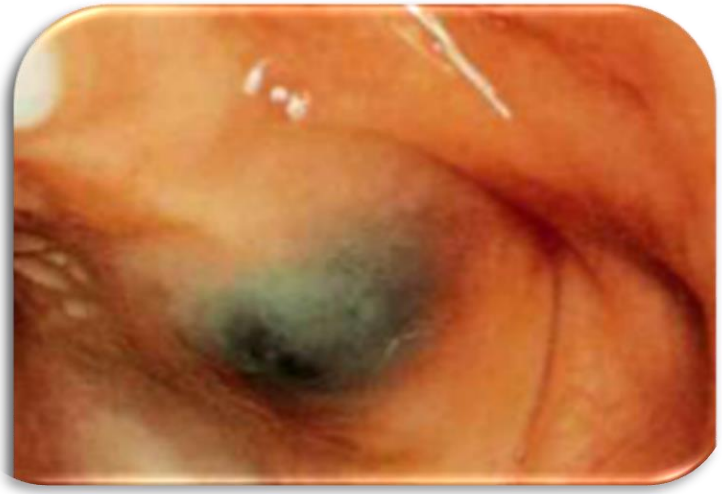
Eruption Cyst

- **Synonyms:** Eruption Hematoma
- **Definition:**

  It is an odontogenic cyst with histologic features of a dentigerous cyst that surrounds a tooth crown that has erupted through bone but not soft tissue and is visible as a soft fluctuant moss on the alveolar ridges.

- Associated with erupting deciduous or permanent teeth
- Mostly anterior to permanent first molars

- Do not have any radiographic changes except for a soft tissue shadow since the cyst is confined within it
- Often requires no treatment,
- However, a small portion of tissue overlying the tooth is sometimes removed to facilitate eruption.



Odontogenic Keratocyst

- Philipsen 1956 coined the term
- **Synonym:** Primordial cyst
- **Definition:**

It is characterized by

- A parakeratinized surface which is typically corrugated,
- A remarkable uniformity of thickness of the epithelium, usually ranging from 6 to 10 cells thick,
- A prominent palisaded, polarized basal layer of cells often described as having a ‘picket fence’ or ‘tombstone’ appearance.

Pathogenesis

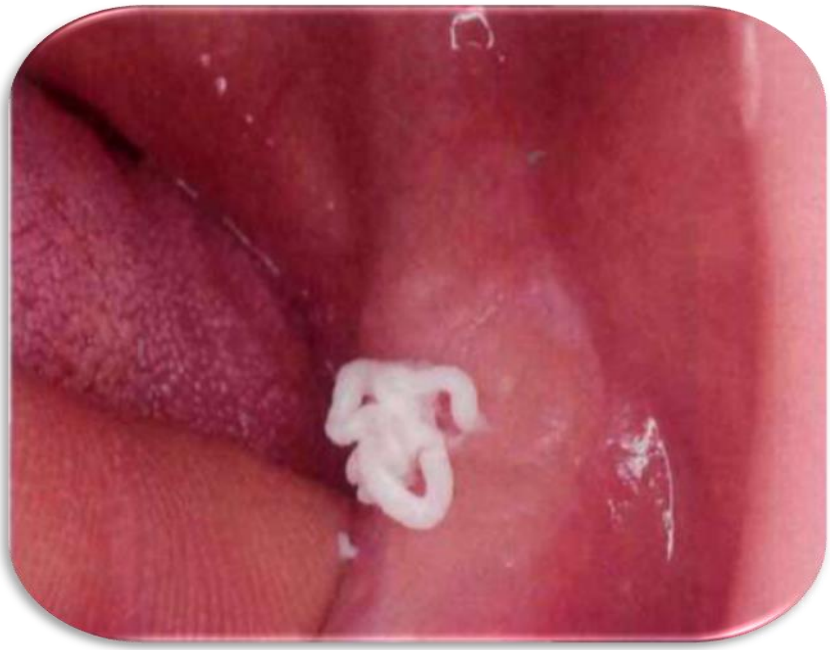
- Keratocyst is originated from cellular proliferation of
  - Dental lamina, or
  - Extension of basal cells of overlying oral epithelium
- Stimulus unknown but it is likely to be genetically determined.
- Epithelium appears to have an innate growth potential like tumours
- Enlargement is due to mural growth
- Multicentric epithelial cellular group divide for enlargement of cyst
- Cells grow and shed in the cystic cavity
- Cyst enlarges within the medullary cavity

Clinical Features

- 11 % of all jaw cysts
- Age - Occurs at any age. Mostly (50 to 60 %) during the second & third decades
- Sex- Males predominance
- Site- more common in mandible, with the majority of the cysts occurring in the ramus-third molar area.
- In the maxilla, the common site is the third molar area, followed by the cuspid region.

Features

- Multiple odontogenic keratocysts are sometimes associated with:
  - Basal cell nevus- bifid rib Syndrome (Gorlin Goltz Syndrome)
  - Marfan Syndrome
  - Ehlers-Danlos syndrome
- Asymptomatic unless infected,
- If infected patient complains of pain, soft tissue swelling & drainage.

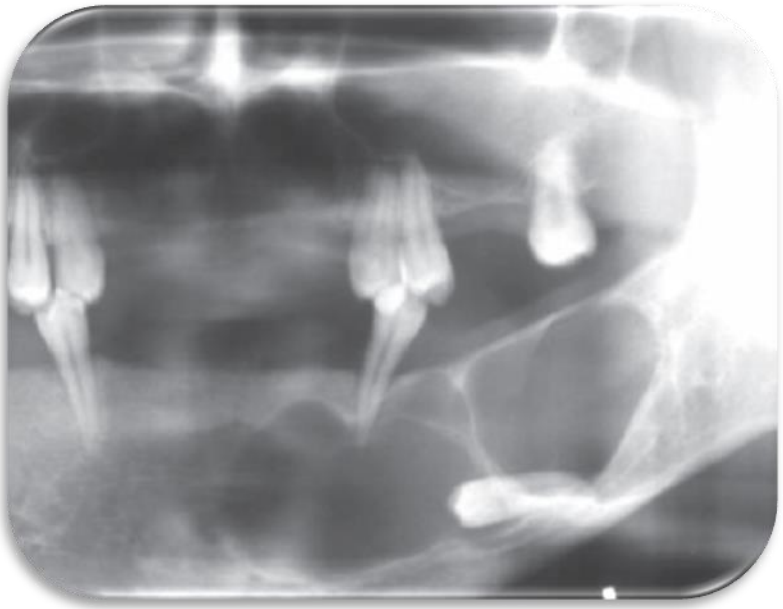


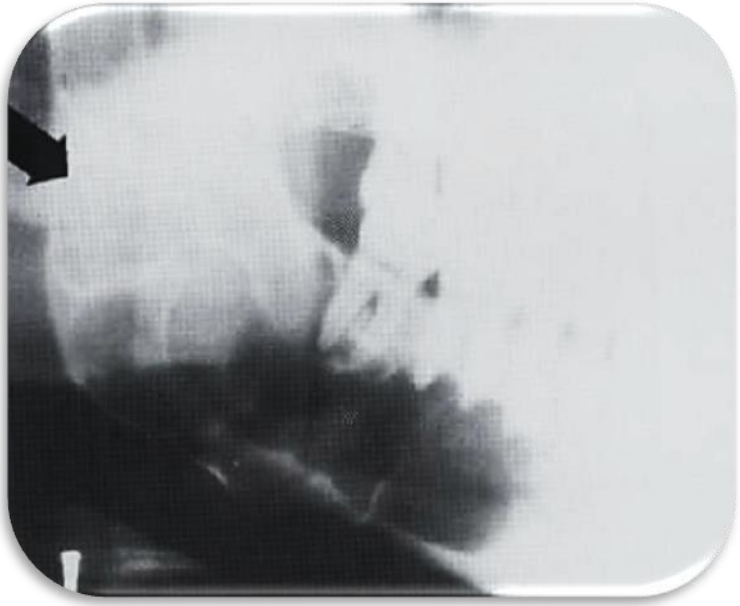
- As it expands through the cancellous (medullary) bone, bony swelling is usually a late feature manifesting only after the cyst has become very large.
- Teeth may be displaced.
- Occasionally paraesthesia of lower lip or pathologic fracture with a extremely large cyst in mandible

- **Location:** posterior body of the mandible (90% occur posterior to the canines) and ramus (more than 50%).
- The epicenter is located superior to the inferior alveolar nerve canal.
- indistinguishable from a dentigerous cyst.
- **Shape:** Mostly irregular shaped

- **Periphery:** a cortical border unless they have become secondarily infected.
- Smooth round or oval shape identical to that of other cysts, or it may have a scalloped outline (a series of contiguous arcs)

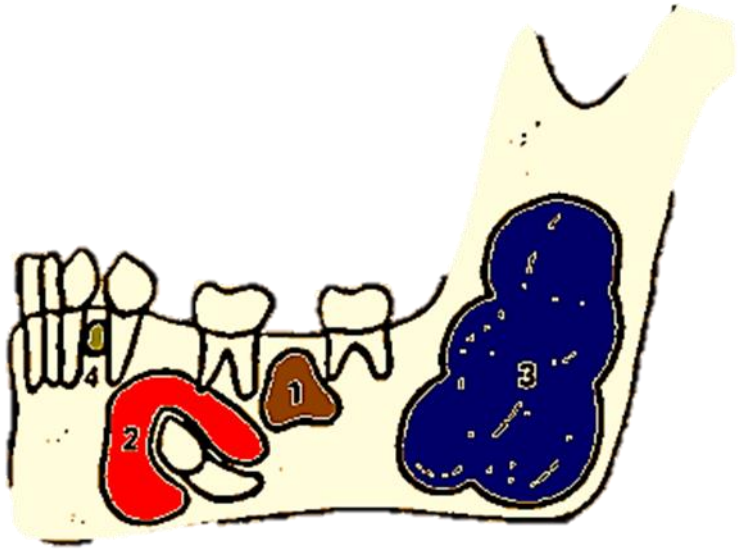
- **Internal Structure:** most commonly is radiolucent.
- show aggressive growth with undulating borders, cloudy interiors, & an appearance suggestive of multilocularity.
- Sometimes curved internal septa present, giving the lesion a multilocular appearance





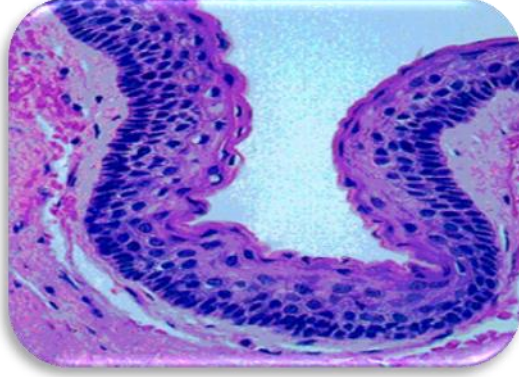
- **Effects on surrounding**: Grow along the internal aspect of the jaws, causing minimal expansion
- It can displace & resorb teeth
- The inferior alveolar nerve canal ma be displaced inferiorly.
- In the maxilla this cyst can invaginate and occupy the entire maxillary antrum.

- Main (1970) proposed the terms
  1. Replacement
  2. Envelopmental
  3. Extraneous
  4. Collateral



Differential Diagnosis

- Dentigerous cyst
- Ameloblastoma
- Residual cyst
- Traumatic cyst
- Central Giant cell Granuloma



- **Aspiration/Contents:**
  - Thick, yellow, cheesy material (keratin).
  - Soluble protein level < 4 gm / 100 ml. (Albumin)
- **Histopathology**
  - Para keratinized surface which is typically corrugated rippled and wrinkled.
  - Uniformity of the thickness of the epithlium usually 6-10 cells thick
  - A prominent pallisaded polarised basal layer of cells often described as having a picket fence or tomb stone appearances
  - Daughter cysts or satellite cysts present

Treatment & Prognosis

- Surgical treatment may vary
- Resection, Curettage, or Marsupialization to reduce the size of large cysts before surgical excision.
- Complete removal of the walls of the cyst.
- Periodic post treatment clinical & radiographic examinations.
- High recurrence rate – 13 to 60 %.
- Dysplastic & Neoplastic transformation is uncommon.

Associated cysts

Primordial cyst

- As the term “primordial cyst” refers to a cyst developing through degeneration of the enamel organ, occurring in place of a tooth, & has no histologic connotation regarding keratin formation, it should be regarded as just one of the many clinical forms of odontogenic keratocysts.

Gorlin - Goltz syndrome

- **Synonyms-** Basal cell nevus Syndrome
  Bifid rib syndrome
  Nevoid basal cell acrcinoma
- Inherited as an autosomal dominant trait with variable expressivity
- It comprises a number of abnormalities such as multiple nevoid basal cell carcinomas of the skin, skeletal abnormalities, central nervous system abnormalities, eye abnormalities, & multiple odontogenic keratocysts.

Clinical Features

- Age- after 5 years of age and before 30 years of age
- Development of jaw cysts and skin, basal cell carcinomas.
- **Jaw lesions-** multiple OKCs of the jaws, usually appearing in multiple quadrant and earlier in life than solitary OKCs
- Recurrence rate higher than with the solitary variety.

- **Skin lesions-** small, flattened, flesh colored or brown papules, occur anywhere on the body but are especially prominent on the face, neck, and trunk.
- Less aggressive than solitary lesions
- **Skeletal anomalies-** include bifid rib (most common) and other costal abnormalities such as agenesis, deformity, and synostosis of the ribs, vertebral fusion, polydactyly, shortening of the metacarpals, temporal and temporoparietal bossing, minor hypertelorism, and mild prognathism.
- **Neurological Abnormalities-** Calcification of the falx cerebri and other parts of the dura occur early in life.
- Mental retardation

Radiographic Features

- **Location:** same as that of solitary OKCs
- Multiple keratocysts develop bilaterally and can vary in size from 1 mm to several centimeters
- **Other radiographic features:**
- a radiopaque line of the calcified falx cerebri may be prominent on the postero-anterior skull projection.
- Occasionally this calcification may appear lamellated.

Differential Diagnosis

- Cherubism
- Multiple Myeloma
- Dentigerous cysts

Calcifying Odontogenic Cyst

- **Synonyms:**
  - Keratinizing &/or calcifying epithelial odontogenic cyst,
  - Gorlin cyst.
- **Definition:**
  - Calcifying odontogenic cysts are uncommon, slow growing, benign developmental lesions that occupy a spectrum ranging from a cyst to an odontogenic tumour.
  - It has been described as-

Type-I cyst

Type-I A – the simple unicystic type;

Type-I B – the odontome producing type;

Type-I C – the ameloblastomatous proliferating type.

Type-II neoplasm - WHO categorizes it as benign tumor.

Pathogenesis

- Develop from - reduced enamel epithelium
  - Remnants of odontogenic epithelium in follicle
  - Gingival tissue or bone
- Epithelial lining has ability to induce the formation of dental tissues in adjacent connective tissue wall
- Possibility of odontome, dentinoid or ameloblastoma being present in cyst wall induced by lining

- **Clinical Features:**
  - Uncommon lesions.
  - Age- bimodal age distribution- 2nd decade & 7th decade of life.
  - Sex- equal sex distribution.
  - Site- 75 % occur anterior to the first molar distribution in both jaws
- **Clinical Presentation:**
  - Slow-growing, painless swelling of the jaw.
  - Occasionally pain.
  - Sometimes expanding lesion destroy cortical plate, & cystic mass may become palpable as it extends into the soft tissue.
  - Discharge from such advanced lesions.
  - May displace teeth

Radiographic Features

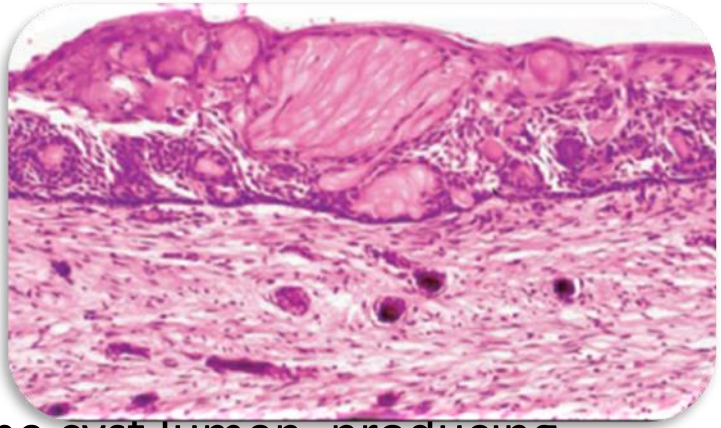
- **Location**: Anterior to the first molar, especially associated with cuspids & incisors (sometimes manifests as a pericoronal radiolucency).
- **Periphery**: vary from well defined & corticated with a curved, cyst-like shape to ill defined & irregular.
- Usually appears as a well circumscribed, unilocular radiolucency; rarely multilocular.

- **Internal Structure:**
  - vary from completely radiolucent;
  - may show evidence of small foci of calcified material as white flecks
  - may show even larger, solid, amorphous masses.
- **Effects on surrounding:**
  - Displacement of teeth & resorption of roots may occur.
  - Perforation of the cortical plate may be seen with enlarging lesions.

Differential Diagnosis

- Odontome
- AOT
- Long standing cyst with dystrophic calcifications
- Adenomatoid odontogenic tumor,
- Calcifying epithelial odontogenic tumor,
- Ossifying fibroma.

Pathology



- **Aspiration/contents:**
  - Viscous, granular, yellow fluid.
- **Histopathology:**
  - Intraluminal epithelial proliferation obscures the cyst lumen, producing impression of a solid tumor.
  - Basal layer more loosely arranged epithelial cells, resembling the stellate reticulum of the enamel organ.
  - Prominent microscopic feature - presence of so-called ghost cell keratinization.
  - Ghost cells are anucleated and retain outline of the cell membrane.
  - These cells undergo dystrophic mineralization characterized by fine basophilic granularity, which may eventually result in large sheets of calcified material.

Treatment

- Enucleation & curettage.
- Recurrence is rare.
- Cyst does have some neoplastic characteristic.
- Carcinomatous transformation has been recorded.
- It is wise to follow treatment with periodic radiographic evaluation.

NON-ODONTOGENIC CYSTS

Nasopalatine Duct Cyst

- **Synonyms:**
  - Nasopalatine/Incisive canal cyst,
  - Median anterior maxillary cyst,
  - Median palatal (palatine) cyst**.**
- Most common non-odontogenic developmental cyst in the maxilla.
- **Origin:**
  - It arises in the nasopalatine canal when embryonic epithelial remnants of the nasopalatine duct (a primitive organ of smell) undergo proliferation & cystic degeneration.
  - Factors for development not identified.
  - Suggested factors- trauma, bacterial infection or genetic determinant.

- It is categorised as its position
  - In the canal- **nasopalatine/incisive canal cyst,**
  - At the oral terminus in the incisive papilla- **cyst of incisive papilla,**
  - Posteriorly in hard palate - **median palatal cyst,**
  - Anteriorly between central incisors- **median anterior maxillary cyst.**

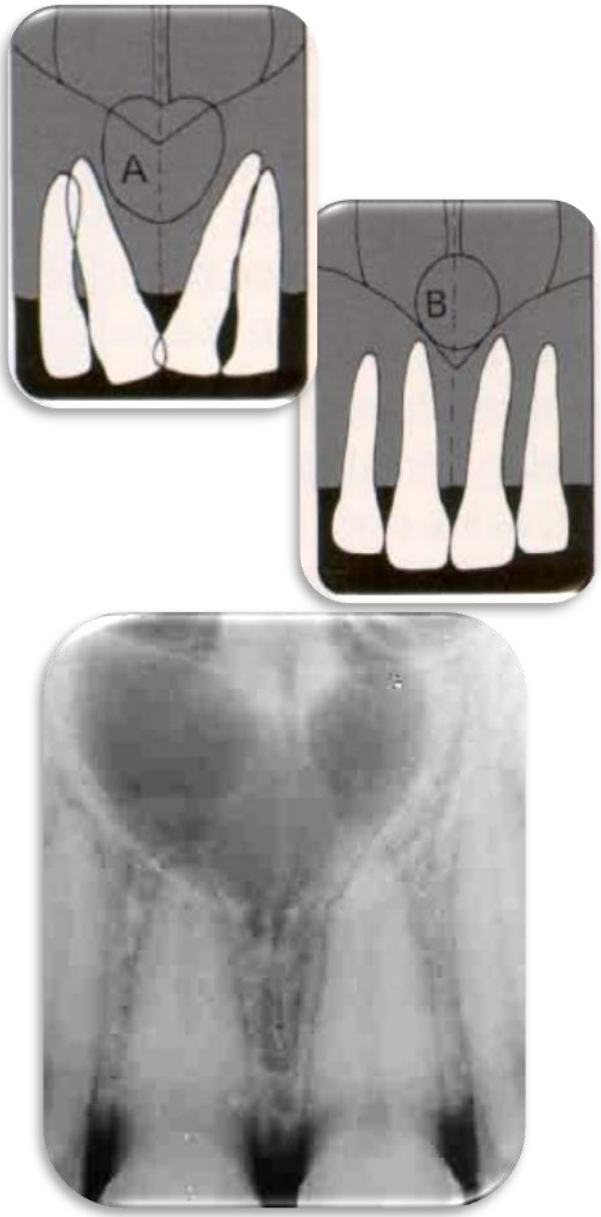



- 10 % of jaw cysts, Most common non-odontogenic developmental cysts in maxilla.
- Age- 4^{th} to 6^{th} decades.
- Sex- incidence is 3 times higher in males.
- Site- just posterior to palatine (incisive) papilla.
- Asymptomatic.
- Mostly complaint is a small, well-defined swelling just posterior to the palatine papilla which is usually fluctuant & blue.

- Swelling below maxillary labial frenum or to one side.
- It may bulge into the nasal cavity & distort nasal septum. Pressure from the cyst on the adjacent nasopalatine nerves may cause a burning sensation or numbness over the palatal mucosa.
- In some cases cystic fluid may drain into the oral cavity & patient reports a salty taste.
- Displacement of central incisors is often observed, but the teeth are vital.

- **Location:** found in the nasopalatine foramen or canal.
  - This cyst may not always be positioned symmetrically.

- **Periphery:** well defined and corticated and is circular or oval in shape.
  - The shadow of the nasal spine sometimes is superimposed on the cyst, giving it a heart shape.

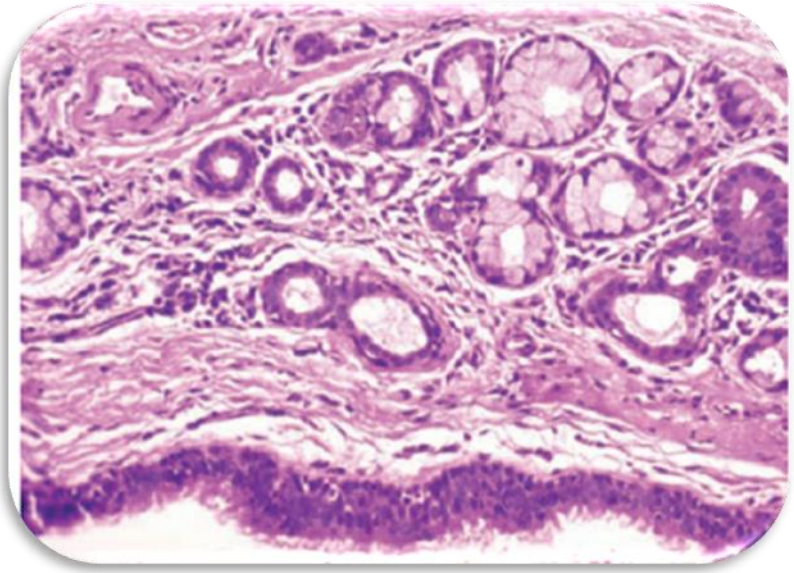


- **Internal structure**: Totally radiolucent.
  - Internal dystrophic calcifications, which may appear as ill-defined, amorphous, scattered radiopacities.
- **Effects on surrounding**: causes the roots of the central incisors to diverge, and occasionally root resorption occurs
  - Seen from a lateral perspective, the cyst may expand the labial cortex as well as the palatal cortex The floor of the nasal fossa may be displaced in a superior direction.

Differential Diagnosis

- Incisive foramen
- Radicular cyst
- Mucocle of maxillary sinus

- **Aspiration / Contents:**
  - Viscous fluid- may be pus or mucoid material.
  - Cholesterol is uncommon.



- **Histopathology:**
  - Epithelium varies at different levels
  - Lower level : Stratified squamous
  - Superiorly : pseudostratified columnar, cuboidal or ciliated
  - Presence of mucous glands, goblet cells
- **Treatment & Prognosis:**
  - For dentulous patients- removal not recommended unless symtomatic.
  - In the edentulous patients- removed before dentures are placed.
  - If the cyst is large- marsupialization.
  - Malignant transformation has not been reported.

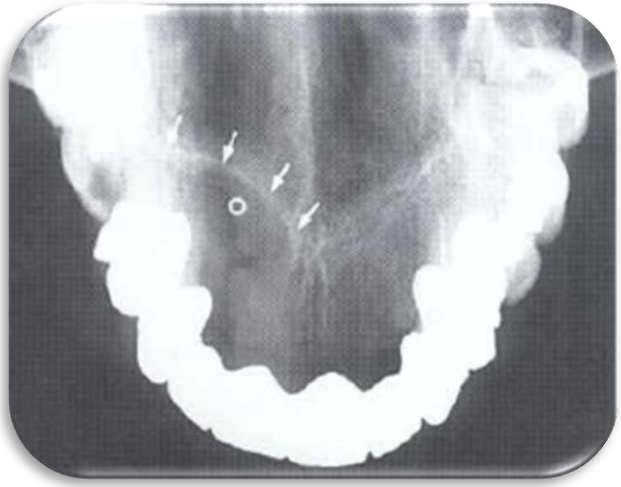
Nasolabial Cyst

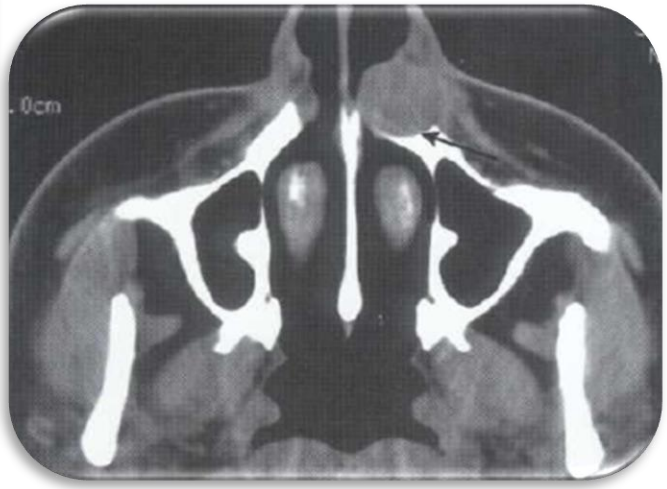
- **Synonyms:**
  - Nasoalveolar cyst
- Occurs outside the bone in the nasolabial folds below the alae nasi.
- Traditionally regarded as a jaw cyst, it should be classified as a developmental soft-tissue cyst that only involves bone secondarily.
- **Pathogenesis:**
  - Fissural cyst arising from the epithelial rests in the fusion lines of the globular (of medial nasal), lateral nasal & maxillary processes or source of epithelium from the embryonic nasolacrimal duct.

Clinical Features

- Rare cyst
- Age- 12 to 75 years (mean age 44).
- Sex- females predilection
- Mostly unilateral seldom bilateral
- When small- very subtle, unilateral swelling of the nasolabial fold, may elicit pain or discomfort in breathing
- When large- bulge into the floor of the nasal cavity, causing some obstruction, flaring of the alae, distortion of the nostrils & fullness of the upper lip. Infection may drain in the nasal cavity

- They are soft tissue cysts, plain radiographs may not show any detectable changes.
- It causes erosion of bone apical to the incisors.
- Actual shape & position of the cyst can be demonstrated by aspirating the cyst fluid & replacing it with a radio-contrast material.
- Investigation could include CT or MRI.

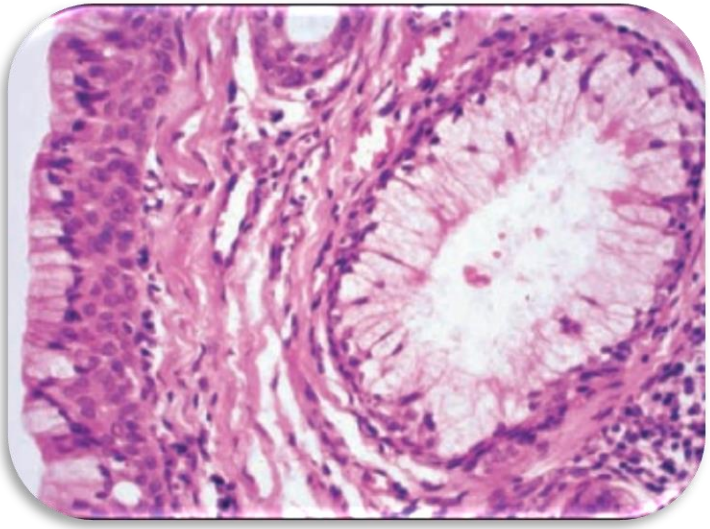




Differential Diagnosis

- Acute dentoalveolar abscess
- Nasal furuncle
- Large mucous extravasation cyst
- Cystic salivary adenoma

- **Aspiration/Contents:**
  - Contains straw-colored mucinous fluid with no cholesterol.



- **Histopathology**
  - Epithelial lining is a pseudostratified columnar type with numerous goblet cells.
  - Stratified squamous epithelium may be present in addition to cuboidal epithelium in some cases.

- **Treatment & Prognosis:**
  - It should be excised through an intraoral approach.
  - Do not tend to recur.

PSEUDO CYST

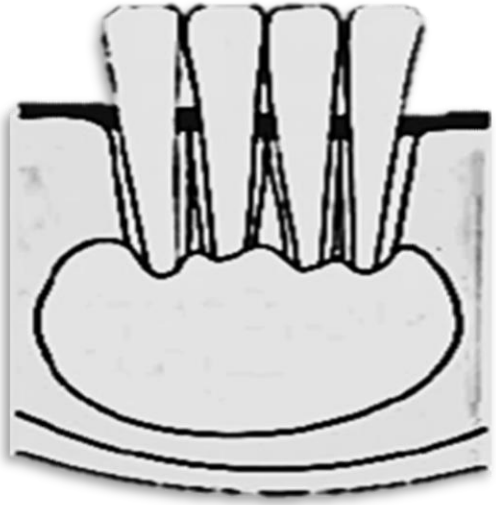
Simple Bone Cyst

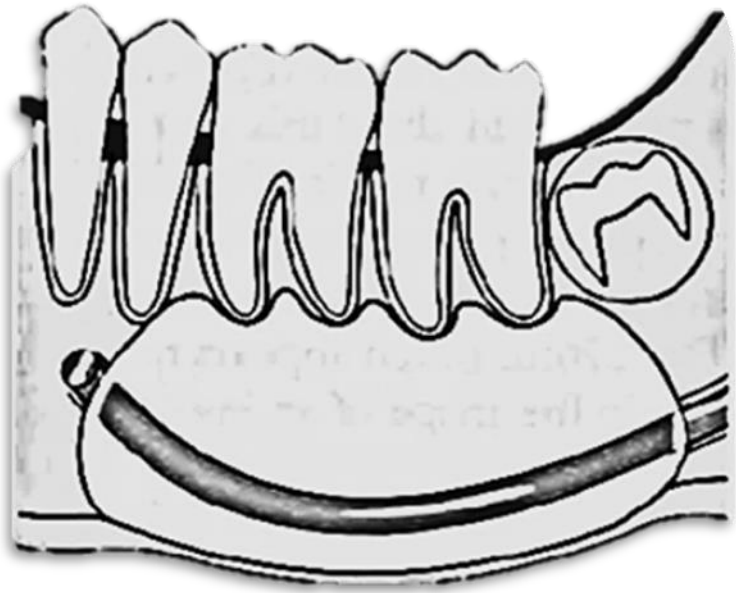
- **Synonyms:**
  - Traumatic bone cyst,
  - Solitary bone cyst,
  - Hemorrhagic bone cyst,
  - Unicameral bone cyst.

- **Definition:**
  - It is a cavity within bone that is lined with connective tissue that may be empty or may contain fluid or gas.
  - Because it has no epithelial lining, it is not a true cyst.

Pathogenesis

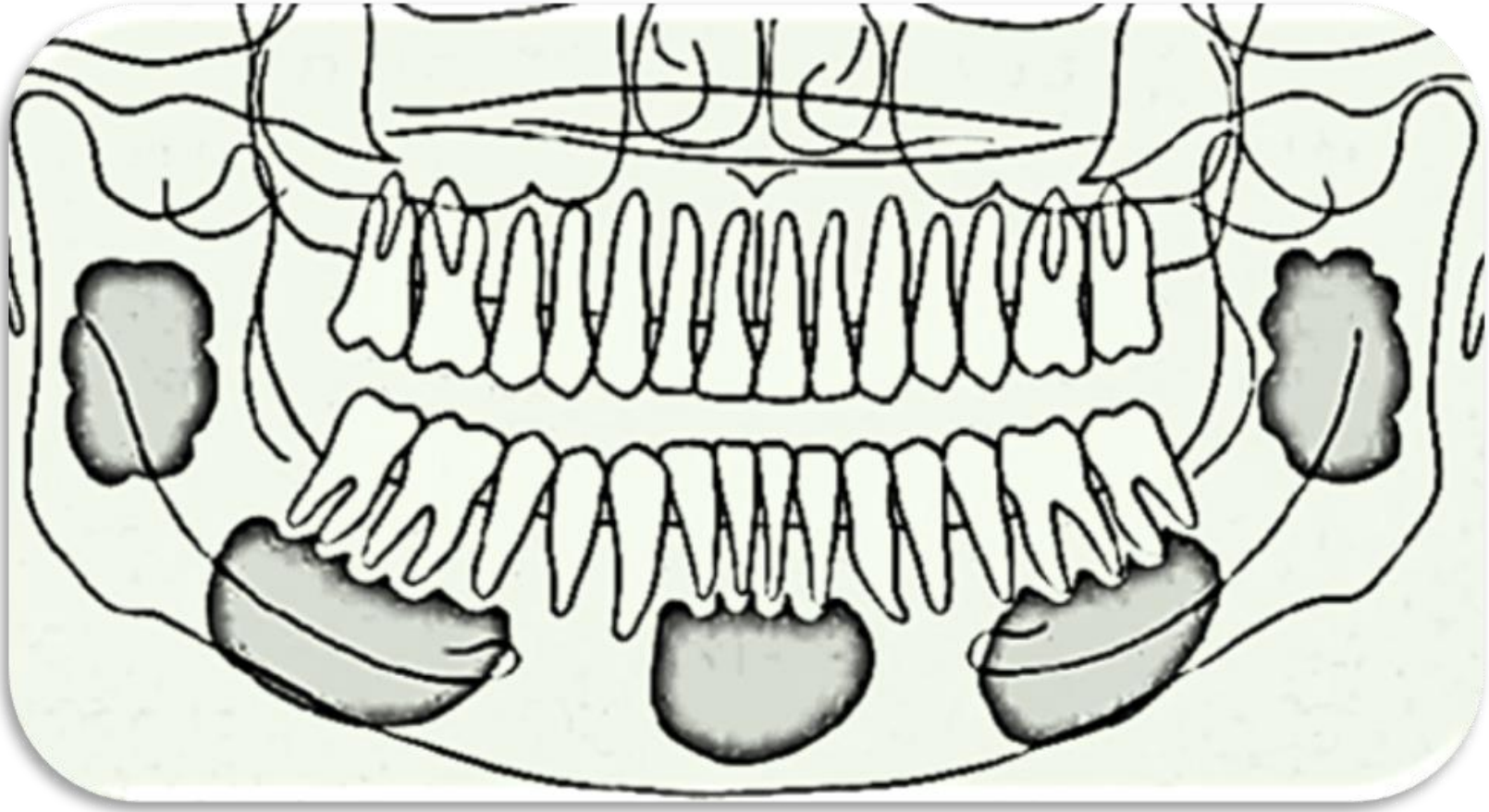
- Following trauma to the bone, there is intramadullary hemorrhage. Failure of early organization of hematoma in some of the marrow spaces & subsequent liquefaction of the clot
- Might result from a failure of differentiation of osteogenic cells.





Clinical Features

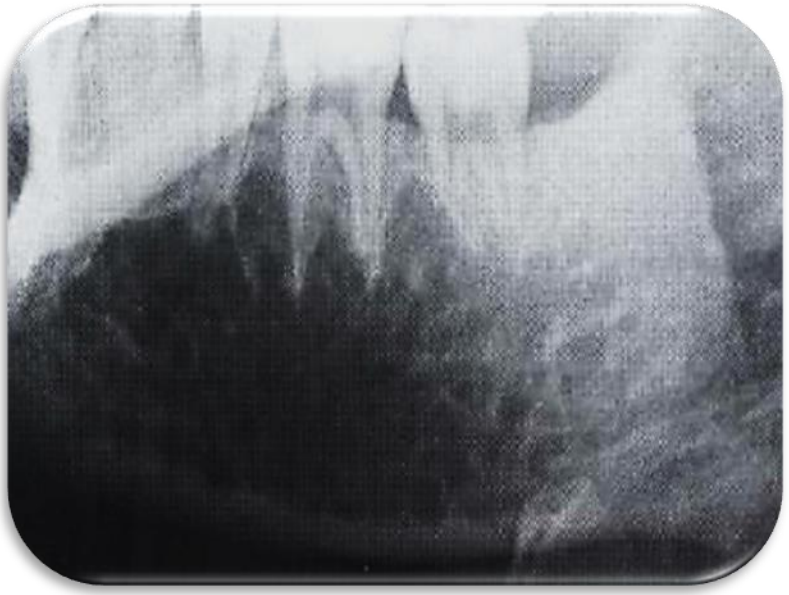
- Rarely seen
- Age- first two decades of life.
- Sex- male predominance.
- Common site- ramus & posterior mandible.
- Multiple simple bone cyst can develop along with cementoosseous dysplasia with mean age of 42 years & female predominance.
- Asymptomatic, but sometimes painful
- Expansion of mandible, or tooth movement is possible but unusual.
- Teeth are vital
- Discovered on routine radiograph



Radiographic Features

- **Location:** In the mandible; rarely in maxilla
  - In mandible in the ramus and posterior mandible in older patients.
- **Periphery:** Vary from a well defined, delicate cortex to an ill-defined border that blends into the surrounding bone.
  - Boundary defined in the alveolar process around the teeth than in the body of the mandible.
  - Shape is smooth and curved, with an oval or scalloped border. It often scallops between the roots of the teeth

- **Internal structure:** Totally radiolucent,
  - Occasionally appears multilocular
  - It is due to pronounced scalloping of the endosteal surface of either the buccal or lingual plates
  - Ridges of bone produced by the scalloping give the appearance of septa on a lateral view of the mandible.



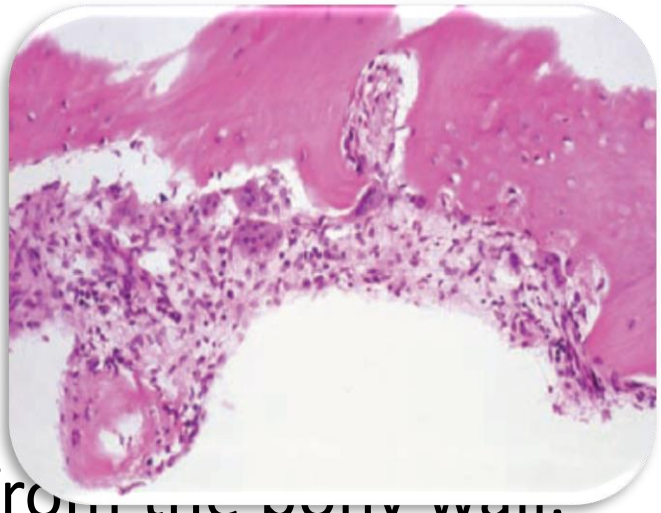
- **Effects on surrounding:**
  - No effect on the surrounding teeth
  - Rare cases of tooth displacement and involves all the bone around the roots of the teeth but leaves the lamina dura intact or only partly disrupted
  - Sparing of the cortical boundary of the crypt around a developing tooth is characteristic.
  - Tendency to grow along the long axis of the bone, causing minimal expansion.



Differential Diagnosis

- OKC
- Ameloblastoma
- Malignant lesion

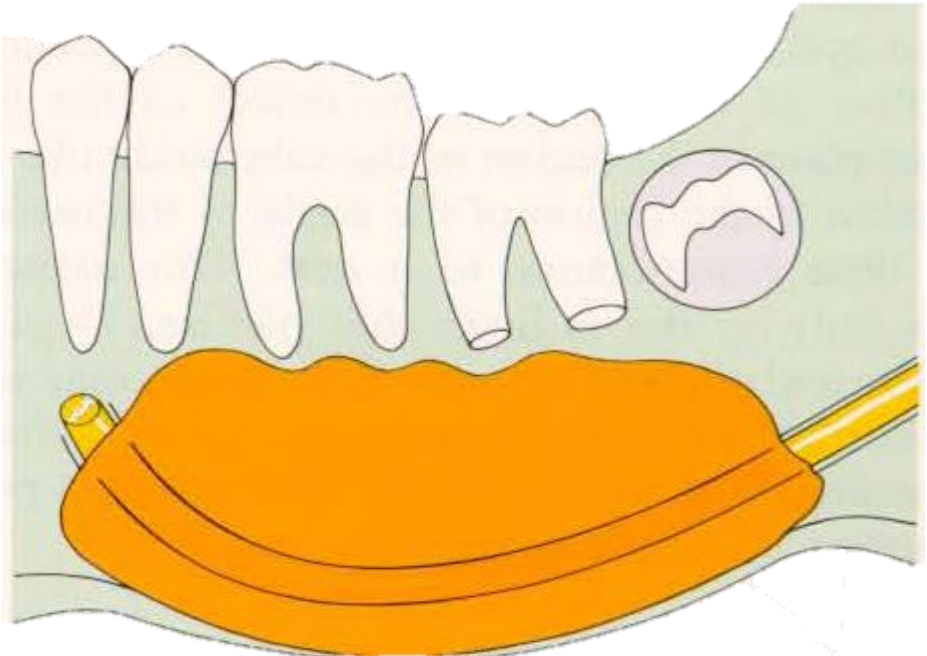
- **Aspiration/Contents:**
  - Mostly non-productive.
  - When productive- straw colored or serosanguineous fluid.



- **Histopathology:**
  - Minimal amounts of fibrous tissue from the bony wall.
  - Occasionally contain blood or serosanguineous fluid.
  - Delicate, well-vascularized, fibrous connective tissue without evidence of an epithelial component is identified
- **Treatment & Prognosis:**
  - Spontaneous healing in some cases.
  - Conservative opening into the lesion & curettage.
  - Rarely recur.

Aneurysmal bone Cyst

- Reactive lesion of bone rather than a cyst or true neoplasm.
- An exaggerated, localized, proliferative response of vascular tissue in bone.
- Its etiology remains unclear.
- Pathogenesis of aneurysmal bone cyst is controversial and it is believed that cyst arises as a result of trauma with subsequent venous occlusion inside the bone.



Clinical Features

- More than 90% in under 30 years of age.
- Females most commonly
- Mandible = maxilla, chiefly the molar areas
- Manifests as a fairly rapid bony swelling (usually buccal or labial).
- Pain is an occasional complaint, and the involved area may be tender on palpation
- a firm, nonpulsatile swelling
- On auscultation, a bruit is not heard on firm palpation, crepitus may be noted.
- Accidentally injury or perforation results in profuse bleeding.
- Paresthesia may be present, regional teeth displaced, derangement of occlusion, displaced teeth are always vital.

Radiographic Features

Location

- Mandible : maxilla (ratio of 3:2)
- the molar and ramus regions

Periphery and shape

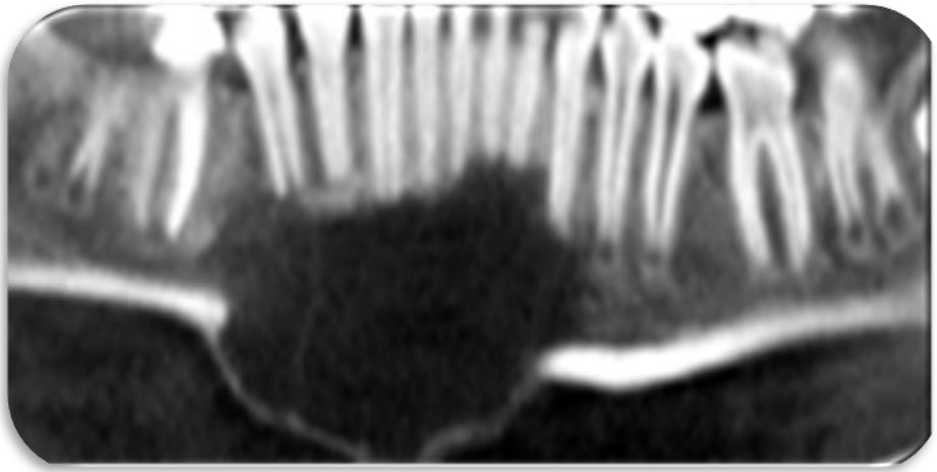
- well defined, is circular or "hydraulic."

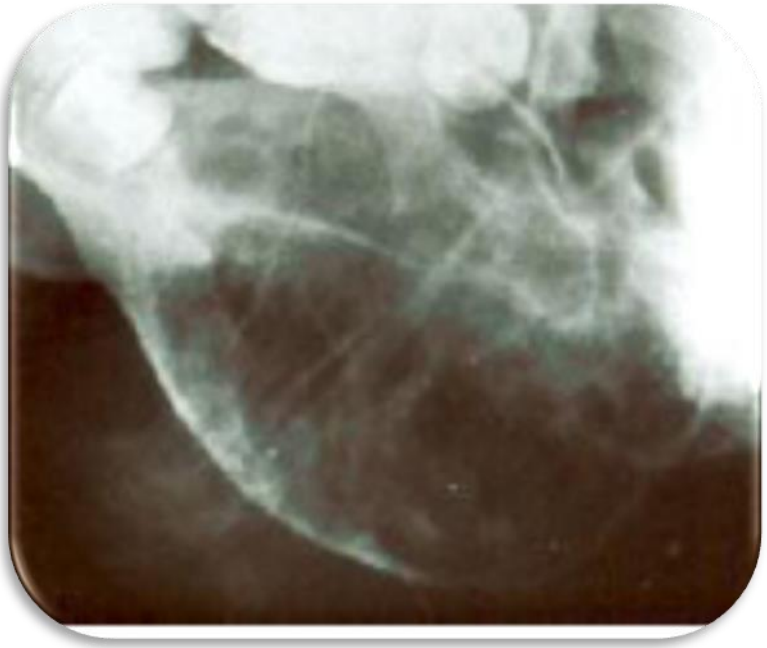
Internal structure

- multilocular appearance
- Septa are like wispy, ill-defined septa seen in giant cell granulomas
- Septa positioned at right angles to the outer expanded border multilocular radiolucent area in the bone, with a typical “honey-comb” appearance.

Effect on surrounding

- “Ballooning” expansion of the cortical plates, displacement of teeth and resorption of the roots of the adjoining teeth
- “blow-out” bulging of the lower border of mandible.
- can displace and resorb teeth





hemorrhagic aspirate favors the diagnosis of ABC

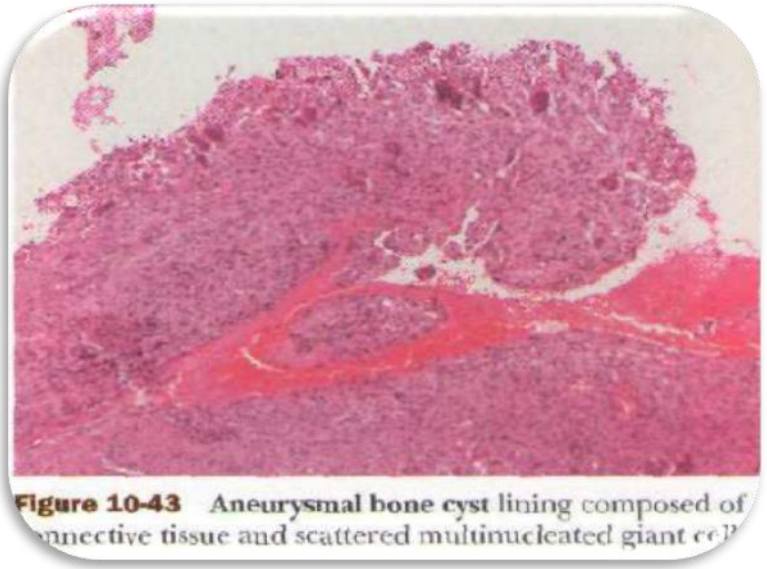


Figure 10-43 **Aneurysmal bone cyst** lining composed of
nnective tissue and scattered multinucleated giant c

Differential Diagnosis

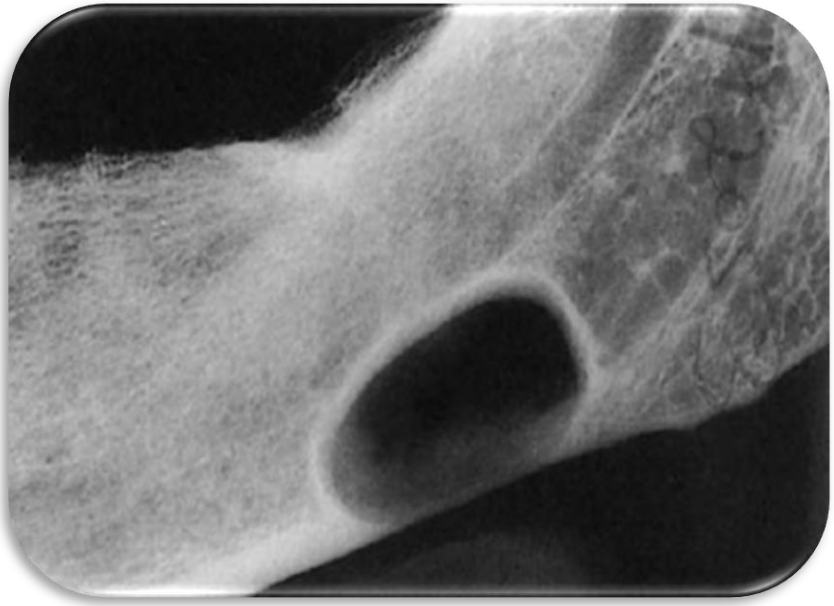
- Odontogenic keratocyst,
- Central giant cell granuloma,
- Ameloblastic fibroma
- Odontogenic myxoma

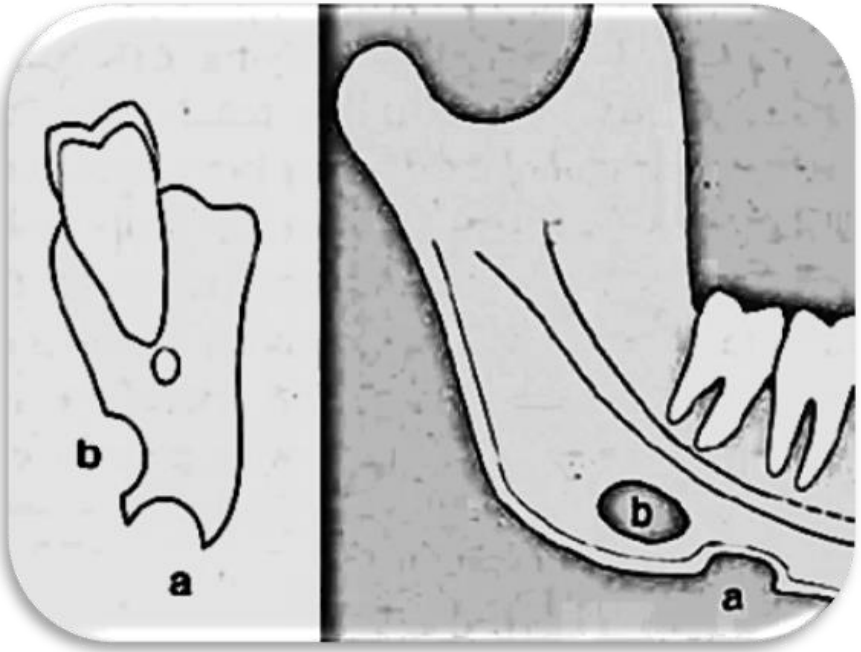
Treatment

- Surgical curettage and partial resection
- The recurrence rate is fairly high,
- ranging from 19% to about 50% after curettage and approximately 11 % after resection.
- Large lesions resection with curettage
- Radiation is contraindicated
- This indicates a need for careful follow-up.

Stafne Bone Cyst

- **Synonyms:** Stafne defect, Static bone cavity, Latent bone cyst
- **Definition:** A developmental salivary gland defect of the mandible is the development of a deep, well-defined depression in the lingual surface of the posterior body of the mandible
- Etiology remains unknown,
- **Clinical Features:**
  - Rare defect
  - Male predominance
  - Developmental anomaly develop in patients as old as 30 years and as young as 11 years.
  - Present at submandibular gland fossa, close to inferior of mandible

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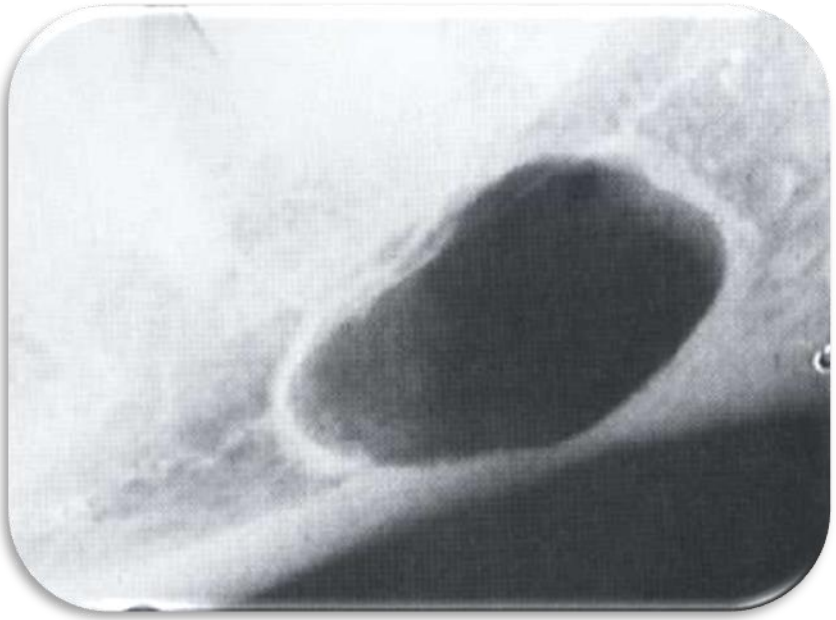
- A developmental salivary gland defect is a round, ovoid or occasionally, lobulated radiolucency that ranges in diameter from 1 to 3 cm
- Located below the inferior alveolar nerve canal and anterior to the angle of mandible, in the region of the antegonial notch. Rare examples are located in the apical region of the mandibular premolars or cuspids and are related to the sublingual gland fossa.
- Margins well defined by a dense radiopaque line. Margin usually thicker on the superior aspect, results from the x-rays passing tangentially through the relatively thick walls of the depression.
- The lesion may involve the inferior border of the mandible.



- **Treatment:**
  - Surgical exploration or the need for advanced imaging such as CT.
  - The defect may increase in size with time. There are rare reports of salivary gland neoplasms developing in the soft tissue within the defect.
  - Destruction of the well-defined cortex of the defect may indicate the presence of a neoplasm.