- ***Cyst:*** *is defined as a pathological cavity which may or may not be lined by epithelium and is filled with solid, semi solid or gaseous material .*

- ***Odontogenic cyst:*** *a cyst in which lining of lumen is derived from epithelium produced during tooth development.*

Types of cyst

- ***1.true cysts:*** *that which is lined by epithelium e.g: dentigerous cyst, radicular cyst.*

- ***2.pseudo cysts:*** *not lined by epithelium, e.g: solitary bone cyst , aneurysmal bone cyst*

Mechanism of cyst formation

- *Proliferation of the epithelial lining*
- *Fluid accumulation within the cyst cavity*
- *Bone resorption*

Classification of cysts of the orofacial region Based on the World Health Organization classification

- **Epithelial cysts**

A) Odontogenic cysts

1) Developmental odontogenic cysts

- keratocyst
- Dentigerous cyst (follicular cyst)
- Eruption cyst
- Lateral periodontal cyst
- Gingival cyst of adults

2) Inflammatory odontogenic cyst

- Radicular cyst (apical and lateral)
- Residual cyst

B) Non-odontogenic cysts

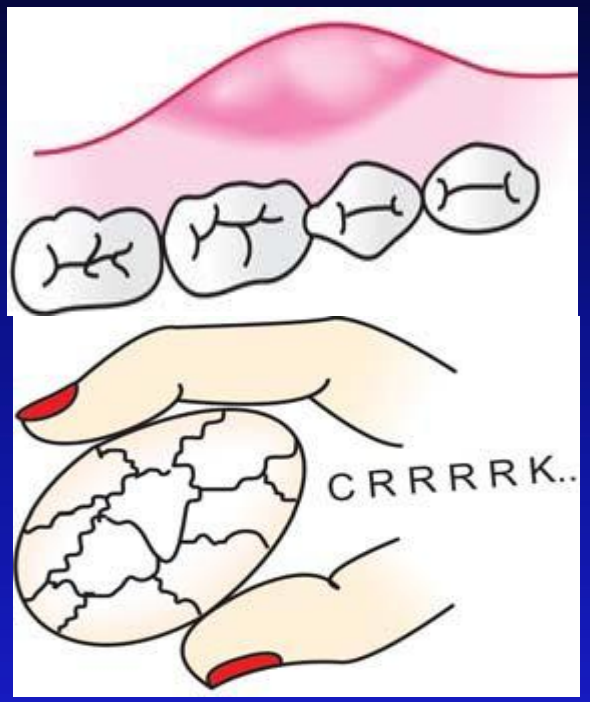
- Nasopalatine cyst
- Nasolabial cyst
- Globulomaxillary Cyst

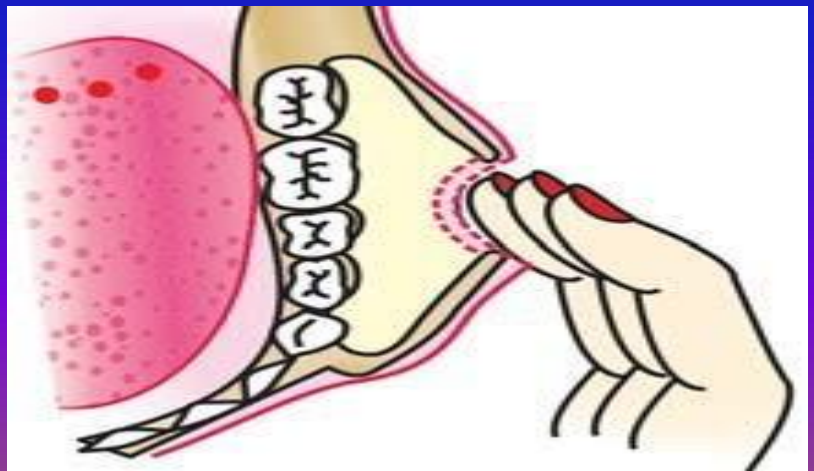
- **Non-epithelial cysts (not true cysts)**
- Solitary bone cyst
- Aneurysmal bone cyst

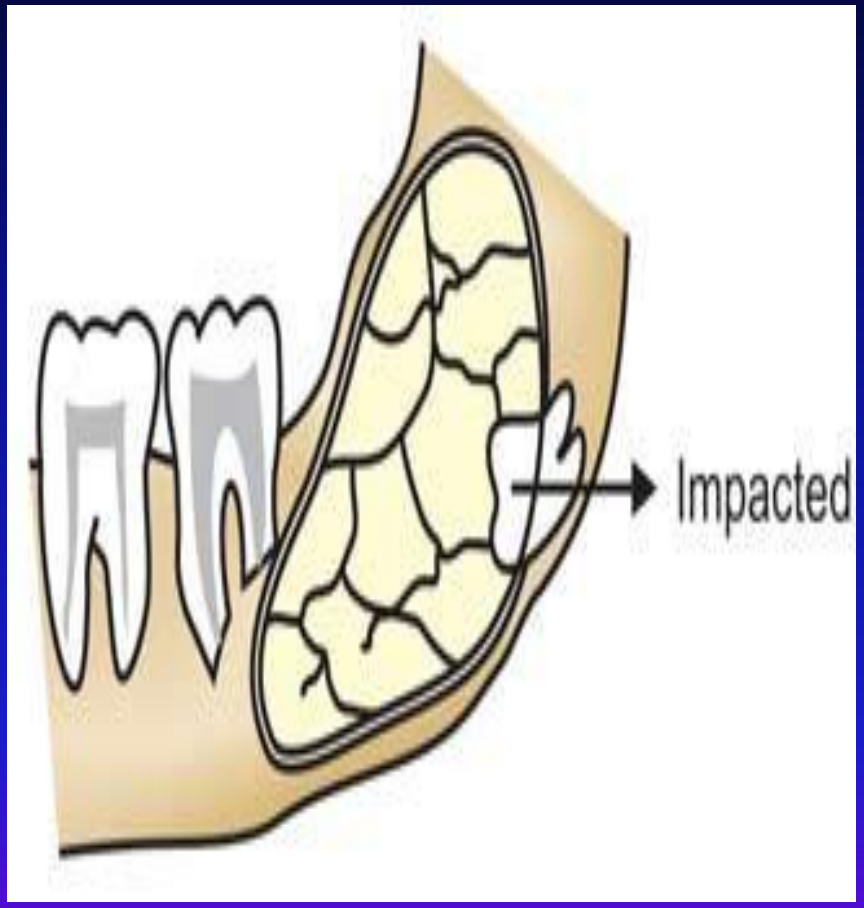
- ***Other cysts that occur in the soft tissues of orofacial regions (out of the coverage of this lecture) like ; Mucocel , Ranula , Dermoid cyst, thyroglossal duct cyst , and branchial cyst .***

General clinical features of the cysts

- Cyst usually asymptomatic. but some symptoms may occure like :
- • swelling
- • displacement or loosening of teeth
- • pain (if infected).
- Eggshell craking
- fluctuance may be elicited



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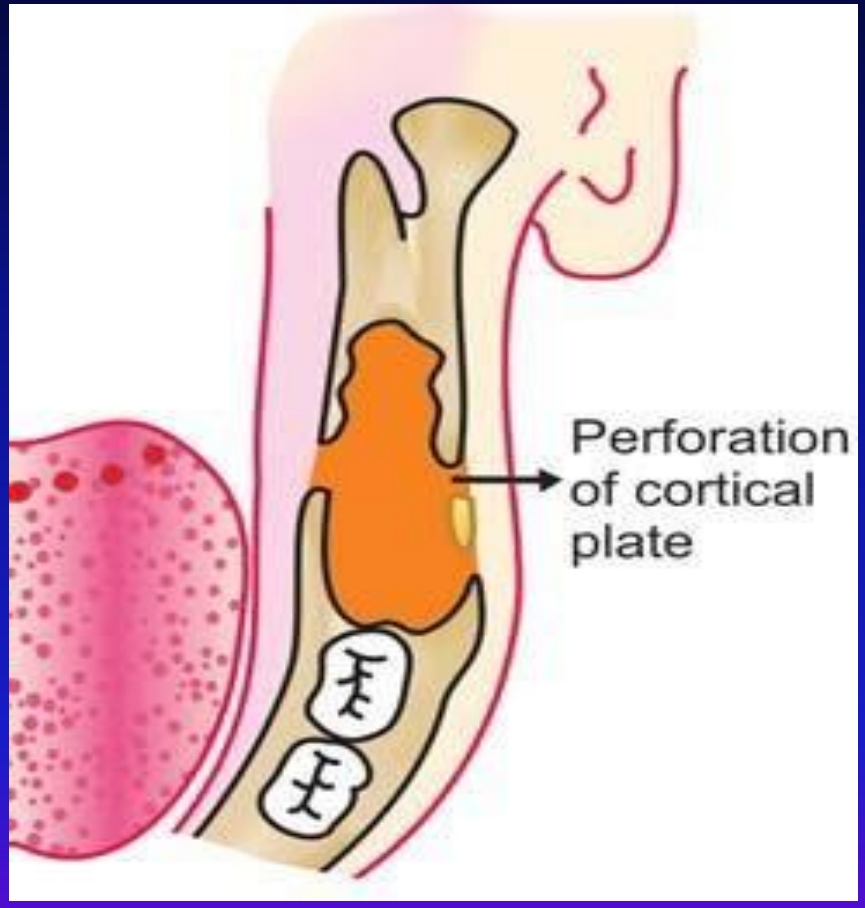

Perforation
of cortical
plate

Radiological examination: general principles

- *As a basic principle, for small cystic lesions, intra-oral films may be all that is needed for diagnosis.*
- *For larger lesions, more extensive radiography is appropriate*

  (extraoral radiograph , CT scan …)

Radiological signs

- *well-defined round or ovoid radiolucencies, surrounded by sclerotic margines (white lines)*
- *'Scalloped' margins are seen in larger lesions, particularly keratocysts.*
- *Infection of a cyst tends to cause loss of the welldefined margin.*
- *Locularity. True locularity (multiple cavities) is seen occasionally in odontogenic keratocysts.*

General principles of cyst treatment

- *Cysts of the jaws, may be treated by one of the following basic methods:*

1. *Marsupialization (decompression)*
2. *Enucleation*

- *Enucleation and packing*
- *Enucleation and primary closure*
- *Enucleation and primary closure with reconstruction/bone grafting.*

Marsupialization (Decompression)

- *creating a surgical window in the wall of the cyst, and evacuation of the cystic contents.*
- *decreases intracystic pressure*
- *promotes shrinkage of the cyst and bone fill.*

. 12.19. Radiograph showing extensive mandibular cyst.
e marsupialization method is indicated for its treatment

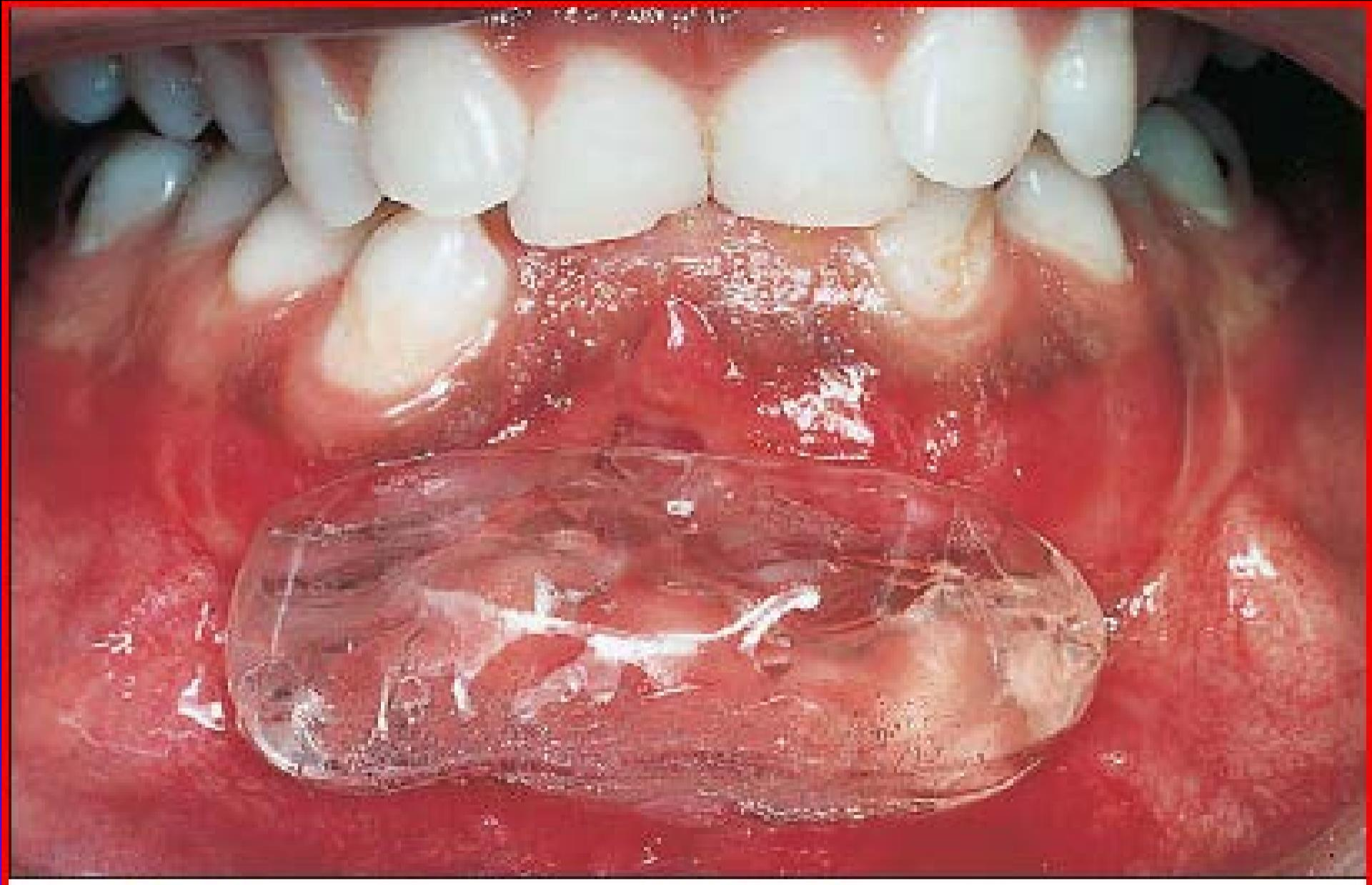


Fig. 9.9 An acrylic bung occluding the entrance to a marsupialized cyst cavity.

Indications of Marsupialization

- *Age: In a young child, with developing tooth germs,where enucleation would damage the tooth buds.In the elderly, debilitated patient, marsupialization, is less stressful and a reasonable alternative.*
- *Proximity to vital structures: When proximity of the cyst to vital structures, could create an oronasal or oroantral fistula, injure neurovascular structures or damage vital teeth, then marsupialization should be considered.*
- *Size of cyst: In very large cysts, where enucleation, could result in a pathological fracture, marsupialization,can be accomplished, through a more limited bony opening.*

Advantages of Marsupialization

- *Spares vital structures*
- *Allows eruption of teeth*
- *Prevents oronasal, oroantral fistulae*
- *Prevents pathological fractures*
- *Reduces operating time*
- *Reduces blood loss*
- *Helps shrinkage of cystic lining*
- *Alveolar ridge is preserved.*

Disadvantages of Marsupialization

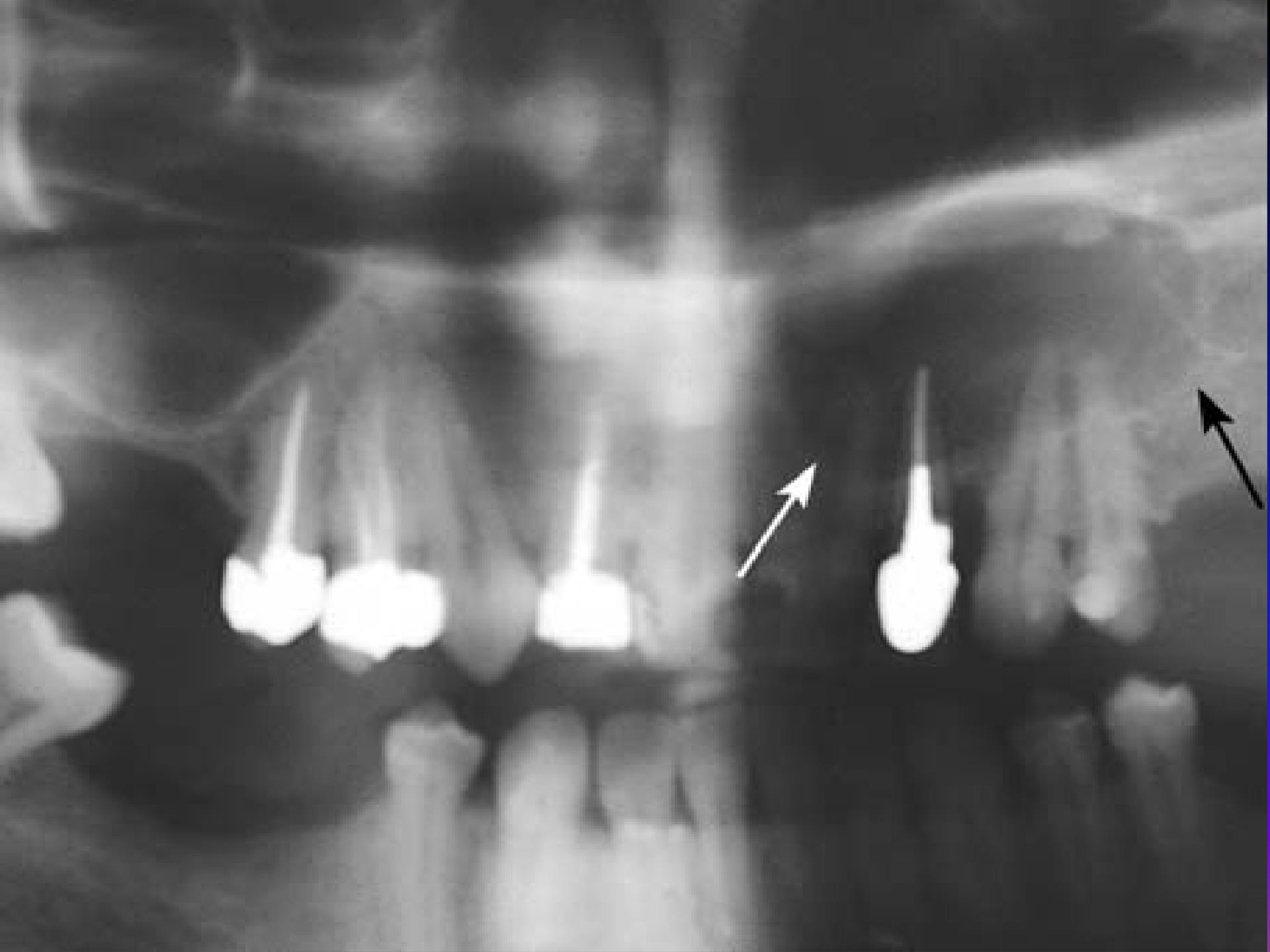
- *Pathologic tissue is left in situ*
- *Histologic examination of the entire cystic lining is not done*
- *Prolonged healing time*
- *Prolonged follow up visits*
- *Periodic irrigation of cavity*
- *Periodic changing of pack*
- *Secondary surgery may be needed*

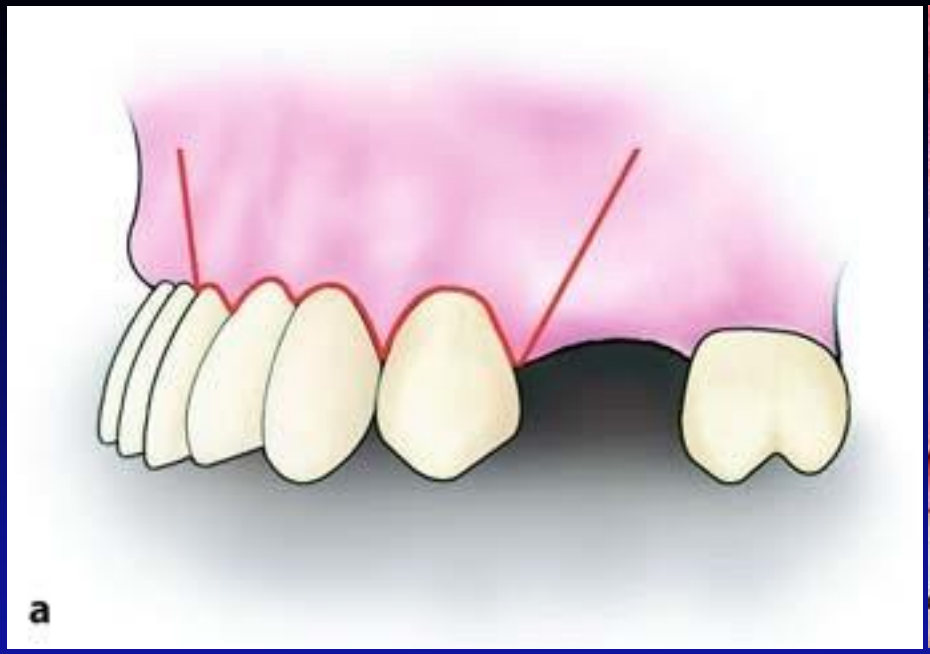
Enucleation

Enucleation allows for the cystic cavity to be covered by a mucoperiosteal flap and the space fills with blood clot, which will eventually organize and form normal bone.

Indications :

- ***Small cyst***
- ***Treatment of odontogenic keratocyst***
- ***Recurrence of cystic lesions of any cyst type***

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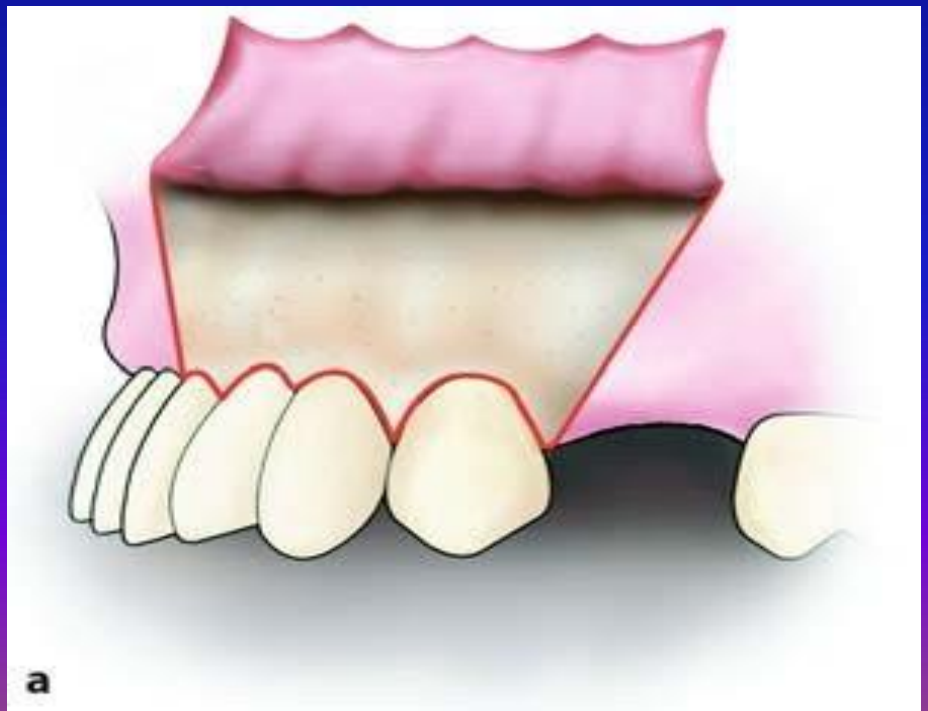
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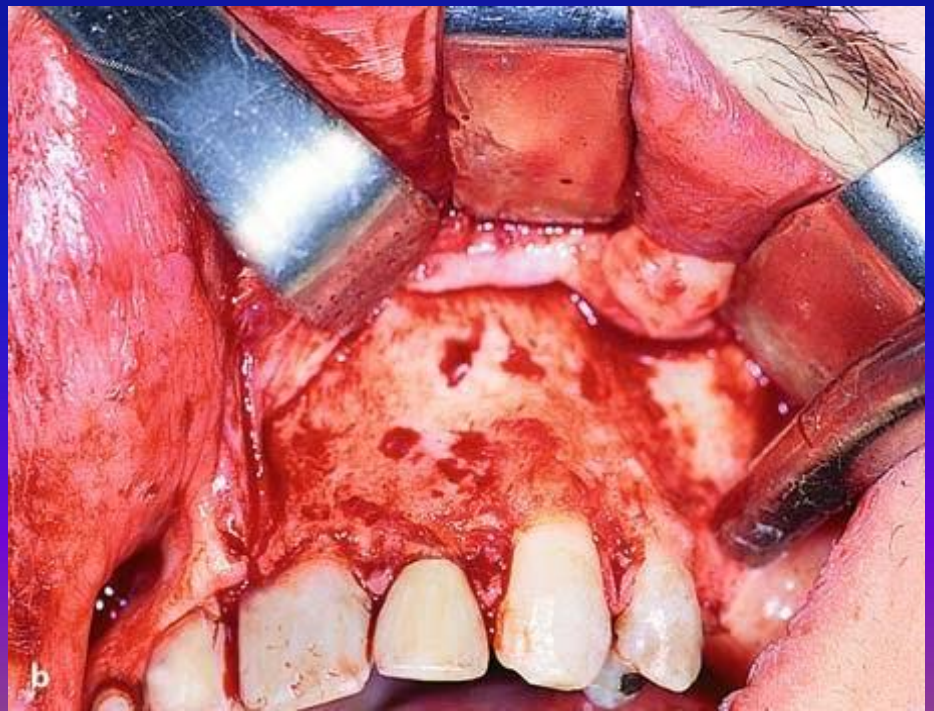
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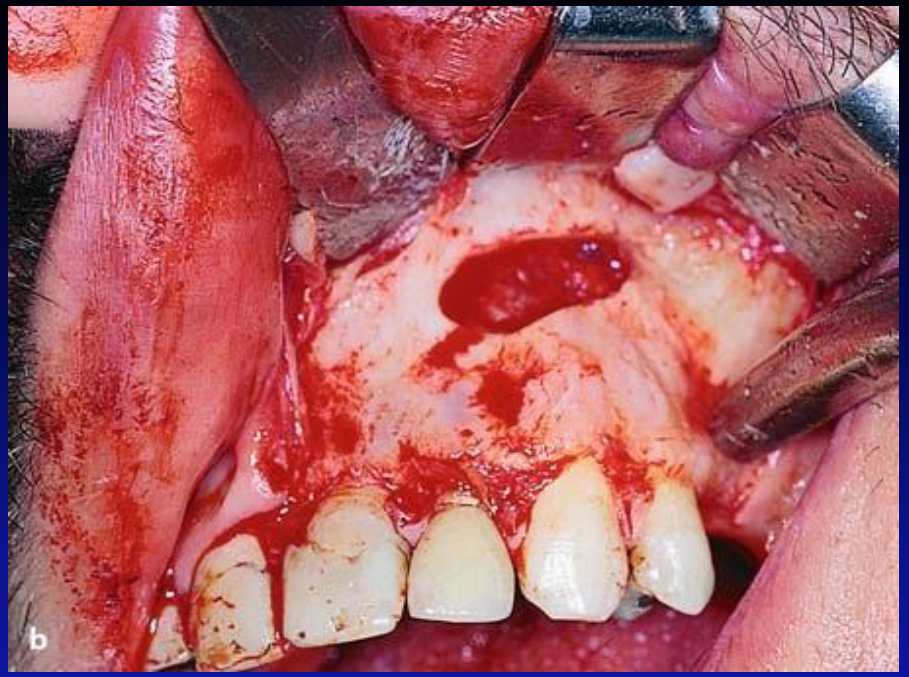
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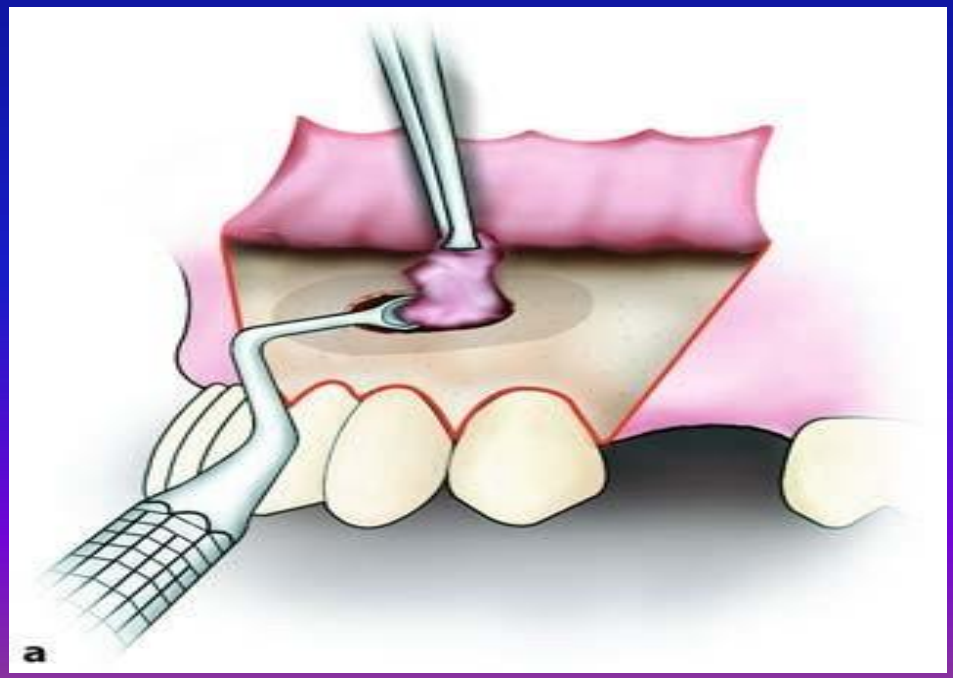
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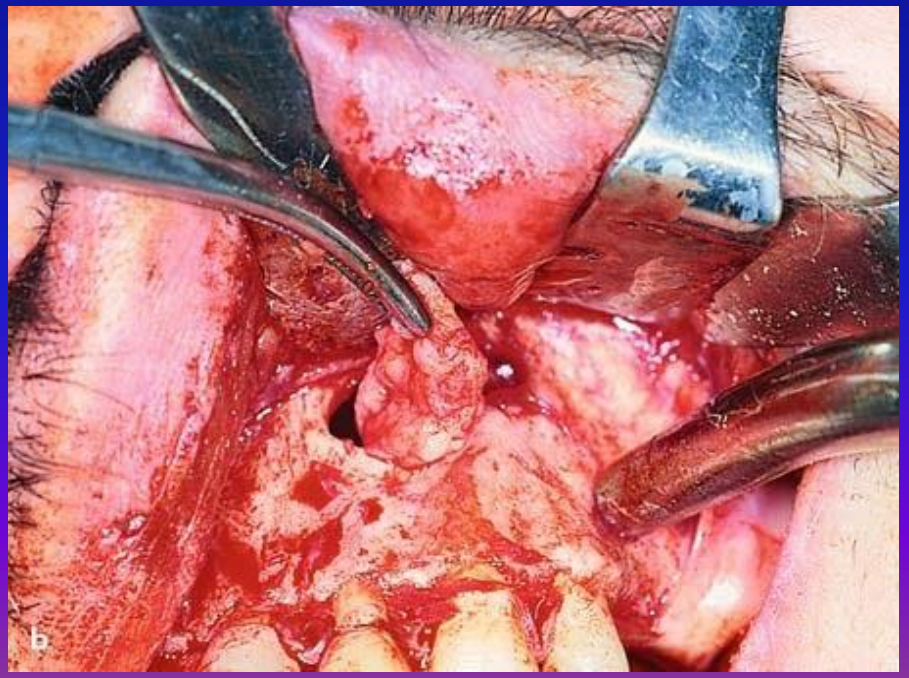
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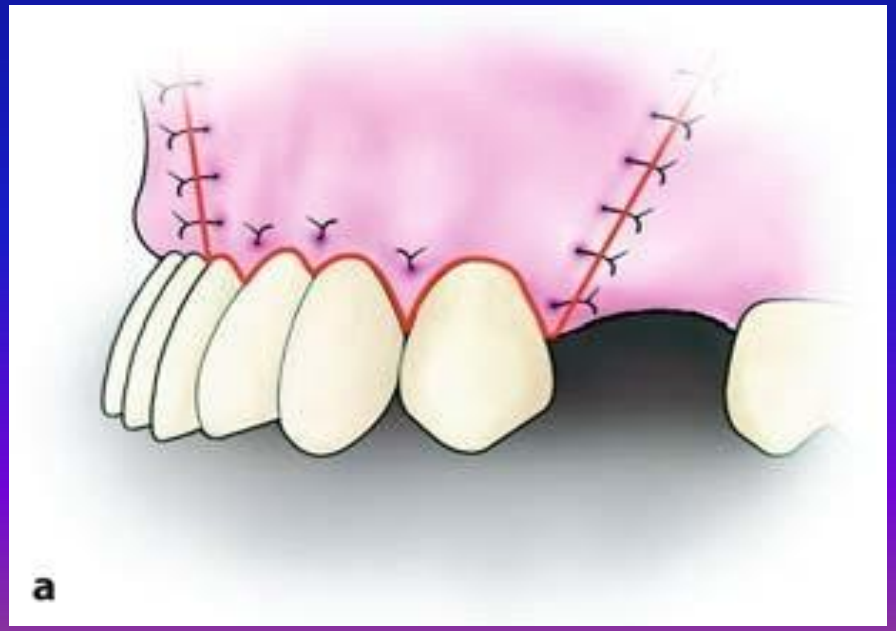
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b

a Panoramic radiograph

clinical photograph

2 months after the surgical proce-

Advantages of Enucleation

- *Primary closure of the wound*
- *Healing is rapid*
- *Postoperative care is reduced*
- *Thorough examination of the entire cystic lining can be done.*

Disadvantages of Enucleation

- *After primary closure, it is not possible to directly observe the healing of the cavity as with marsupialization*
- *In young persons, the unerupted teeth in a dentigerous cyst will be removed with the lesion*
- *Removal of large cysts will weaken the mandible,making it prone to jaw fracture*
- *Damage to adjacent vital structures*
- *Pulpal necrosis*

Adjunct therapy

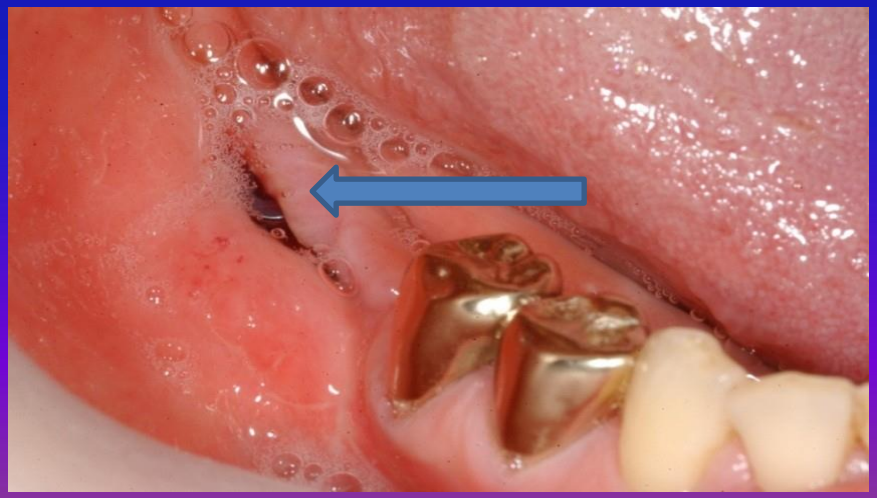
1.Chemical cauterization. (carnoys solution)

2.Cryotherapy.(liquid nitrogen)

3.Peripheral ostectomy

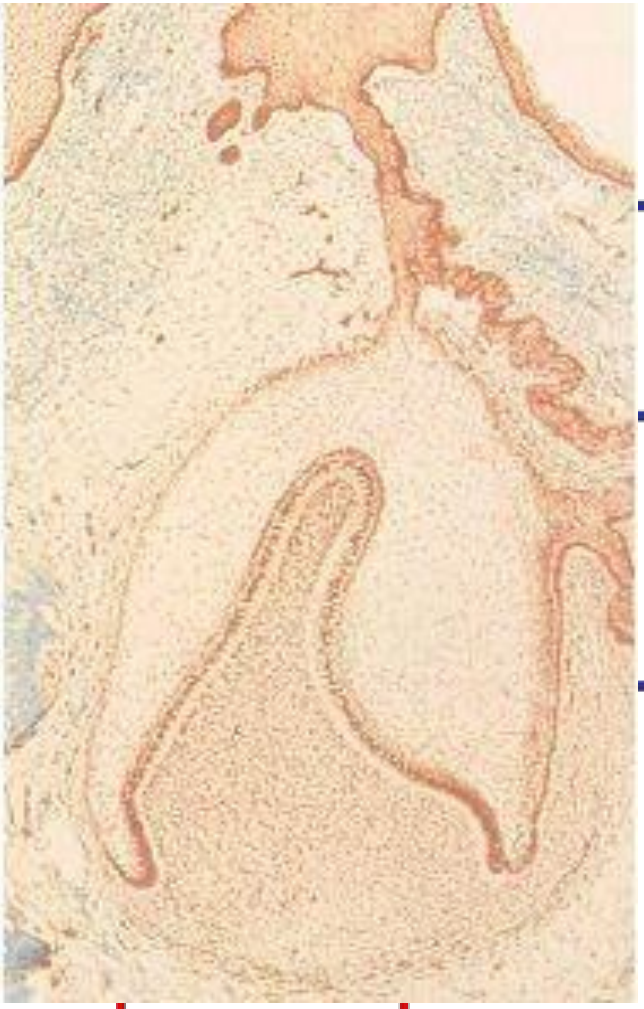
Complications of cystic lesions

- Pathological fracture
- Postoperative wound dehiscence
- Loss of vitality of teeth
- Neuropraxia in infected cysts
- Postoperative infection
- Recurrence in some cysts
- Dysplastic, neoplastic or even malignant changes.




ODONTOGENIC CYSTS

Odontogenic Tissues



Dental Lamina

Enamel Organ

Epithelial Root Sheath of Hertw

Serres Pearl

Reduced Dental Epithelium

Epithelial Rests of Malassez

Tooth Sac

Periodontal Ligament

Dental Papilla

Dental Pulp

Primordial Cyst (Keratocyst)

- arising from dental lamina or its remnants .

- **Incidence :** about 5 to 10 per cent of odontogenic cysts of the jaws and are seen predominantly in the second, third and fourth decades of life.

- **Site :** most common site are posterior mandible .

Clinical features

- *A small cyst generally detected accidentally on a radiographical examination.*
- *usually extend in anteroposterior direction.*
- *Large mandibular cysts deflect the neurovascular bundle into an abnormal position.*
- *Neuropraxia may associated with infected cyst (When tension is relieved, with spontaneous discharge of pus via a sinus tract or surgical drainage, sensation returns to normal).*

Radiological features

- *unilocular or multilocular radiolucency with well defined border and some times associated with sclerotic margin .*

- ***Cyst contents (aspirate)***
- ***white, kreamy suspention (consist mainly from keratin), which has an appearance of pus, but without an offensive smell.***
- ***These suspension charectarized by that the amount of protein content will be less than that present in the other cysts (total protein will be found to be below 4 gm/100 ml).***

Pathology *: The primordial cysts are thin walled and are lined by a regular keratinized stratified squamous epithelium. The keratin formed by the epithelium is seen in two variants,*

- *parakeratinized – in which there is persistence of the nuclei*
- *orthokeratinized - in which the nuclei are absent*

Clinically, the parakeratinized variant appears to have a much higher incidence of recurrence

- ***Recurrence :*** ***high tendency to recur. The recurrence rate about 5 to 62 % with most occurring in the first 5 years.***

- ***possible reasons reported for high recurrence rate :***
  - ***Scolloped margins***
  - ***Presence of daughter cysts***
  - ***Cystic lining is very thin and fragile, portions of which may be left behind***
  - ***Epithelial lining of keratocysts have an intrinsic growth potential***
  - ***new cysts can arise from basal cells of the oral mucosa***
  - ***Patients with nevoid basal cell carcinoma syndrome (Gorlin-Goltz syndrome) have a particular tendency to form multiple keratocysts with other manifestations in different parts of the body (Multiple basal-cell carcinomas of the skin, rib and vertebrae anomalies,intracranial calcifications, frontal bossing, hypertelorism, and mandibular prognathism .palmar and plantar pitting)***

Treatment of keratocyst

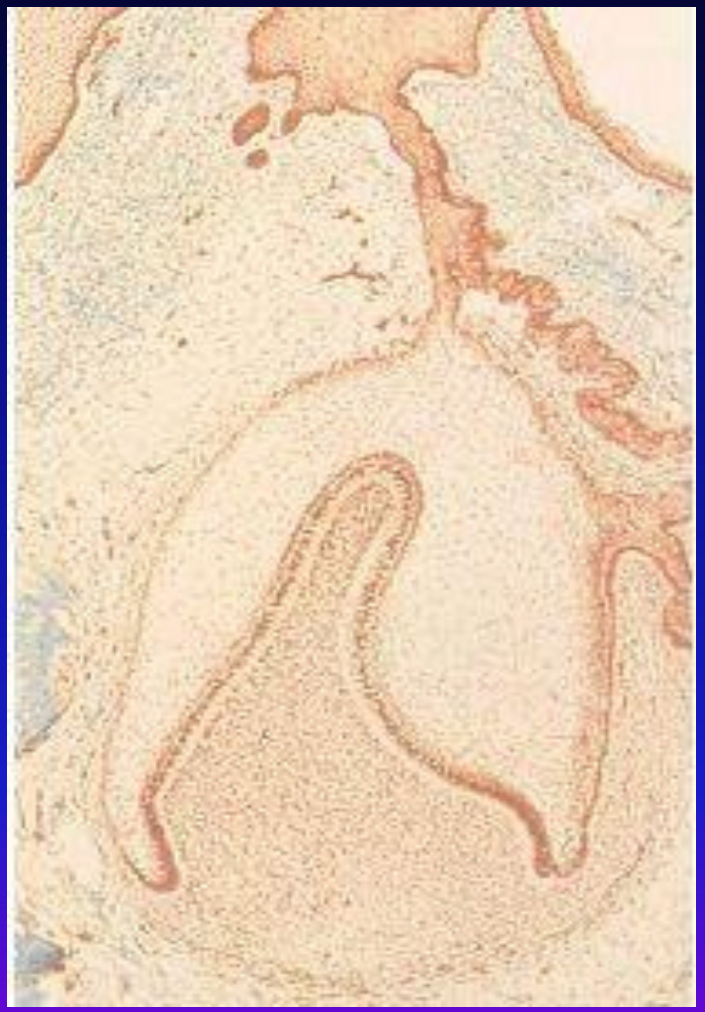
- Treatment should always be based on proper clinical assessment, accurate diagnosis and appropriate tests of the cystic aspirate.

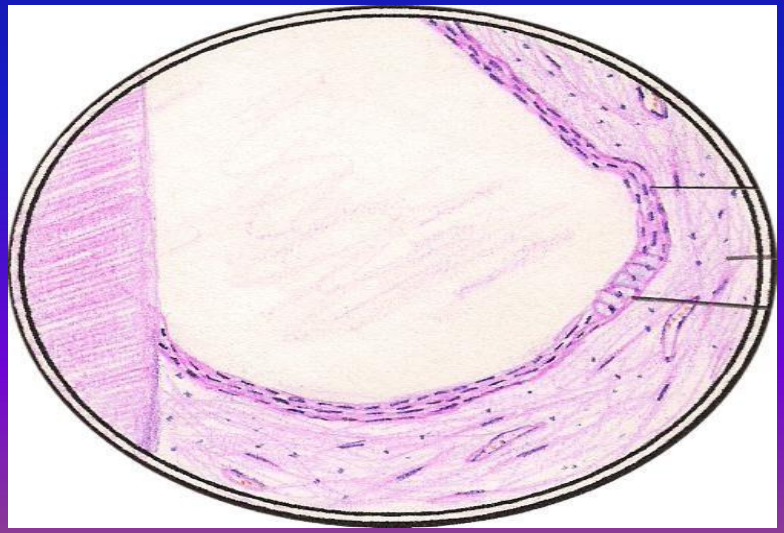
Treatment options for keratocyst :

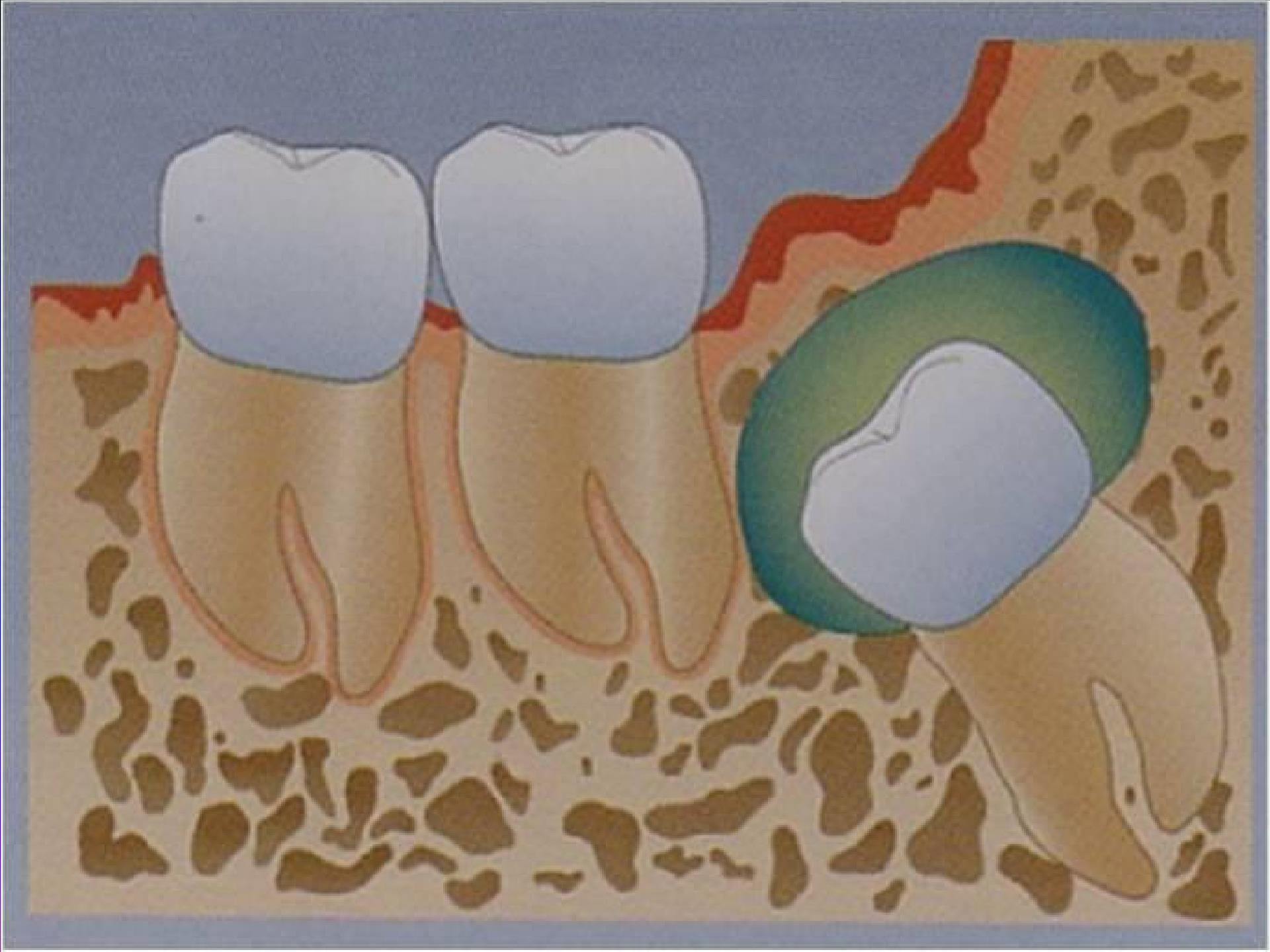
- 1. Total enucleation and primary closer.
- 2. Enucleation with chemical fixation. recommended use of Cornoy's solution after enucleation to destroy the daughter cysts and remnant lining. The Cornoy's solution acts as chemo-cauterization to prevent recurrence.
- 3. Marsupialization (usually not enough in keratocyst due to high recurrence rate)
- 4. Resection.(in case of multiple recurrence)

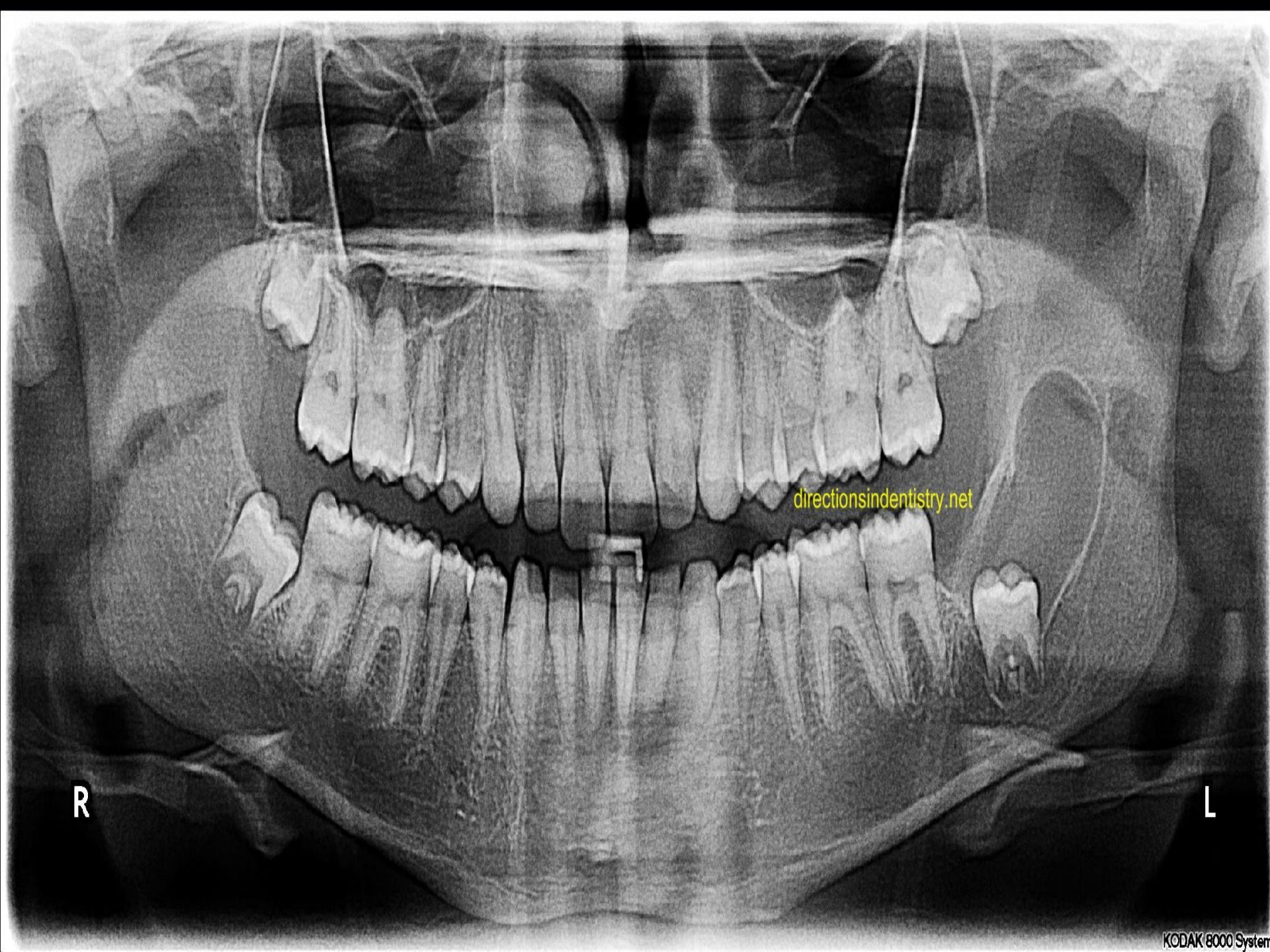
Dentigerous Cyst (Follicular Cyst)

- *It originates by accumulation of fluid between the reduced enamel epithelium and the tooth crown, so its always associated with the crown of a unerupted tooth.*





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- ***Incidence:*** *The dentigerous cyst is the most common type of developmental odontogenic cyst, making up about 20 percent of all epithelium lined cysts of the jaws.*

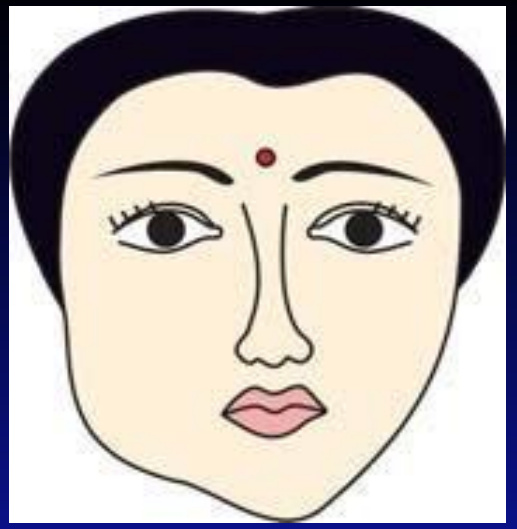
- *The most common age periods for diagnosis are the first, second, third decades*

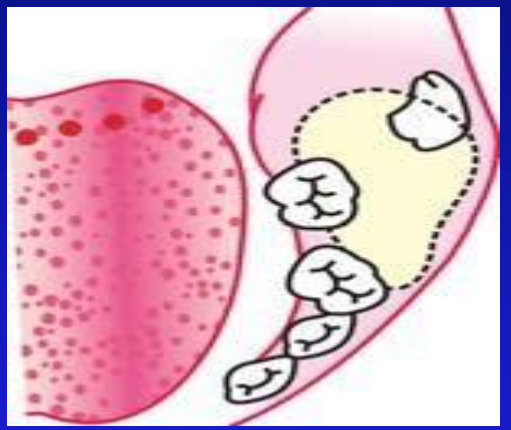
- *Slight predilection for the males and the prevalence is higher for whites than for blacks.*

- *Most common sites; mandibular third molars , maxillary canine, maxillary third molar and mandibular second premolar.*

Clinical features:

- *Dentigerous cysts have the potential, to attain a large size, often it is the pronounced facial asymmetry .*
- *Teeth displacement*
- *Root resorptions*

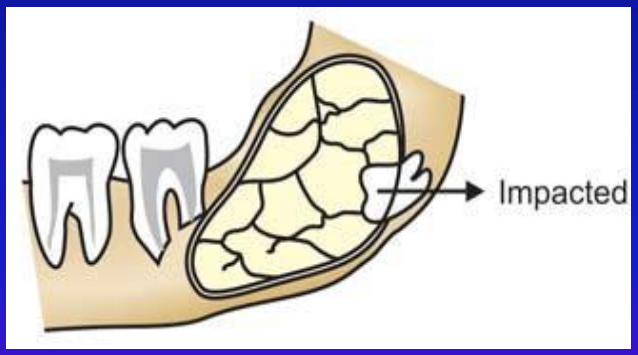




Clinical features:

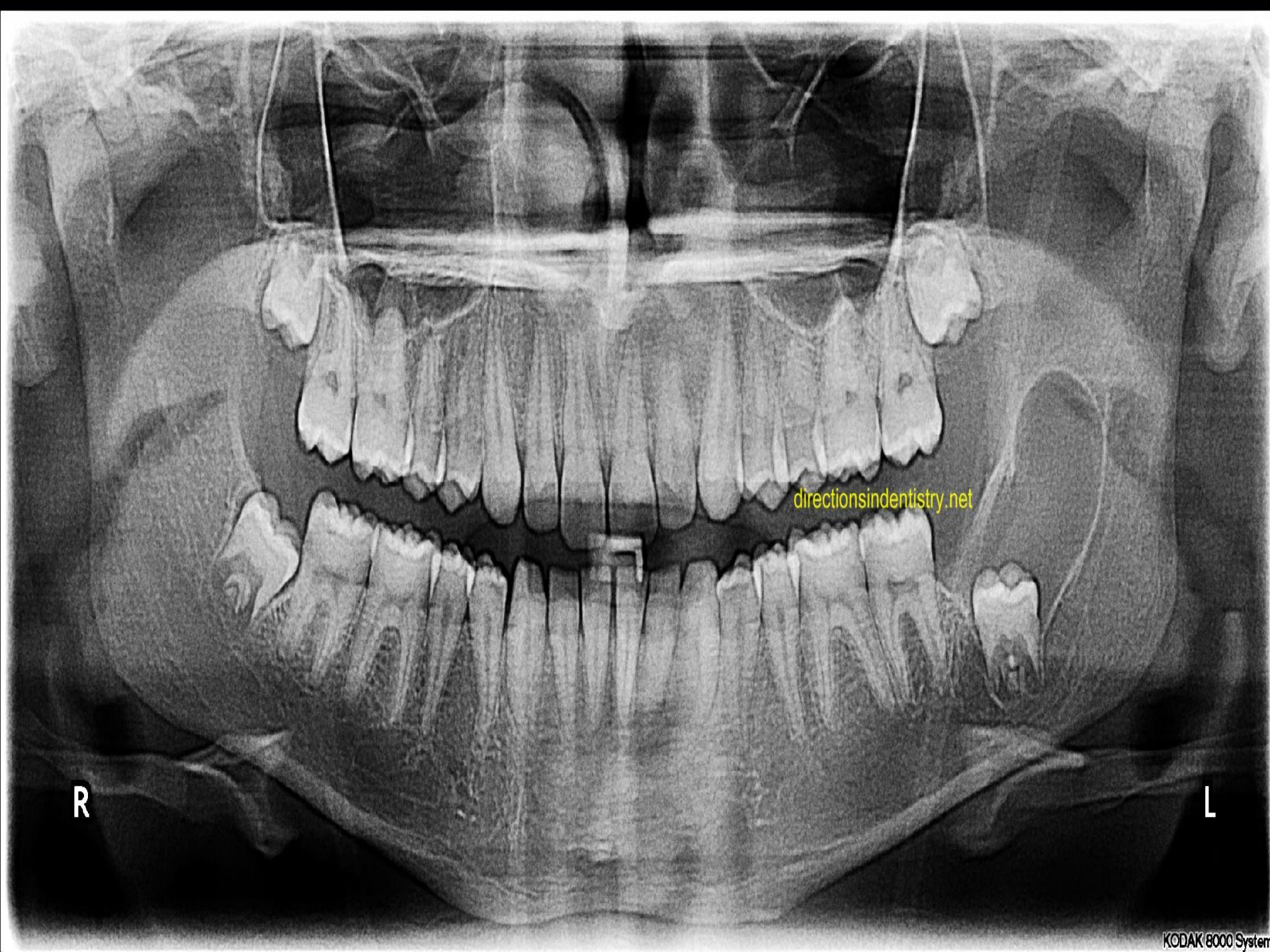
- *Pain may be a presenting symptom, if secondary infection occures.*

- *eggshell crackling, in large cysts.*



- ***Radiological features :*** *generally reveals a unilocular radiolucency associated with crowns of unerupted teeth (multilocular effect can be seen, in large cysts due to bony trabeculations).*

- *Cysts have a well defined sclerotic margin, unless when they are infected then the margins are poorly defined.As compared to the other jaw cysts,*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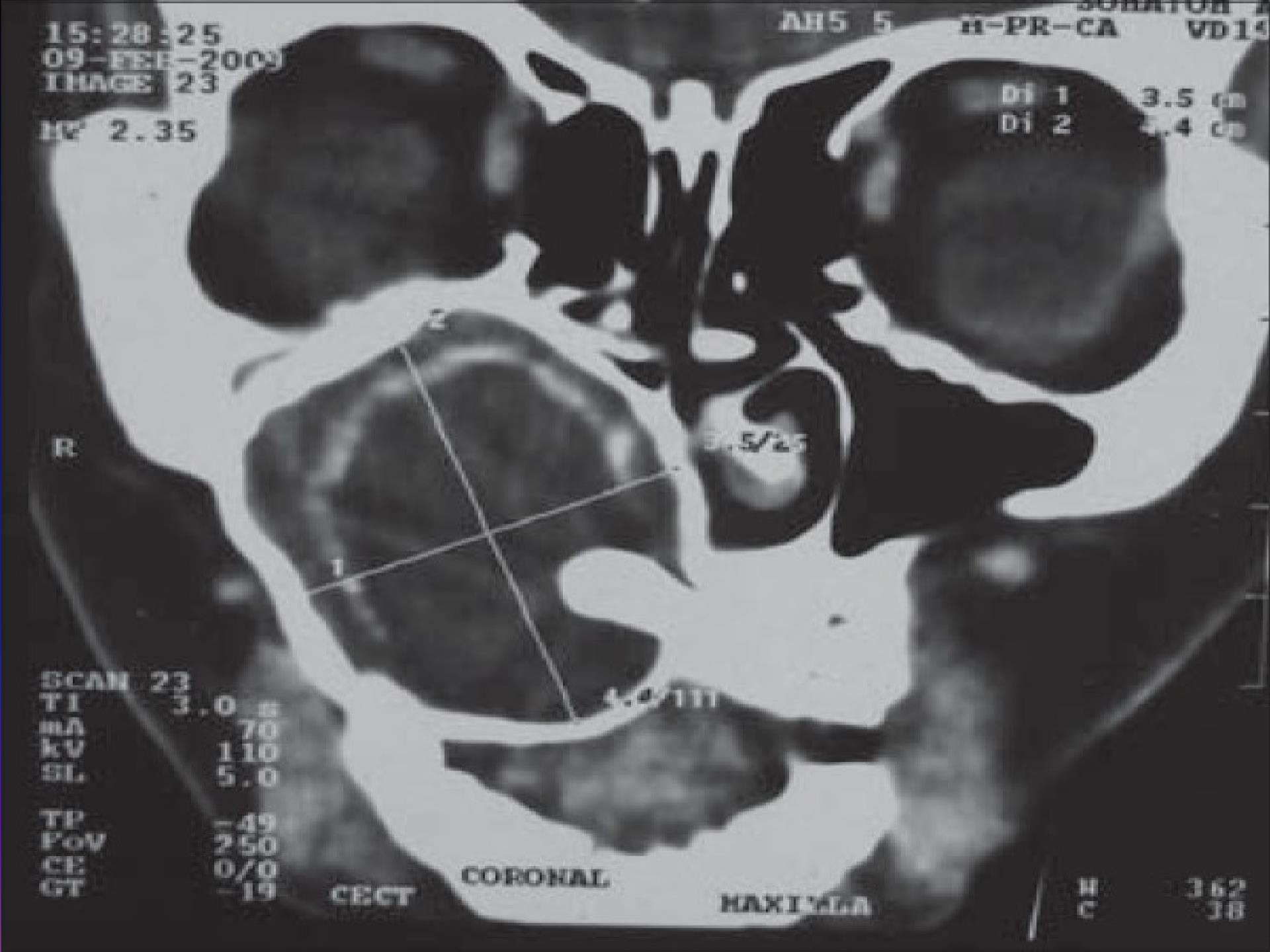
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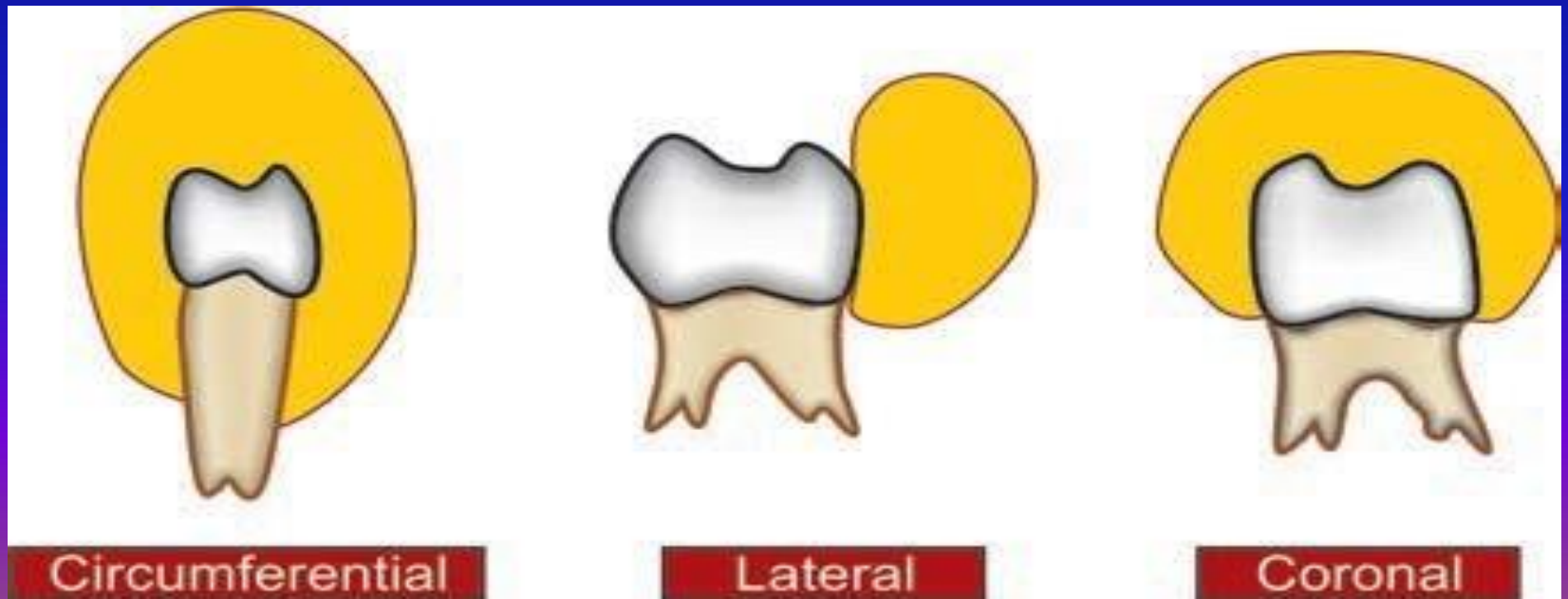
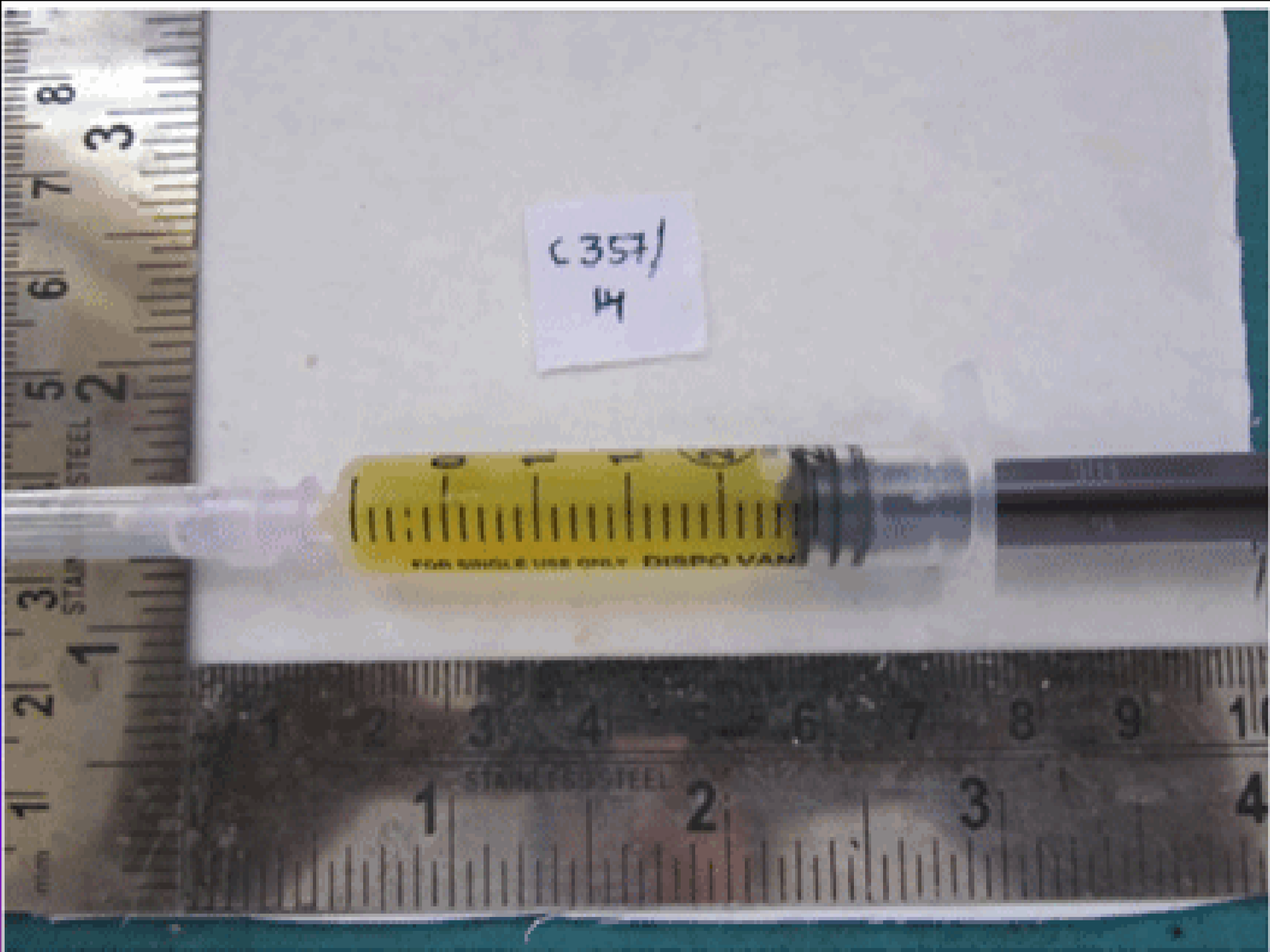
- ***Radiologically** : the dental follicle may expand around the unerupted or impacted tooth in three variations :*
- *(a) circumferential (b) lateral (c) central or coronal*



- ***Cystic contents (aspirate):*** ***The cystic contents consist of clear yellowish fluid, in which cholesterol crystals may be present, and if the cyst infected it may show a purulent material.***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Treatment :

- Marsupialization ; It is indicated in children if the cyst is very large in size and the involved tooth/teeth are to be maintained.
- Enucleation with or without packing of defect when the possibility of the tooth erupting is low.

Behavior and prognosis : Recurrence rate is low

It is widely believed that ameloblastomas frequently arise in dentigerous cysts so lining of the cyst should be examined histopaphologically .

Gross specimen of a dentigerous cyst.
Cyst encloses the crown of the tooth and is attached to its neck

Developmental Lateral Periodontal Cysts

- *found lateral to the roots of vital teeth*

- *It is most often related to the mandibular cuspid, bicuspid and third molar roots*

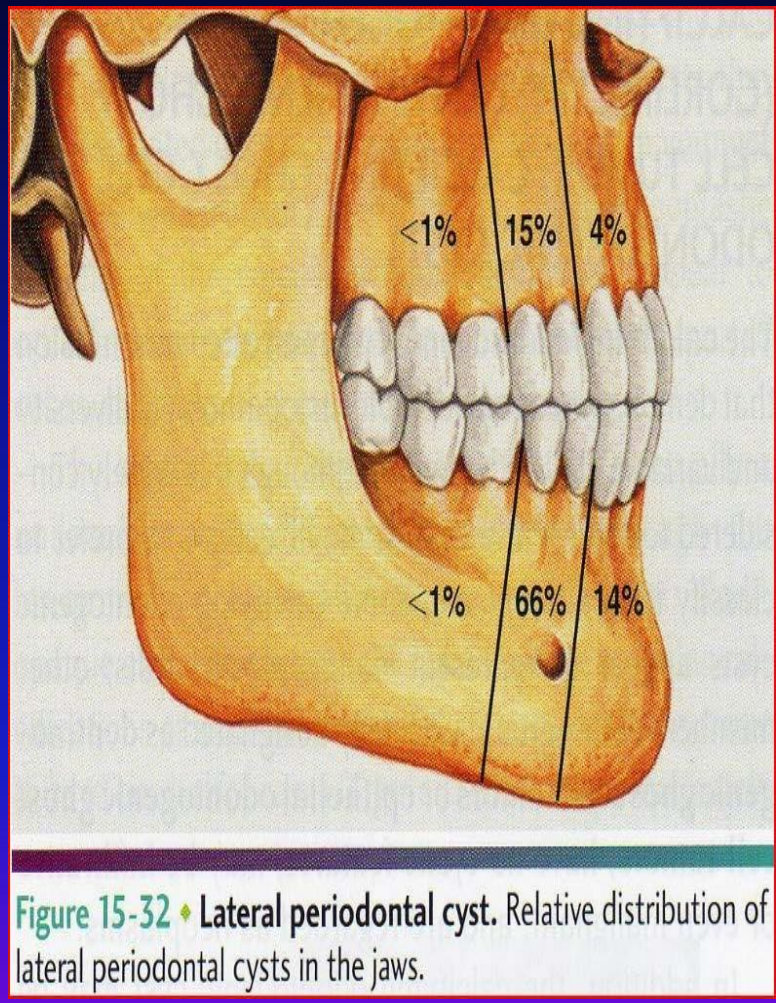


Figure 15-32 • **Lateral periodontal cyst.** Relative distribution of lateral periodontal cysts in the jaws.

Developmental Lateral Periodontal Cysts

- **Radiological features**: well defined round or ovoid radiolucency with a sclerotic margin, the lamina dura of the involved tooth is destroyed.
- Most of the cysts are smaller than 1 cm in size and are seen to be present between the cervical margin and apex of the root.
- **Treatment:** Enucleation (attempts should be made to avoid sacrificing the associated tooth).

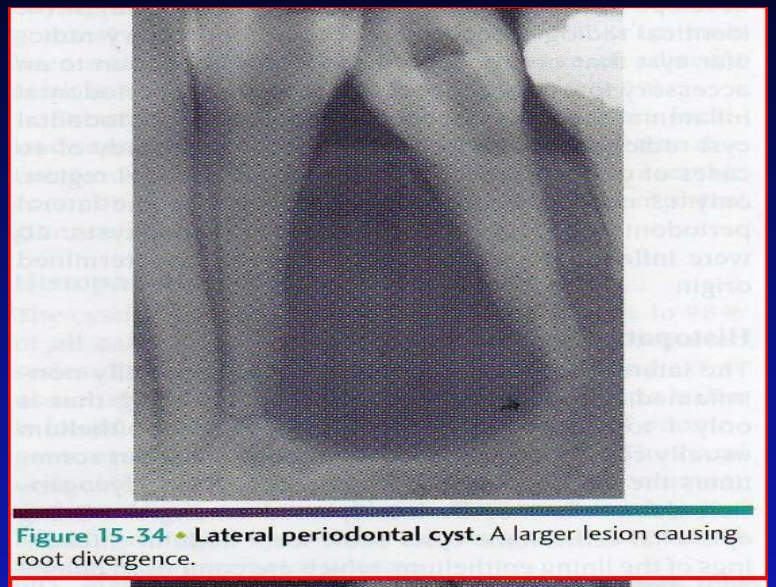


Figure 15-34 • **Lateral periodontal cyst.** A larger lesion causing root divergence.

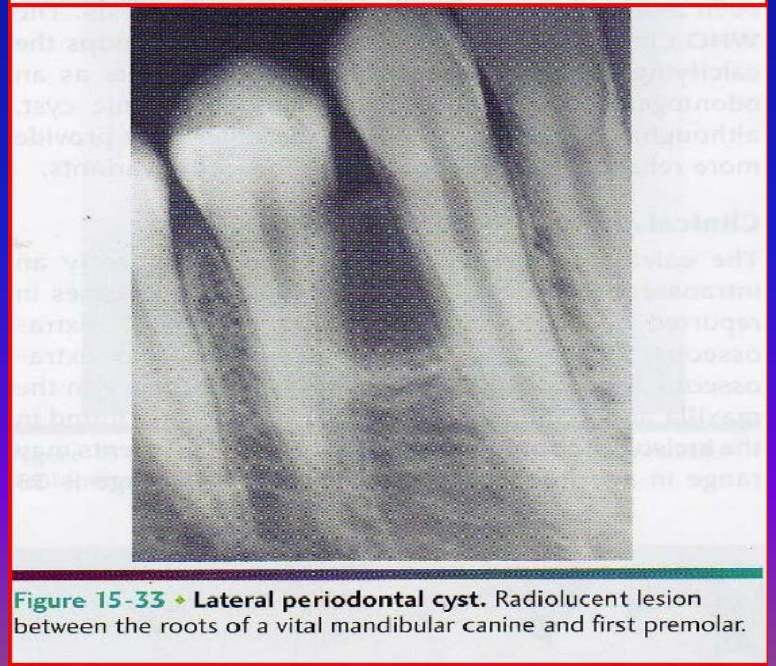


Figure 15-33 • **Lateral periodontal cyst.** Radiolucent lesion between the roots of a vital mandibular canine and first premolar.

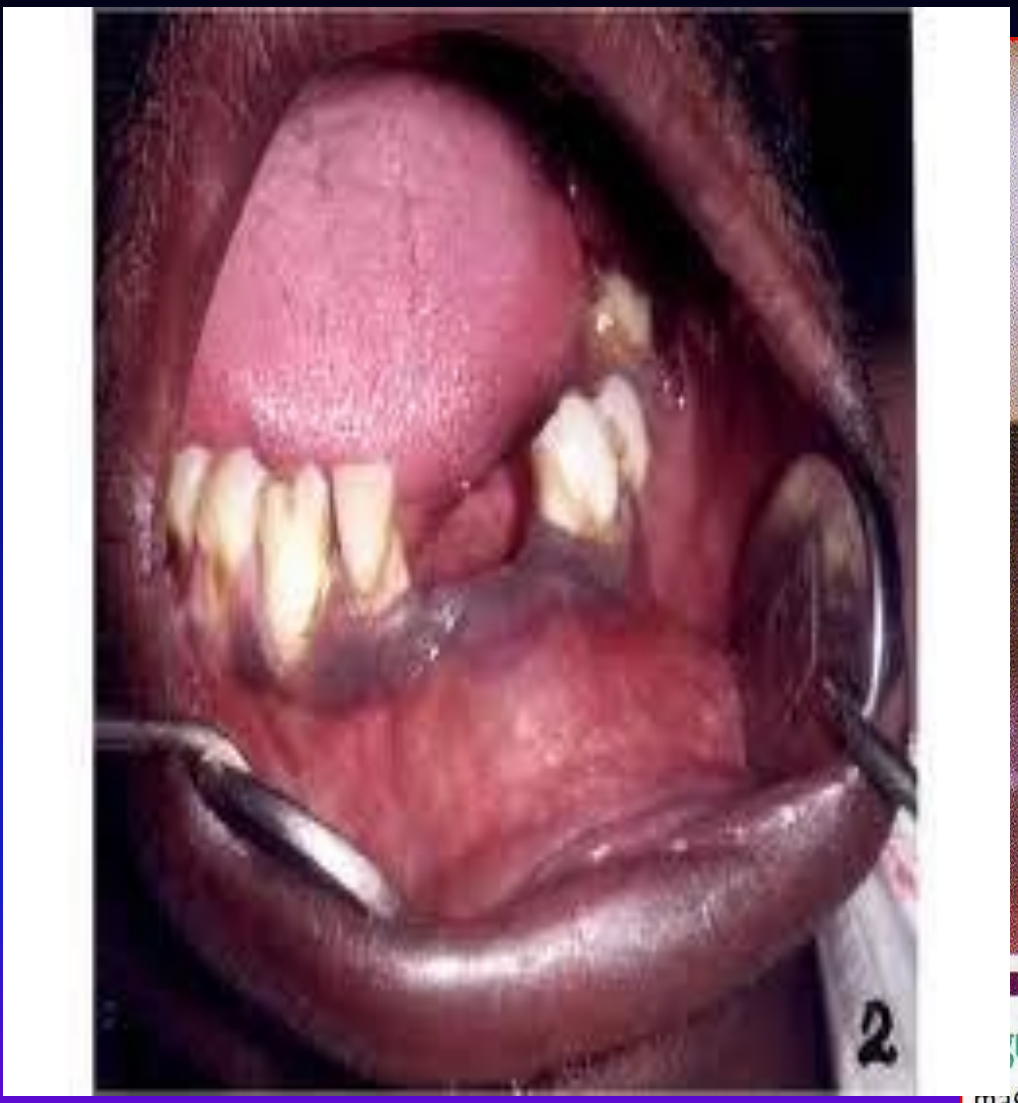
Calcifying Epithelial Odontogenic Cyst (Gorlin Cyst)

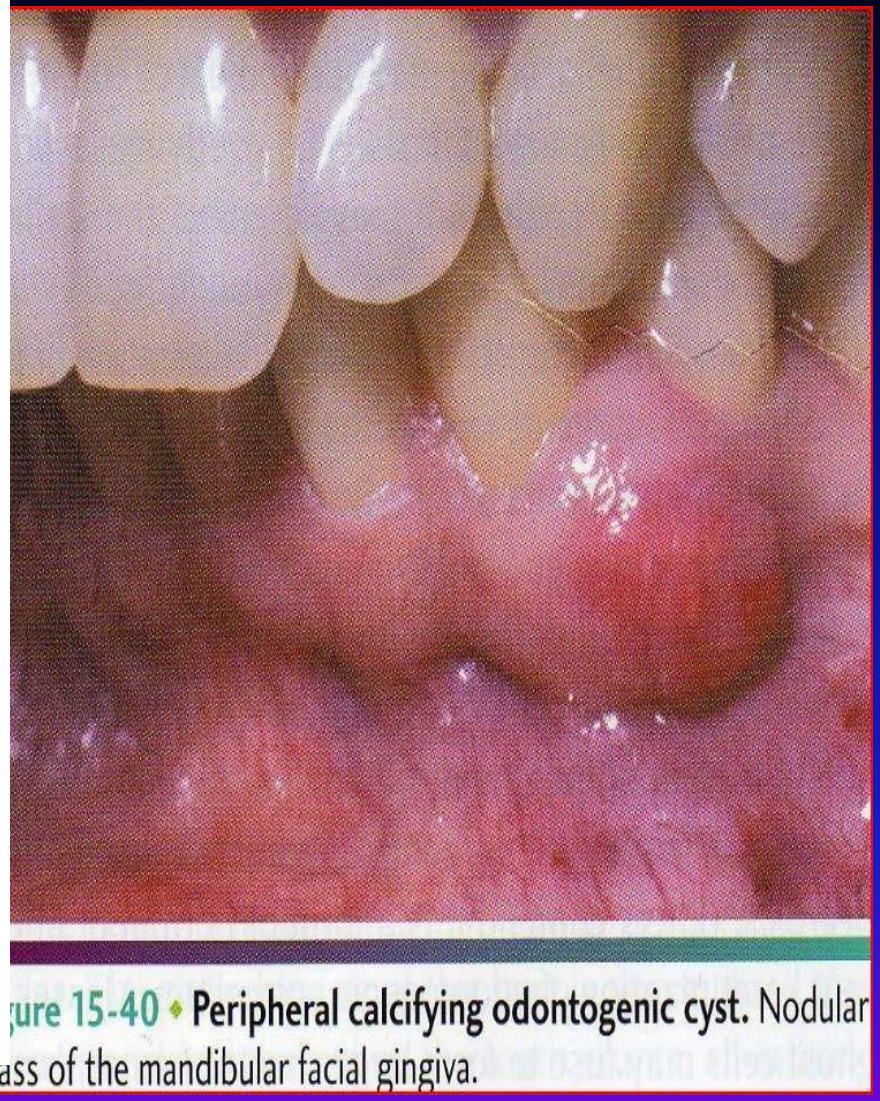
- uncommon , no sex predilection. more common in children and young adults.

- **Site:** most common site of occurrence is in the anterior part of the mandible.

Clinical features : usually discovered accidently on radiographic examination. Swelling is the most frequent complaint, rarely there is pain.

- **Two variant present :** peripheral and intraosseous variant, the latter produce a hard bony expansion and may be fairly extensive . in a few cases displacement of the teeth may be seen.





ure 15-40 • **Peripheral calcifying odontogenic cyst.** Nodular mass of the mandibular facial gingiva.

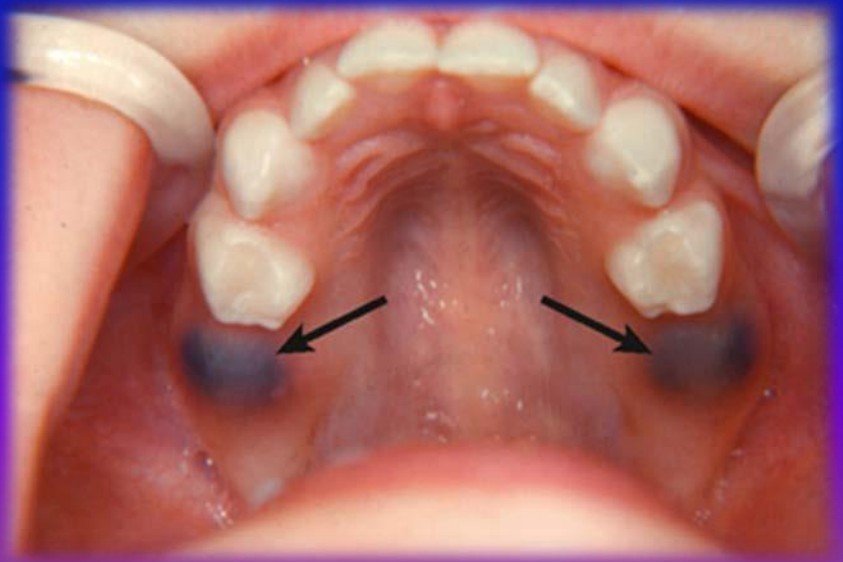
- ***Radiological features :*** ***mixed radiolucency with well defined and some times irregular margine ,may be unilocular or multilocular. The cyst may be associated with a complex odontome or an unerupted tooth.***
- ***Resorption of the roots of the adjacent teeth may be***

- ***Pathology:*** *The lining consist from stratified squamous epithelium. In some areas the lining is thin, in patches, the epithelium proliferates and the cells become swollen and eosinophilic due to a form of keratinization. These are called, (ghost cells). At first the outline of the cells and their nuclei can still be distinguished, later the outline is lost, the cells fuse and tend to calcify. It is this calcification, which forms the opacities that is seen in the radiographs.*

- ***Treatment:*** *Simple enucleation . recurrence usually not occure.*

Eruption cyst

- An eruption cyst is a counterpart of dentigerous cyst that occure in the soft tissue.
- The cysts are found in children as abluish swelling , and occasionally in adults if there is delayed eruption.
- **Radiology :** No distinct radiographical picture (soft tissue mass may be seen in high resolution radiograph)
- **Pathology :** The histological features are similar to those of the dentigerous cyst .
- **Treatment :** marsupialization



Gingival Cyst of Adults

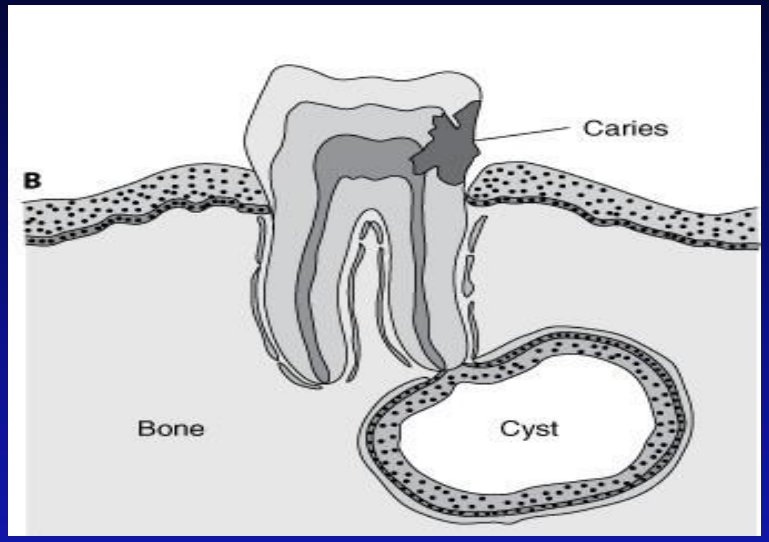
- There is a great confusion between the gingival cyst of adults and the lateral periodontal cyst, both types of cyst have a predilection for occurrence in the canine and premolar area of the mandible

- Gingival cyst only soft tissue lesions of the gingiva with no bony involvement.

- The cysts are round to oval, well circumscribed swellings, usually less then 1cm in diameter and may occur in the attached gingiva or the interdental papilla.
- The adjacent teeth are usually vital.
- Treatment ; local excision , there is no tendency for recurrence

Inflammatory (Radicular) Cysts

- *The radicular cyst is an inflammatory cyst which results due to infection extending from the pulp into surrounding periapical tissues*



- *It may develop apically, or it may develop on the side of the root of a nonvital tooth, when it is termed as a lateral (periodontal) radicular cyst, this cyst should be differentiated from a developmental lateral periodontal cyst which is associated with a vital tooth.*

Figure 3-24 • **Periapical cyst.** Well-circumscribed radiolucency intimately associated with the apex of the mandibular central incisor. Note the loss of lamina dura in the area of the lesion.

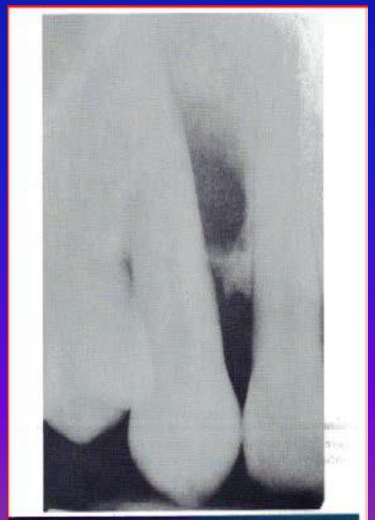


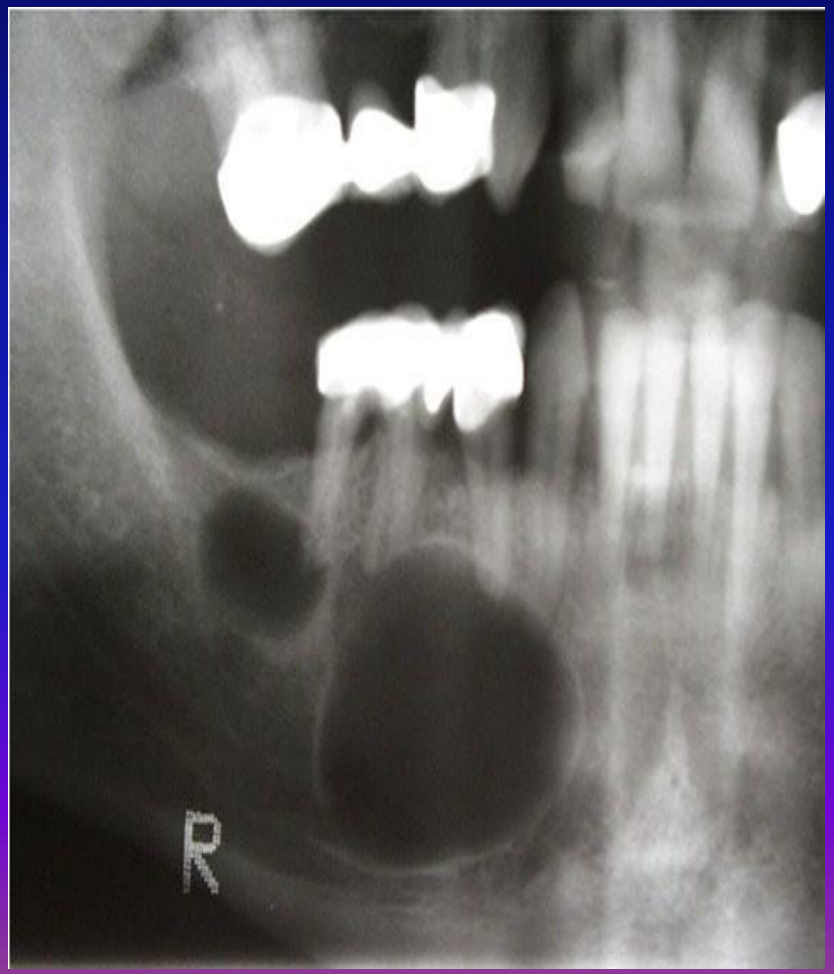
Figure 3-28 • **Lateral radicular cyst.** An interradicular radiolucency has developed as a result of periodontal inflammation along the mesial surface of the right maxillary cuspid. (Courtesy of Dr.

Incidence: *As compared to all other jaw cysts, this is the most common of all cysts of odontogenic origin. Males are affected more commonly than females.*

Site: *most common site in the anterior maxilla*

- ***Clinical features:***
- *The cyst itself is frequently symptomless and may be discovered, when periapical radiographs are taken of teeth with nonvital pulps.*
- *Slowly enlarging swellings and pain may be a significant chief complaint.*
- *An intraoral sinus tract may be identified with discharging pus when the cyst is infected. The involved tooth/teeth will be found to be nonvital,discolored, fractured or with heavy restorations or a failed root canal.*
- *Temporary paresthesia or anesthesia of the regional nerve distribution may be evident as with other cysts when infection is present.*

Radiological features: *a round, pear or ovoid shaped radiolucency with (usually) sclerotic margin associated with the root of nonvital tooth.*



Treatment:

- *Nonvital teeth that are associated with the cyst, can either be extracted or they can be treated by endodontic treatment or apicoectomy.*
- *External sinus tracts should be excised.*
- *The cyst itself is enucleated, with primary closure.*
- *Large periodontal cysts that encroach upon the maxillary antrum or inferior alveolar neurovascular bundle or the nose, may be treated by marsupialization*

Residual Cyst

- *present at the site of tooth extracted*

possible Causes

- *An incompletely removed periapical granuloma or cyst*
- *An impacted tooth associated with a lateral dentigerous cyst is removed, but the cystic lesion is unrecognized and is left in situ, this residual cyst persists and will enlarge*
- *A cystic lesion develops on either a deciduous tooth or a retained tooth, which either exfoliates or is extracted without knowledge of the underlying pathologic process.*

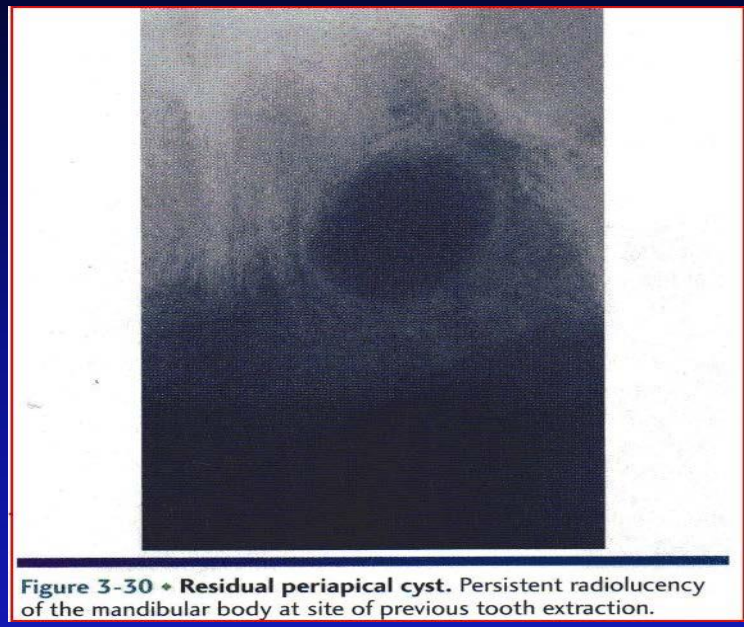


Figure 3-30 • **Residual periapical cyst.** Persistent radiolucency of the mandibular body at site of previous tooth extraction.

Fig. 1. Well-circumscribed radiolucency distally of 35. A tentative clinico-radiographic diagnosis of residual cyst was made.

Residual Cyst

- **Incidence:** It is less commonly seen than in the radicular cysts. It is identified mainly in middle aged and elderly patients. There is no sex predilection.

- **Treatment:** enucleation .

Nonodontogenic cysts

Developmental Fissural Cysts

- *Fissural cysts are nonodontogenic cysts, that arise from epithelial inclusions or entrapments in the lines of closure of the developing facial processes during the embryonic period of life. Each cyst is correlated,with its actual anatomic location*

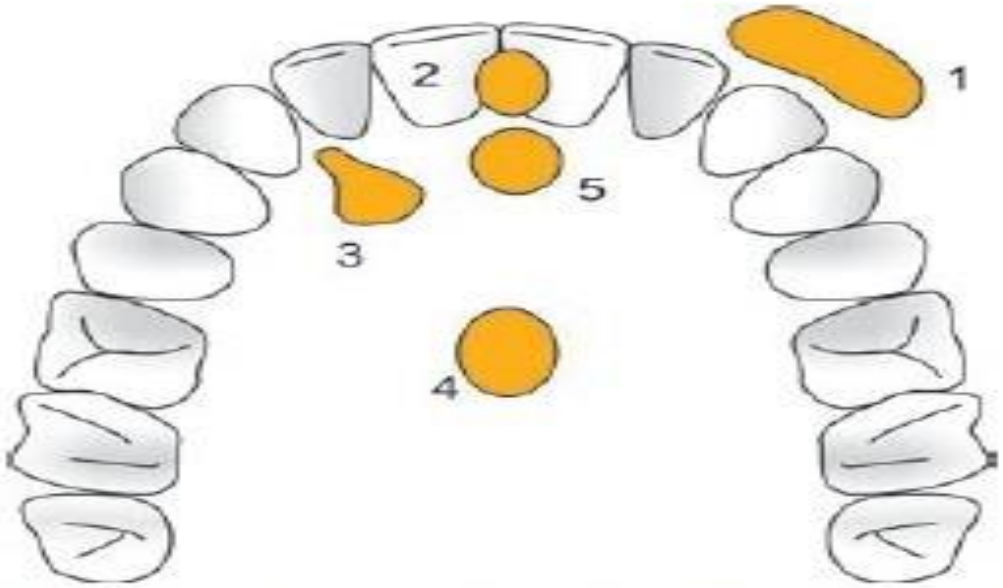


Fig. 35.11: Developmental and soft tissue cysts: (1) Nasolabial, (2) Median alveolar (median mandibular), (3) Globulomaxillary, (4) Median palatal, (5) Nasopalatine

Median Palatal Cyst

- **Site:** in the hard palate,posterior to the incisive canal
- **Clinical features:** No signs and symptoms exist, unless the cyst becomes large, with expansion of bone

- **Radiological features:** A maxillary occlusal view will help to identify the ovoid radiolucency in the midpalatal region, often it becomes difficult to distinguish the cyst from an extensive incisive canal cyst.

- **Treatment:** enucleation with primary closure.

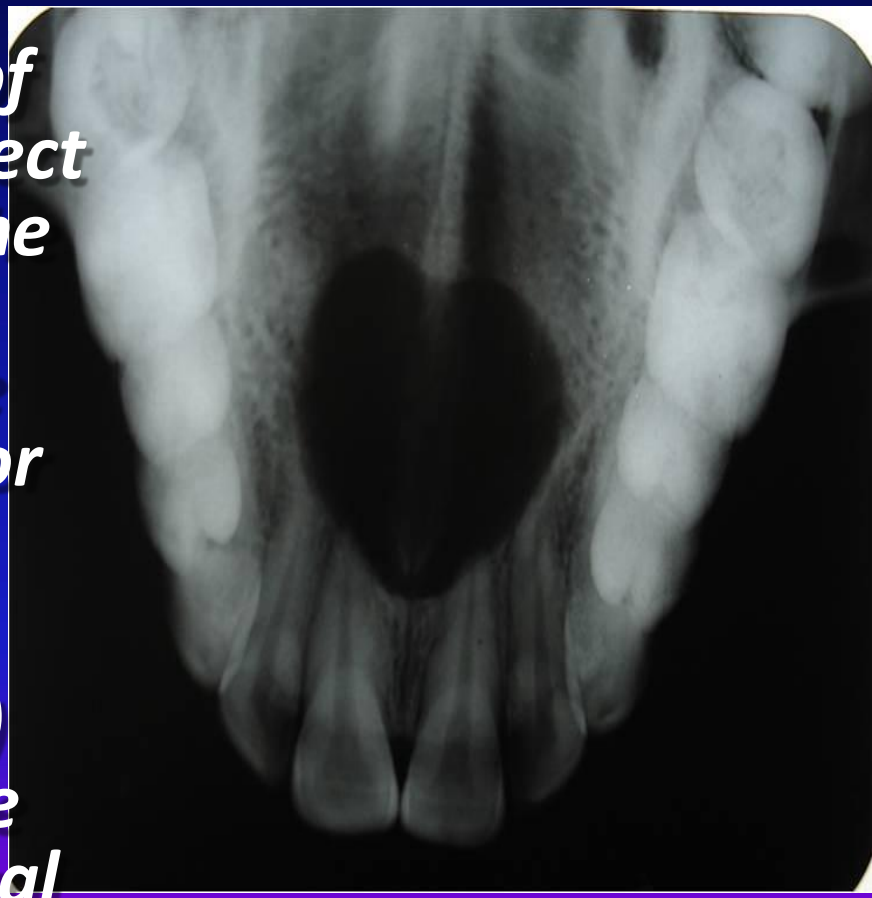
Nasopalatine Duct Cyst

- also referred to as the incisive canal cyst, it arise from the epithelial remnant of nasopalatine canal, that connects the oral and nasal cavities in the embryonic stage.
- **Site:** more commonly seen between the apices of the central incisor.

Incidence: This is the most common type of developmental, nonodontogenic cyst.

Fig. 44.3. Nasopalatine duct cyst: anterior palate swelling.

Clinical features: *Majority of the cysts remain asymptomatic, The notable common symptom is a recurrent swelling, in the anterior region of the midline of the palate, or on the labial aspect between the central incisors .The central incisors are vital and normal in color, unless they are affected adversely, by trauma or caries.*



Radiological features: *well defined round or (heart shape) radiolucency, between or above the roots of the maxillary central incisor teeth.*

Pathology: *The type of epithelium found may vary at different levels. It may be stratified squamous at a lower level, more superiorly it may be pseudostratified columnar epithelium.*

Cystic contents (aspirate): *Aspiration is an important diagnostic aid to rule out a normal incisive canal fossa radiolucency. The viscous fluid content may be mucoid material or even pus if the cyst has been infected.*

Treatment: *enucleation*

Globulomaxillary Cyst

- It is also termed as a lateral fissural cyst. it arises from epithelium inclusions at the site of fusion of the globular process of the medial (frontonasal) process and the maxillary process.
- Site: It is seen between the maxillary lateral incisor and canine.
- Clinical features: The lateral and maxillary cuspid teeth will be found to be tilted coronally with root divergence.Vitality test will be normal for both the teeth.
- Radiological features: (pear) shaped radiolucency between the maxillary lateral incisor and canine. The roots reveal divergence.

- ***Pathology:*** ***The epithelial lining is of pseudostratified columnar ciliated epithelium, often derived from the nasal mucosa.***

- ***Treatment:*** ***Careful enucleation without damage to the adjoining roots of the teeth, followed by primary closure.***

Nasolabial cyst

- *This is rare ((soft tissue)) cyst occurs outside the bone in the nasolabial folds.*
- ***Clinical presentation :****The most frequent symptom is swelling. Sometimes the patients complained of pain and difficulty in nasal breathing, but pain is generally present when the cysts are infected.*

Radiological features: *its soft tissue cyst there is no distinct radiographical pictures*

Treatment: *Although the nasolabial cysts are extra-osseous they lie subperiosteally, and careful surgical enucleation should be done .*

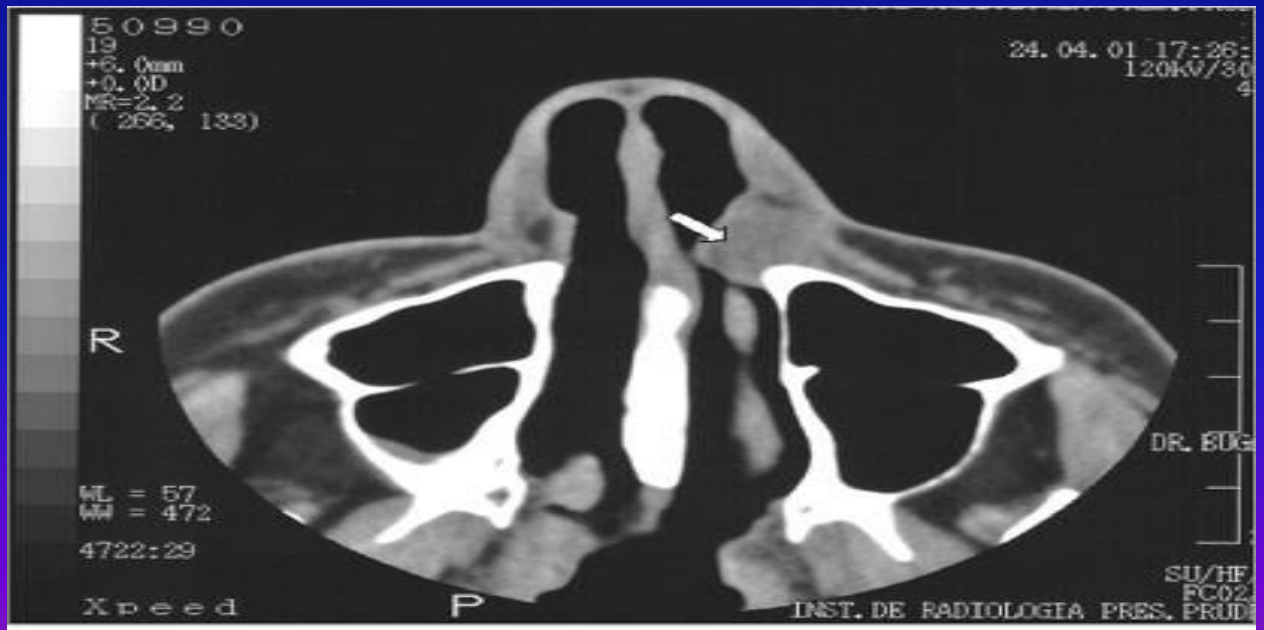


Figure 1. CT image (axial section) showing a heterogeneous mass suggesting soft tissue in the left nasal fossa (arrow).

Nonodontogenic Nonepithelial Bone Cysts (Cyst like Conditions)

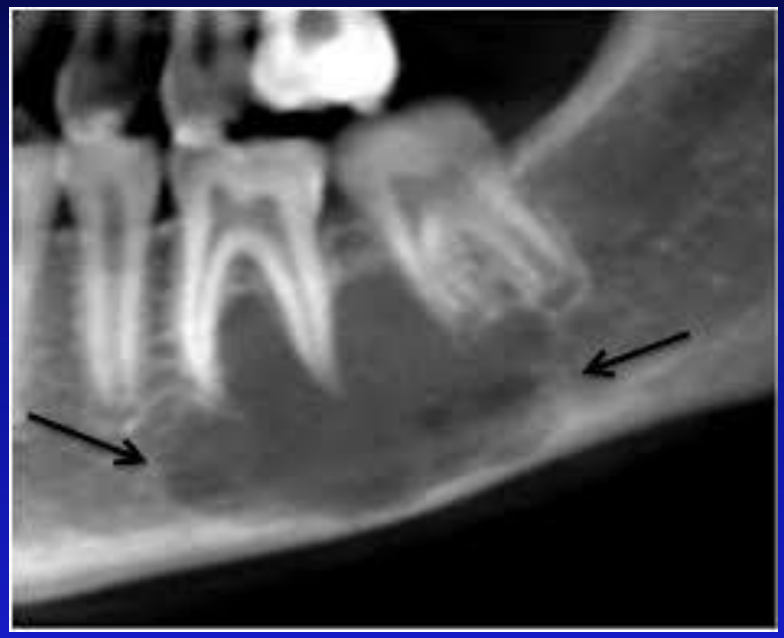
Solitary Bone Cyst

- ***also termed as traumatic or hemorrhagic bone cyst. it is not confined to the jaws as similar lesions are seen elsewhere in the skeleton.***

- ***Etiology:*** ***A number of theories include:***
- ***• Trauma and hemorrhage with failure of organization***
- ***• Abnormal calcium metabolism***
- ***• Chronic low-grade infection***
- ***• Necrosis of fatty marrow secondary to ischemia***

Solitary Bone Cyst

- ***Incidence:*** *its rae cyst occur particularly in children and adolescents.*
- ***Site:*** *mostly seen in the subapical region, above the inferior dental canal, in the cuspid and molar region.*
- ***Pathology:*** *frequently found to be empty cavity. No visible lining , some cases, granulation tissue or blood clots, with small multinucleate cells may be seen.*



- ***Radiological features:*** ***The cyst appears as a unilocular radiolucency with scalloped margin***

Solitary Bone Cyst

- ***Treatment:*** ***Surgical exploration is required for ((diagnosis)) and usually constitutes the treatment. Gentle curettage stimulates hemorrhage which results in rapid obliteration of the defect and eventual healing by new bone formation.***

Aneurysmal Bone Cyst

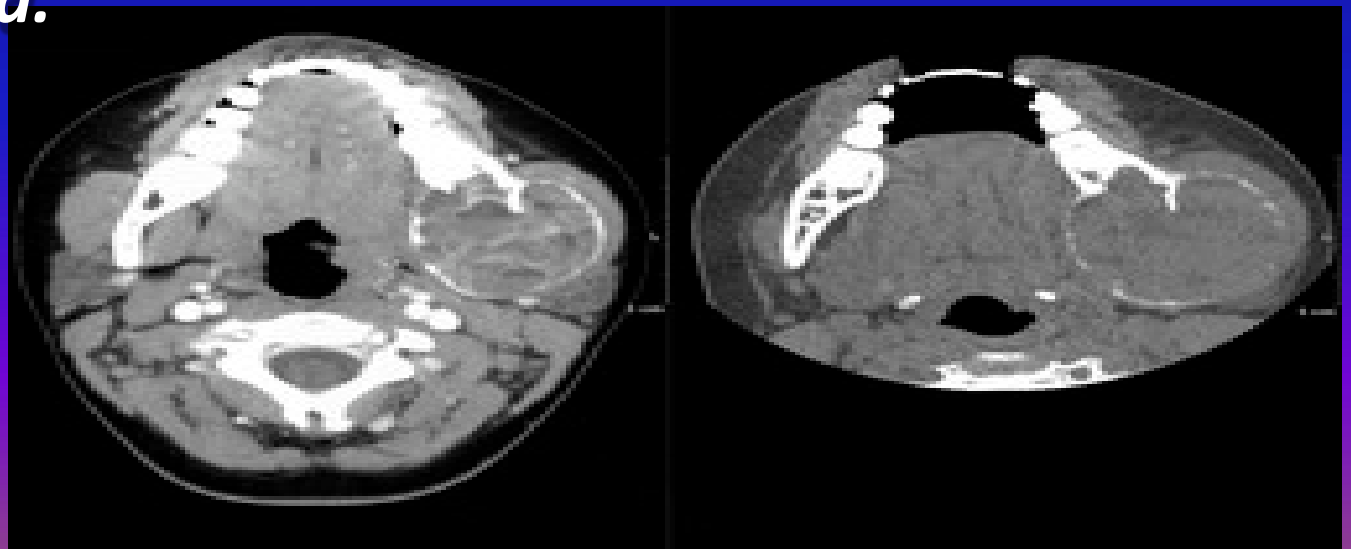
- uncommon hemorrhagic lesion of the bone. Its rarely seen in the jaws It is seen mainly in children, adolescents or young adults.
- **Site:** It is more commonly seen in the mandibular posterior region .
- **Clinical features:** The lesions produce firm swellings, the patients may give a history of rapid enlargement, the teeth may show displacement, although they remain vital..

Radiological features:

- *The lesions are usually unilocular and may give a multilocular appearance also described as(honeycomb or soapbubble appearance) .*

- *They generally show a subperiosteal layer of new bone.*

- *Teeth may be displaced and root resorption has been described.*



Aneurysmal Bone Cyst

- ***Cystic contents (aspirate):*** ***venous blood .***
- ***Treatment options:***

a. ***observation and long term follow up,which may lead to spontaneous regression.***
b. ***calcitonin injections***
c. ***Curettage***
d. ***resection.***

Case of recurrent aneurysmal bone cyst treated by resection


THANK YOU