
GOOD MORNING

CYSTS OF JAW

Part - I

DEFINITION

- ‘A pathological cavity having fluid, semifluid or gaseous contents and which is not created by the accumulation of pus’. Most cysts, but not all, are lined by epithelium.

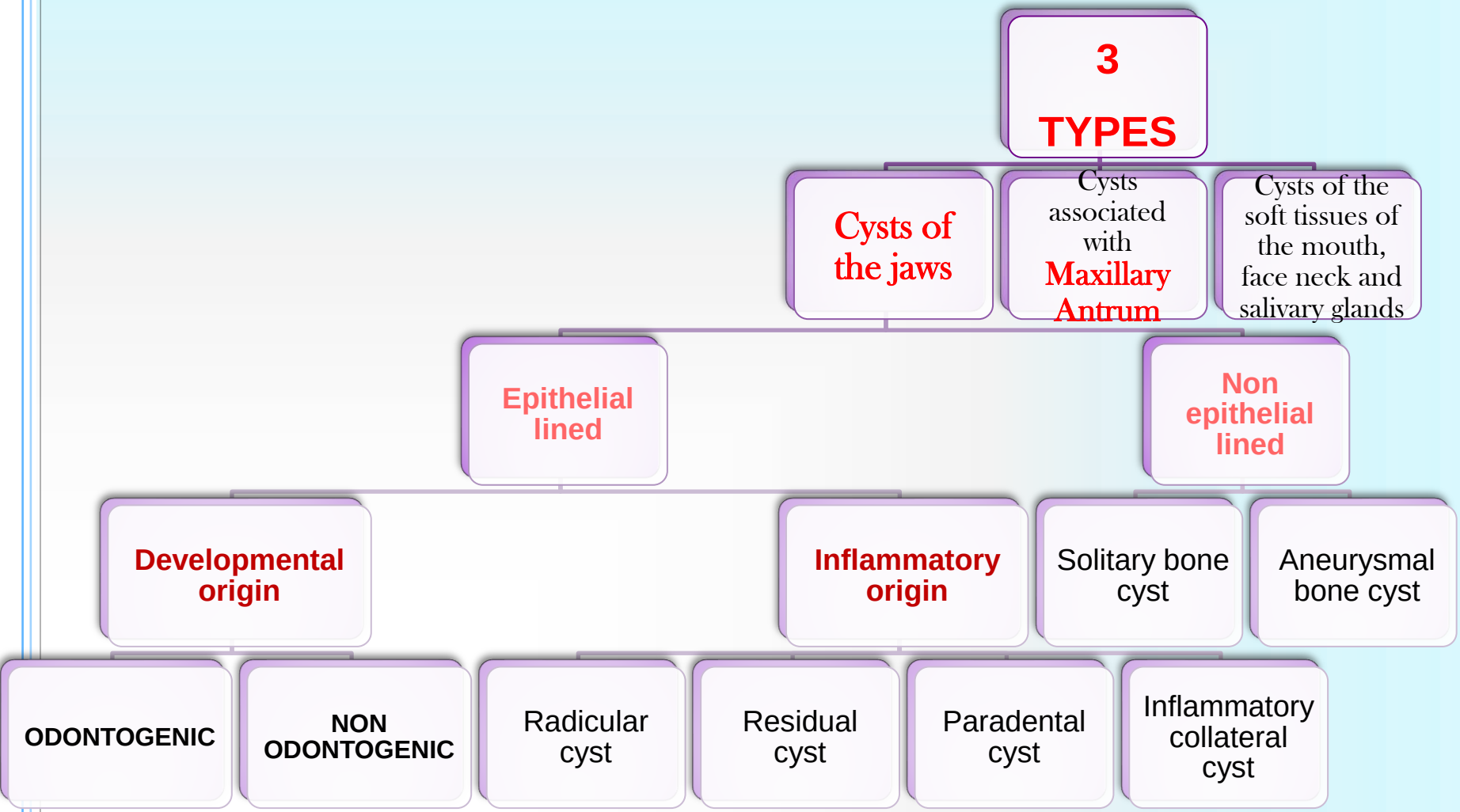
(KRAMER in 1974)

★Not lined by epithelium : Mucous extravasation cyst of salivary glands, Aneurysmal bone cyst & Solitary bone cyst -

‘PSEUDOCYSTS’

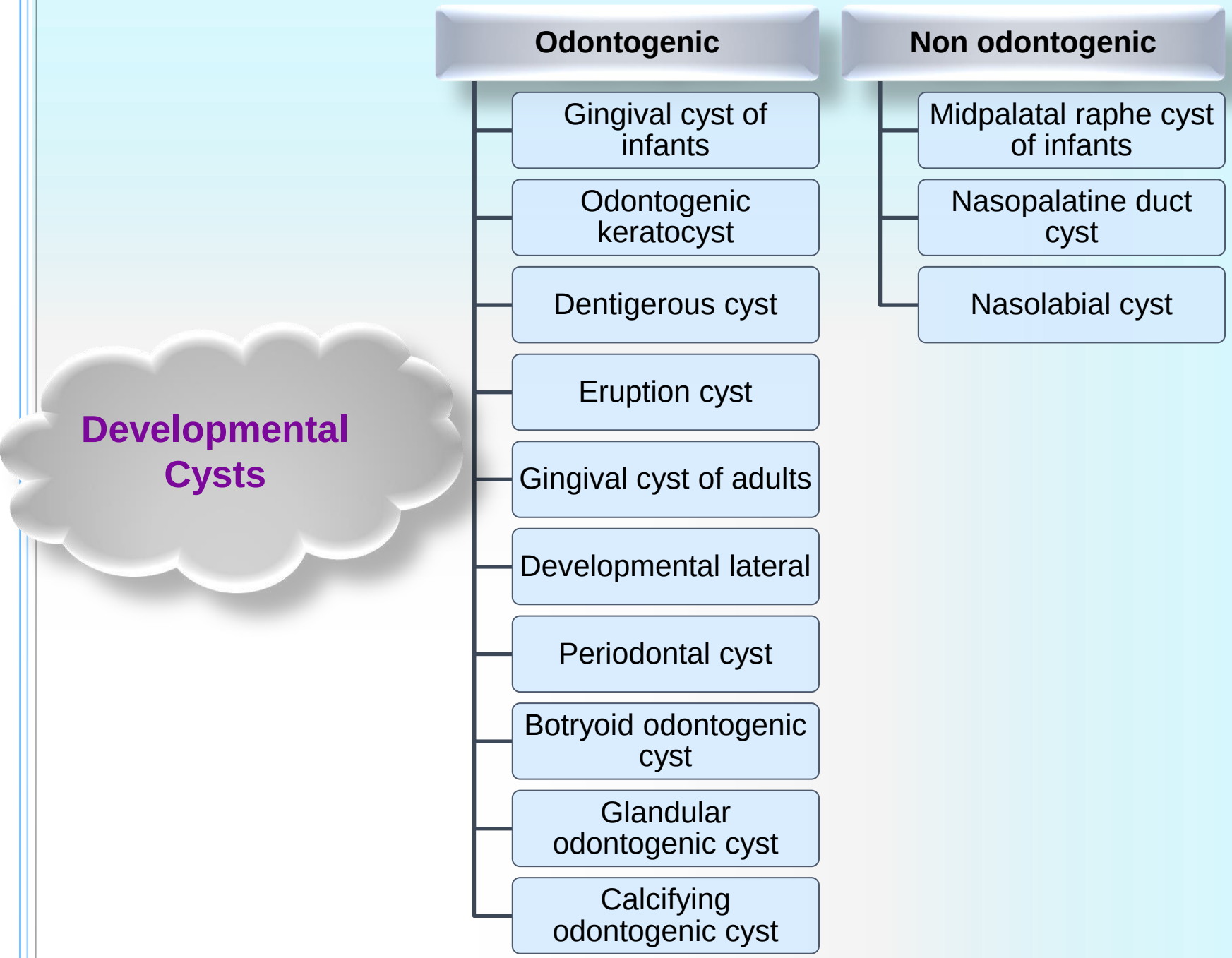
Reichart and Philipsen (2004) - ‘***Cavities***’

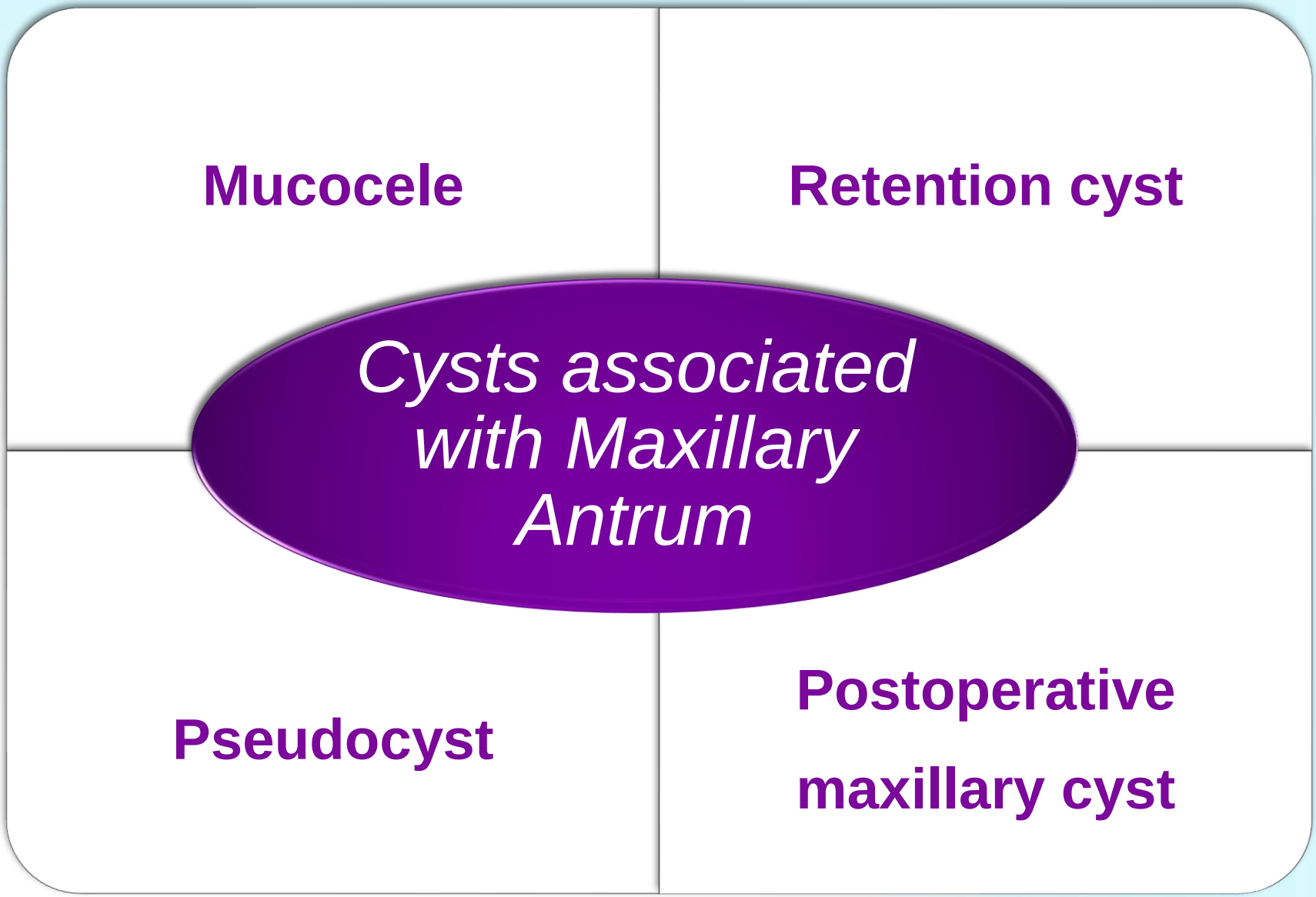
CLASSIFICATION



According To Shear

Textbook on Cysts of the oral regions; Mervyn Shear; 4th edition


Developmental Cysts
Odontogenic
Gingival cyst of infants
Odontogenic keratocyst
Dentigerous cyst
Eruption cyst
Gingival cyst of adults
Developmental lateral
Periodontal cyst
Botryoid odontogenic cyst
Glandular odontogenic cyst
Calcifying odontogenic cyst
Non odontogenic
Midpalatal raphe cyst of infants
Nasopalatine duct cyst
Nasolabial cyst


Mucocele
Retention cyst
Cysts associated with Maxillary Antrum
Pseudocyst
Postoperative maxillary cyst

Cysts of soft tissues of Mouth, Face & Neck

- Dermoid and epidermoid cysts
- Lymphoepithelial (Branchial) cyst
- Thyroglossal duct cyst
- Anterior median lingual cyst (intralingual cyst of foregut origin)
- Oral cysts with gastric or intestinal epithelium (oral alimentary tract cyst)
- Cystic hygroma
- Nasopharyngeal cyst
- Thymic cyst
- Cysts of the salivary glands: Mucous extravasation cyst; mucous retention cyst; ranula; polycystic (dysgenetic) disease of the parotid
- Parasitic cysts: hydatid cyst; *Cysticercus cellulosae;* trichinosis

CLASSIFICATION BY TISSUE OF ORIGIN

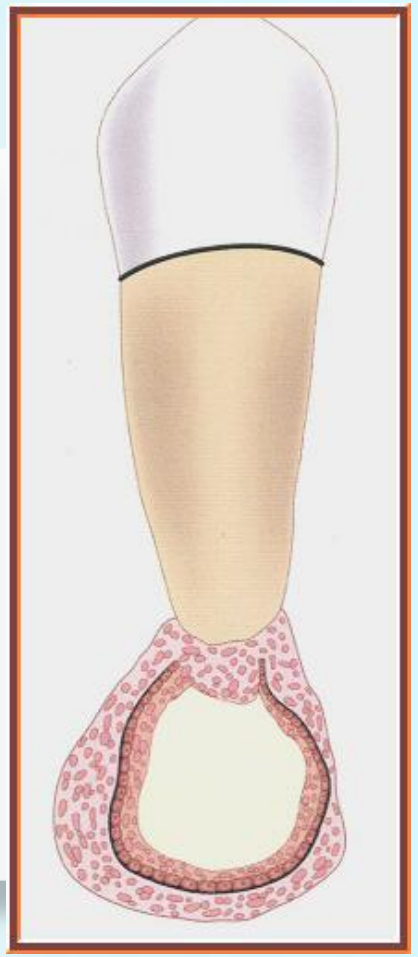
RESTS OF MALASSEZ	REDUCED ENAMEL EPITHELIUM	DENTAL LAMINA
• Periapical Cyst • Residual Cyst • Paradental Cyst	• Dentigerous Cyst • Eruption Cyst	• Odontogenic Kerato Cyst • Gingival Cyst Of New Born • Gingival Cyst Of Adult • Lateral Periodontal Cyst • Glandular Odontogenic Cyst

INFLAMMATORY CYSTS

RADICULAR CYST

SYNONYMS:

- Periapical cyst
- Root end cyst
- Apical periodontal cyst
- Dental cyst



Types

- Apical cyst 75%
- Residual cyst 20%: which has remained in the jaw following extraction of involved tooth
- Lateral cyst: rare, arises as a result of extension of inflammation from pulp into lateral peridontium along a lateral root canal

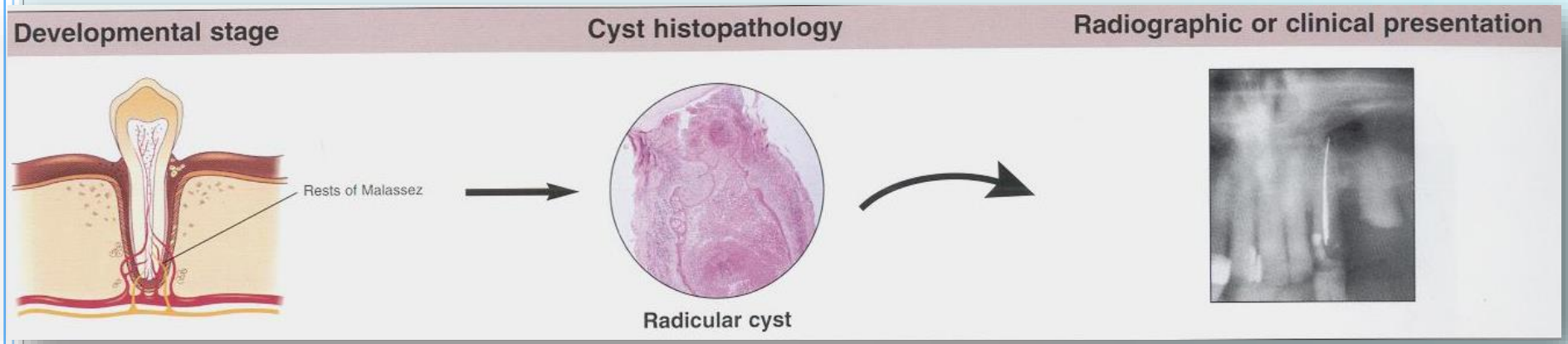
Soames & Southm 4th ed.

Etiology

- Caries involving pulp
- Trauma
- Previous restoration
- Failure of RCT

PATHOGENESIS

- Develops - proliferation of subsequent cystic degeneration of ‘epithelial cell rests of malassez” - periapical region **- Non Vital tooth**.



- The entire process of cyst development occurs in different phases:
  - *Phase of Initiation*
  - *Phase of Proliferation*
  - *Phase of Cystification*
  - *Phase of Enlargement*

Phase of initiation

- Bacterial infection of dental pulp / direct inflammatory effect of necrotic pulpal tissue in a *Non-vital Tooth* ➜ stimulation -cell rests of malassez

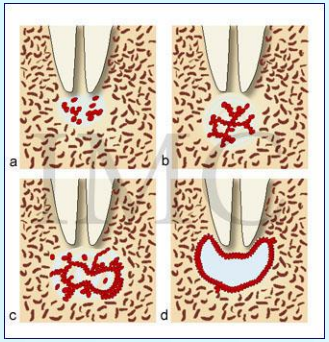
Phase of proliferation

- Excessive and exuberent proliferation of cells ➜ formation - large mass / island of immature proliferating epithelial cells at periapical region of affected tooth.

Phase of cystification

- Centrally located cells - deprived - nutritional supply
- Ischemic liquifactive necrosis, peripheral cells survive
- Formation:cavity - hollow space/ lumen : mass proliferating cell rest of malassez & peripheral lining of epithelial cells

ENLARGEMENT



- Epithelial proliferation in lining
- Hydrostatic pressure generated in cyst lumen from hyperosmolarity created by cellular breakdown & sloughing of cells into lumen
- Osmotic gradient favors transudation of fluid into lumen, maintains its hydrostatic pressure , causes further resorption of surrounding bone
- **Suzuki (1984)** - jaw cyst enlargement - lipo-peroxide and prostaglandin-like substances produced by lipid peroxidation of cyst wall and fluid.

CLINICAL FEATURES

- Most common cyst
- Incidence: > 50% all jaw cyst
- 3rd-5th decade
- M>F
- Maxilla> Mandible

Clinical presentation

- Symptomless
- Pain if infected
- Larger cyst can cause swelling.
- Initially bony hard→crackling sound→ rubbery and fluctuant.

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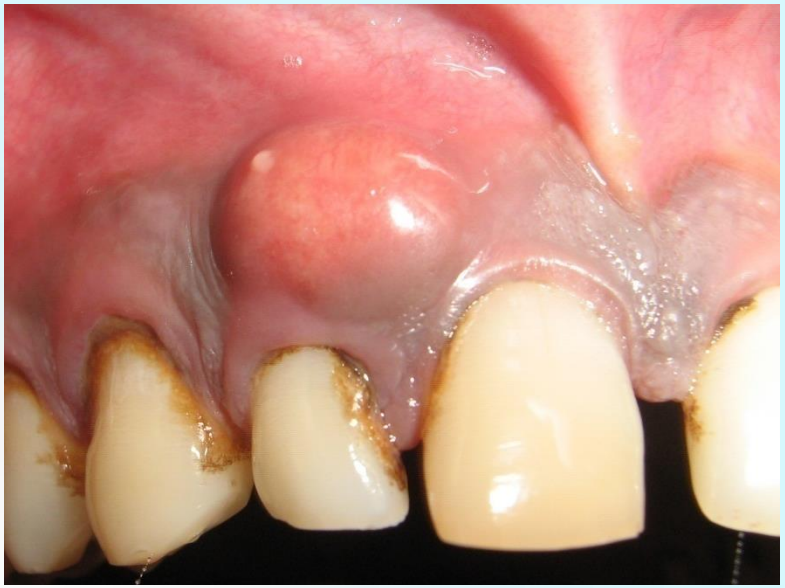
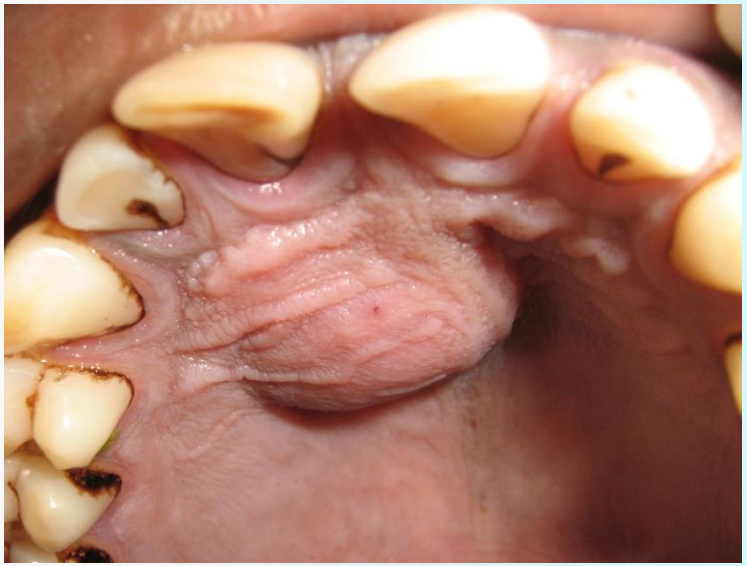
- In maxilla → buccal or palatal enlargement
- In mandible→ usually labial or buccal enlargement
- Lingual expansion is rare in mandible.
- Associated with non vital tooth.





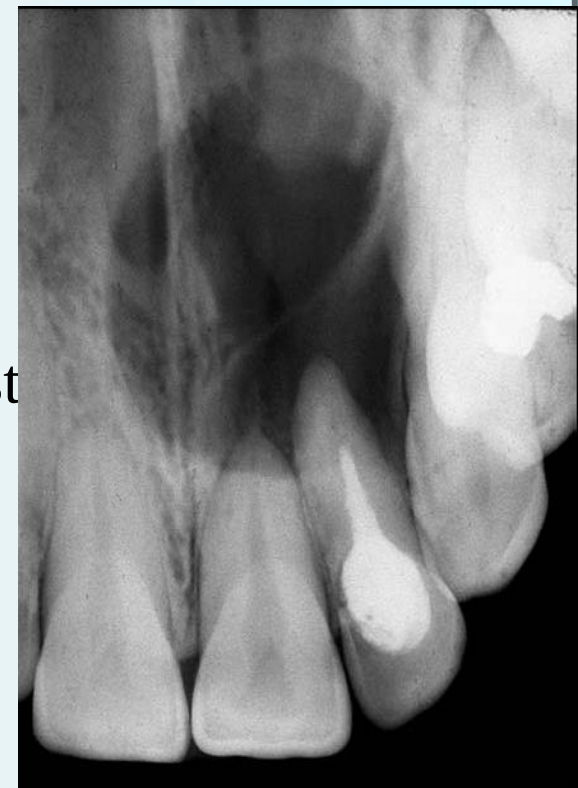
- Rare in deciduous teeth. 0.5% (Lustman and Shear 1985)

Mervyn Shear 4th ed.

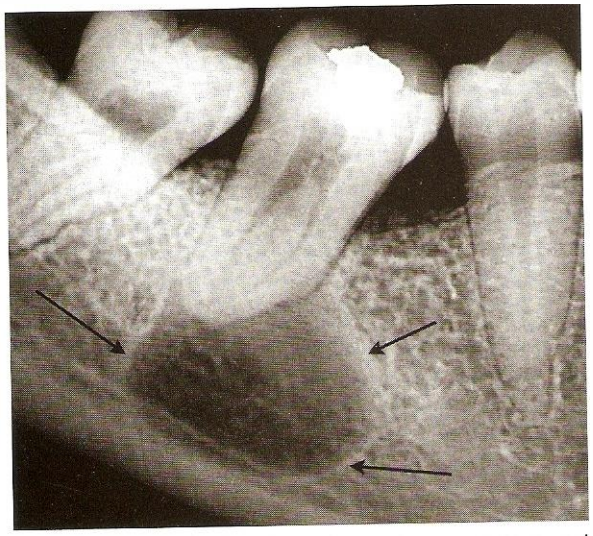
Radiologic features

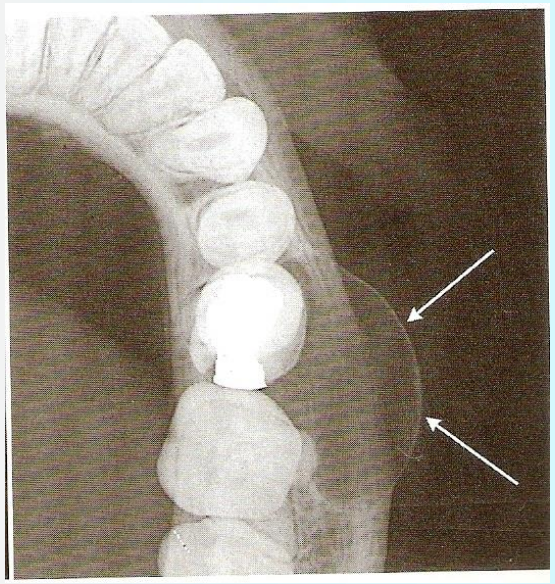
- Location: apex of nonvital tooth

  60% in maxilla esp. around incisor and canine .
- Periphery and shape: well defined cortical border
- Outline is curved or circular
- Internal structure:radiolucent
- Dystrophic calcification → in long standing cyst



- Effects on sorrounding structure:
- If large displacement and resoption of root of adjacent teeth.
- Resoption pattern may have a curved outline.
- In rare cases resoption of involved nonvital tooth
- Expansion of outer cortical plate in a curved or circular shape
- Displacement of inferior alveolar canal.





Differential diagnosis

- Apical granuloma
- Periapical surgical defect
- Radiolucent apical scar
- Lateral periodontal cyst

DIAGNOSIS

- Periapical radiographs
- Pulp tests
- Ultrasonography - ECHO present (better than radiographs)
- Fluid Aspiration
  - YELLOW BROWN from the breakdown products of blood
  - Cholesterol crystals –*Shimmering gold /Straw color*
  - Protein estimation: 6.3-7.5g/100ml rich in gama globulin high molecular weight substance enters via altered permeability (implies are inflammatory exudates)

treatment

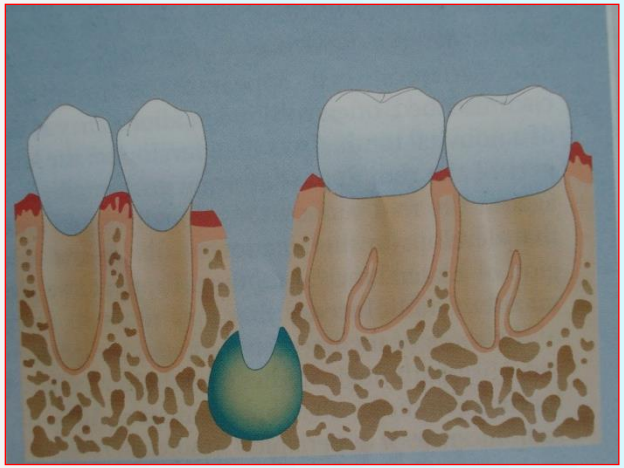
- Conservative endodontic therapy(Bhaskar)

Decompressed through reduction of intracystic pressure

- 84% Success Rate (Shah 1988)
- Root resection
- Enucleation
- marsupilization

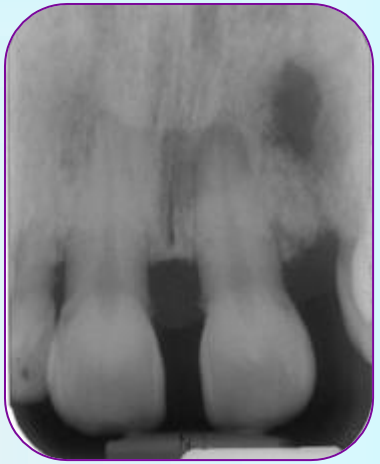
Residual Cyst

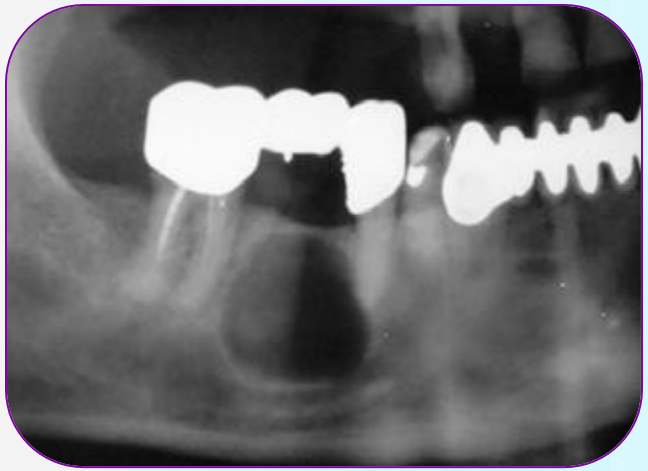
- Inflammatory cyst of jaws that fails to resolve after root canal therapy / tooth removal
- Age: older age group
- Sex: Male>Female
- Site: Maxilla>Mandible
- Asymptomatic
- Rarely >5 to 10 mm in diameter



RADIOGRAPHIC FINDINGS

- Residual cysts -enlarging darkening radiolucency
- Will not show much bony expansion
- Most are small, 1 to 3 cm, sizes > 6 cm may be seen





DIFFERENTIAL DIAGNOSIS

- Periapical cemento-osseous dysplasia or a sublingual salivary gland depression - anterior mandible
- Idiopathic bone cavity - Remained static or enlarged only slowly

DIAGNOSIS AND TREATMENT

- Pulp testing of adjacent teeth to rule out the possibility of a source for another radicular cyst
- Exploration and enucleation of the residual cyst
- Exploration and removal of any inflammatory focus, such as residual roots or root canal filling

INFLAMMATORY COLLATERAL CYST

SYNONYMNS

- Paradental cysts/ Inflammatory paradental cyst
- Mandibular infected **Buccal** cyst
- Inflammatory pocket cyst
- Eruption pocket cysts **Slater(2003)**

3 -4% of all cysts

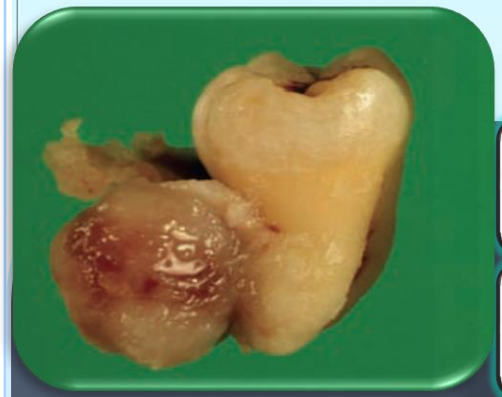
- Clinical variant - Dentigerous cyst

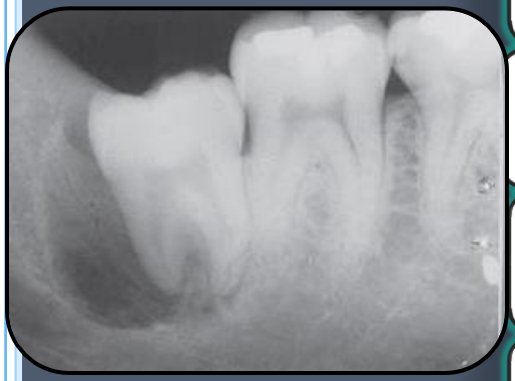
Inflammatory origin

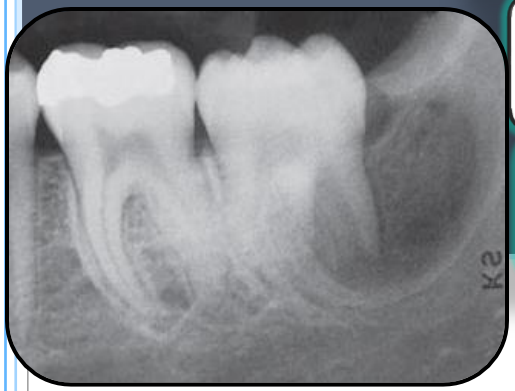
Odontogenic epithelium

(Craig 1976)

- Cell rests of Malassez
- Reduced enamel epithelium







Male predominance

Age:- 10 - 39 , 2/3rd in -3rd decade

Arises - partially erupted 3rd molar (rarely, other teeth)

1st – 2nd molars - *Juvenile Paradental Cyst*

Partially erupted tooth displaces cyst buccally - lies against buccal roots or bifurcation

Unilocular, Well demarcated, radiolucency distal to partially erupted tooth, often buccal superimposition.

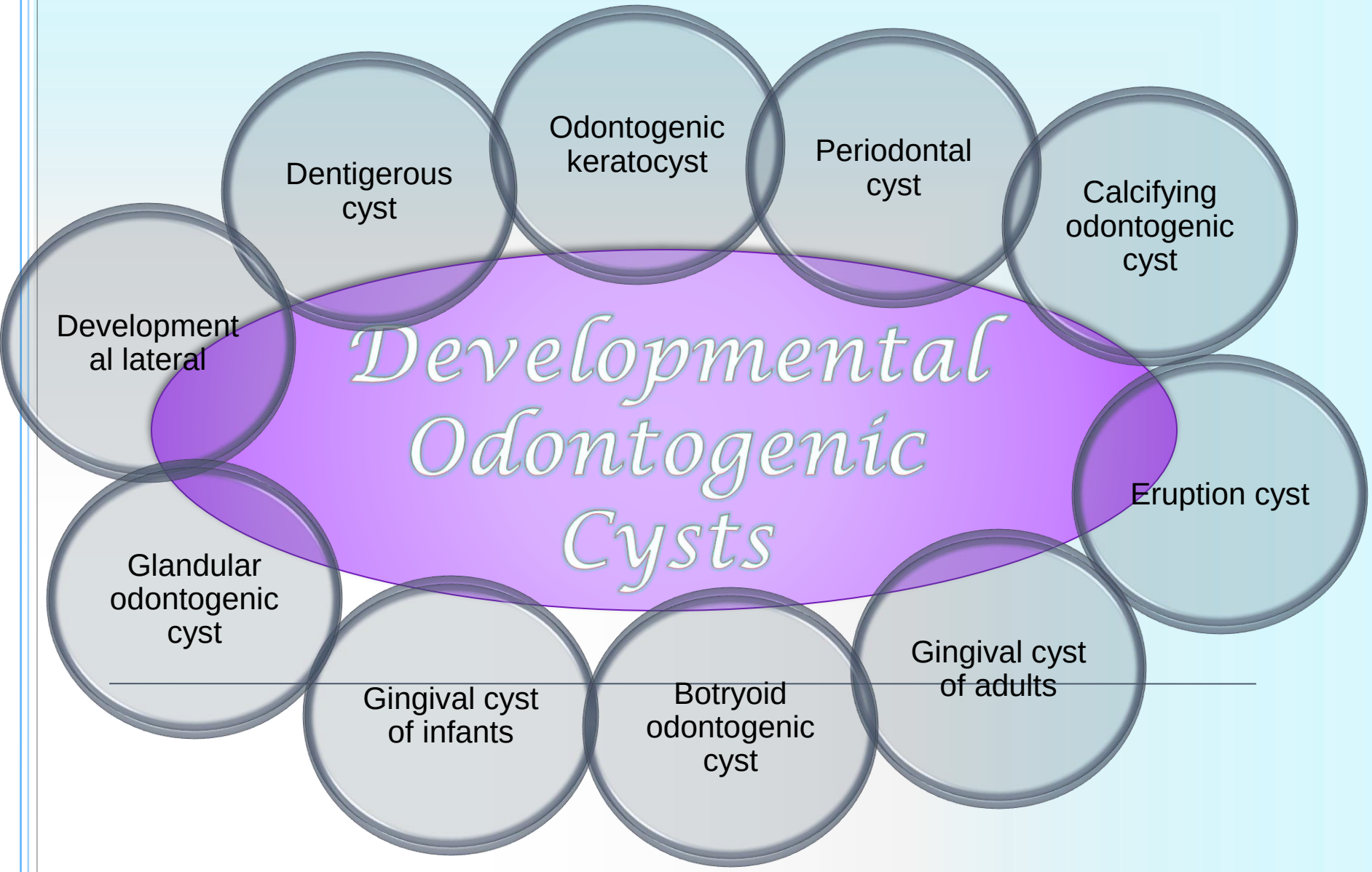
Intact Periodontal Ligament space, **TOOTH VITAL**

Swelling and pain not prominent features

TREATMENT

- **Colgan et al. (2002)** *-food impaction-* plays role- occlusion of the opening of the pocket – currettage done
- Paradental cysts associated with third molars - removed along with offending tooth
- Juvenile lesions enucleation of cyst without removal of associated tooth

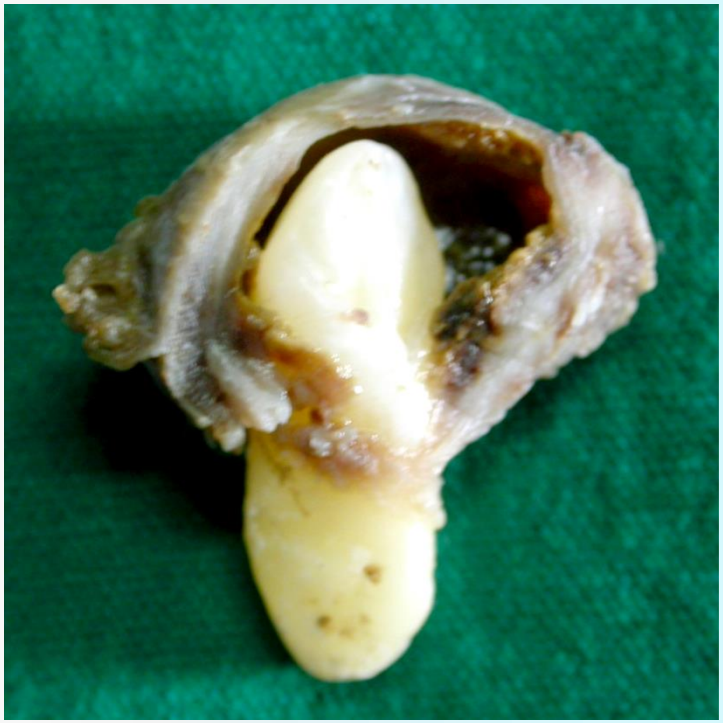

GOOD MORNING


Developmental Odontogenic Cysts
Dentigerous cyst
Odontogenic keratocyst
Periodontal cyst
Calcifying odontogenic cyst
Developmental lateral
Eruption cyst
Glandular odontogenic cyst
Gingival cyst of infants
Botryoid odontogenic cyst
Gingival cyst of adults

DEntigerous cyst (follicular cyst)

- Dentigerous cyst is one which encloses the crown of an un-erupted tooth by expansion of its follicle & is attached to the neck.

Mervyn Shear



SYNONYM

- FOLLICULAR CYST
- PERICORONAL CYST

- Second most common type of cyst in the jaws
- Forms about 16% of oral cyst
- Asymptomatic
- Follicular spaces >5mm (normal 2-3 mm) should be closely followed for potential development of dentigerous cysts.

OOO 2008;105:139-43

- associated with unerupted teeth and seemingly attached to the amelocemental junction.

British Dental Journal 2002; 192: 75–76

Clinical features

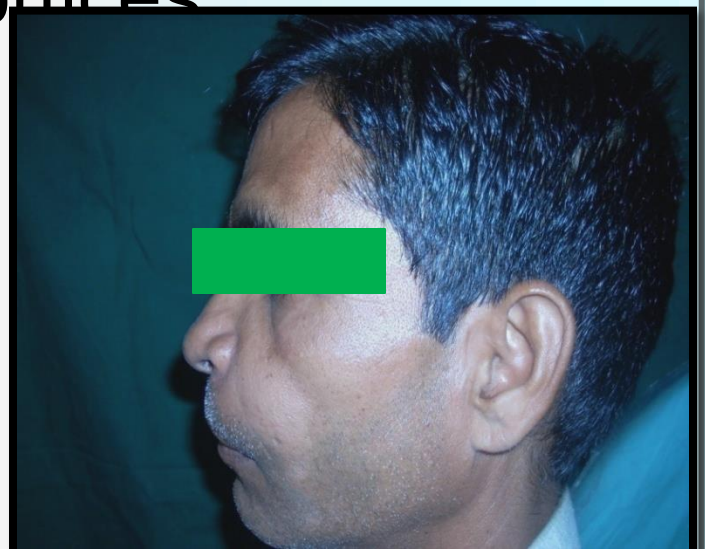
- Age – 10 -30 years
- Sex – M > F (2: 1)
- Race – Whites > Blacks
- Site –
  - Mandibular 3rd molar,
  - Maxillary permanent canines,
  - Mandibular premolars &
  - Maxillary 3rd molars

Langlais and langland

- Rarely with supernumerary teeth and odontomas (5 to 6%). Lustman and Bodner (1988).

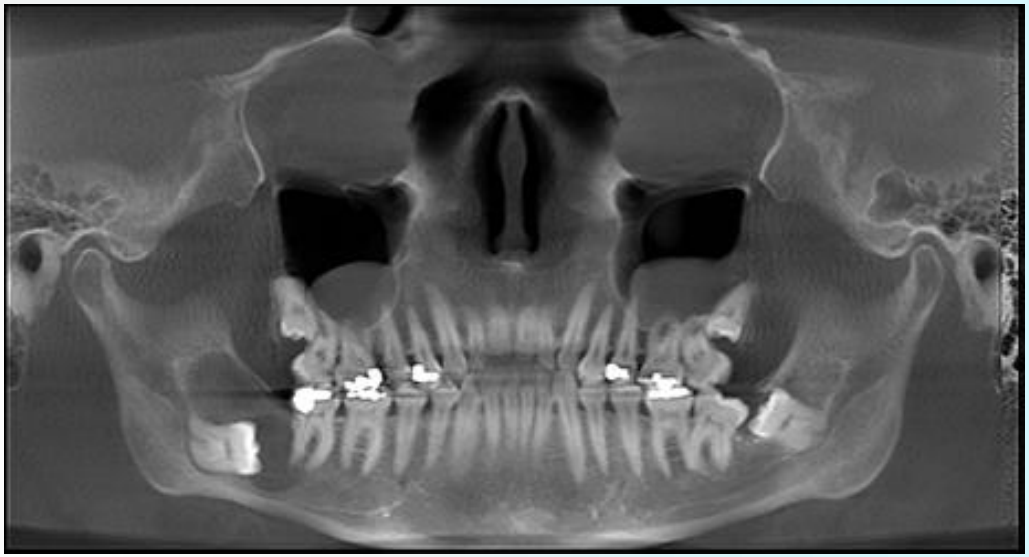
- Can attain a size of 10-15 cm.
- Bony expansion and facial fullness.
- Painless unless secondarily infected.
- Larger cyst can cause pathological fracture.
- Can resorb one or both cortices

MARX & STERN



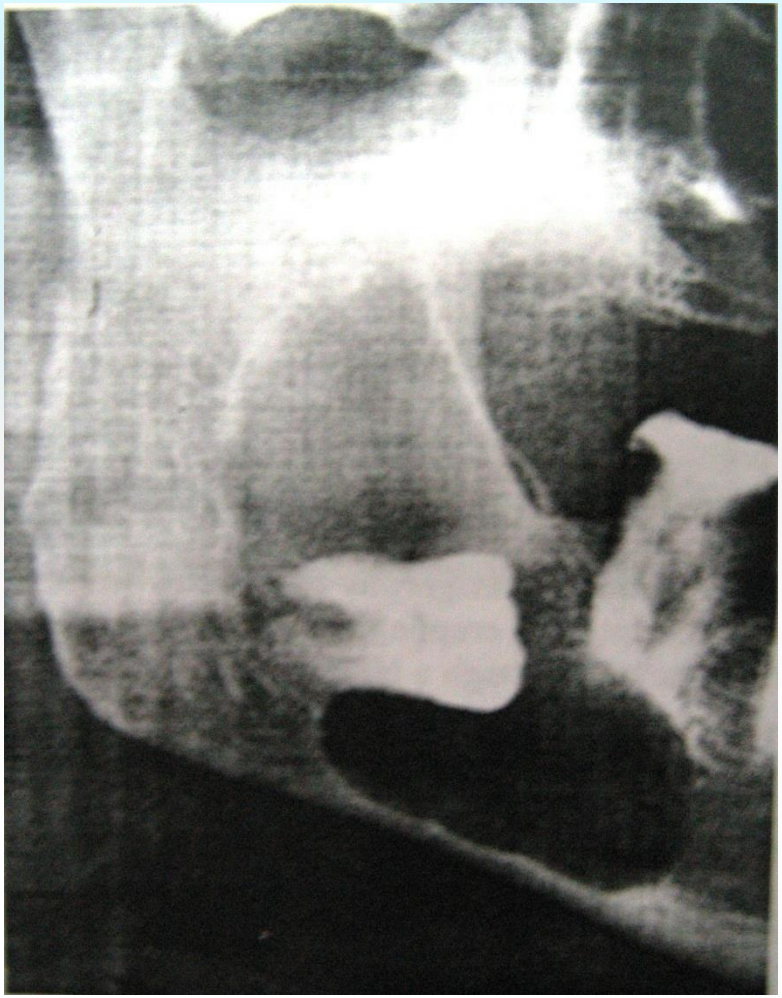
RADIOGRAPHIC FEATURES

- Unilocular lucency asso. with crown of un-erupted tooth
- Well defined sclerotic border
- Root resorption (55%)
- Either resorbs or displaces the adjacent teeth.

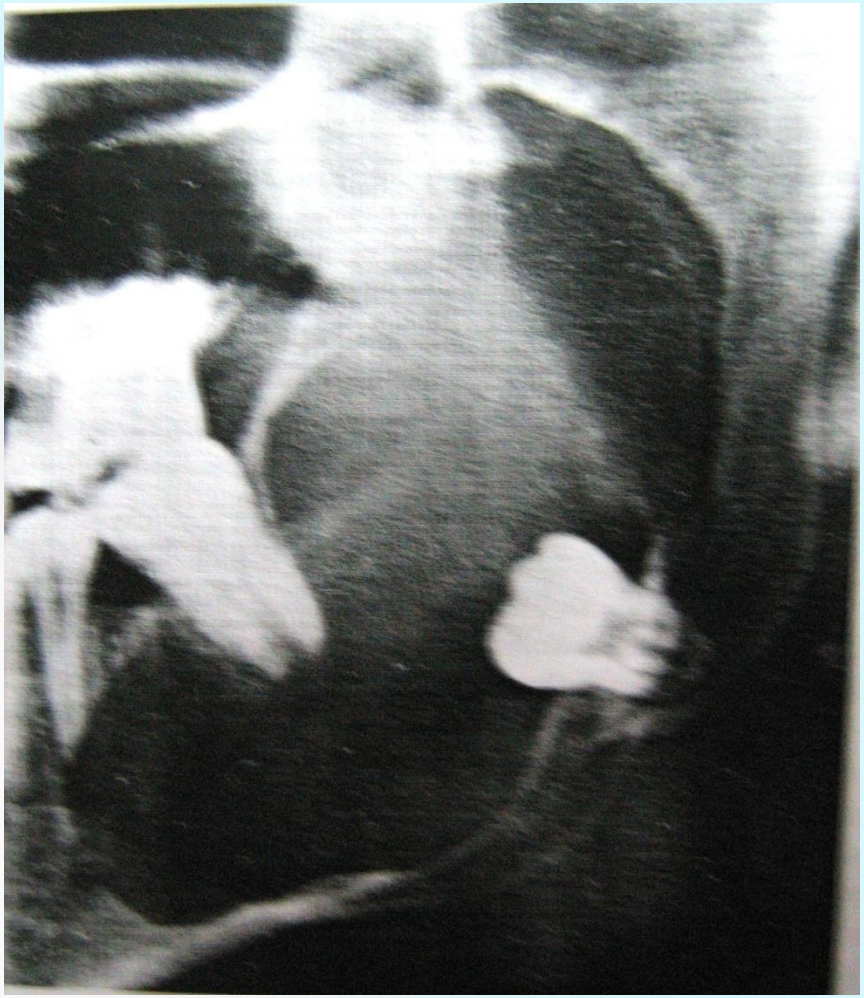


- Can displace the tooth into inferior border of the mandible, ramus of the mandible, nasal floor, and maxillary sinus .

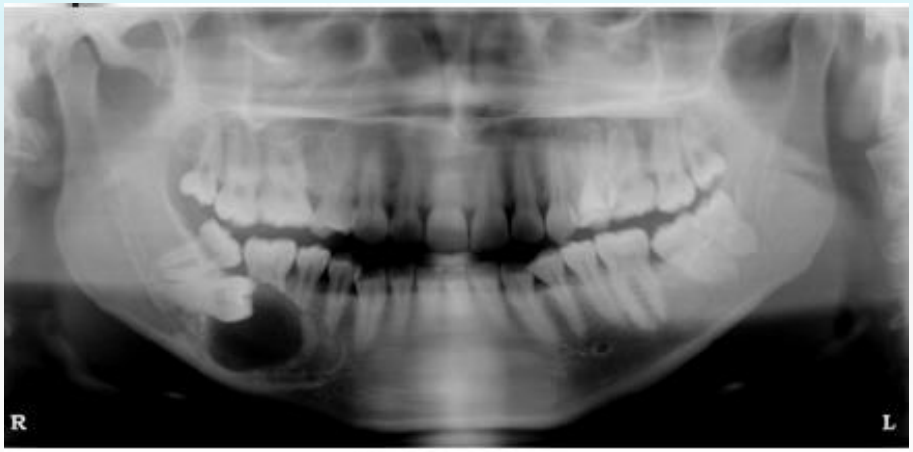
Expansion of the outer cortex



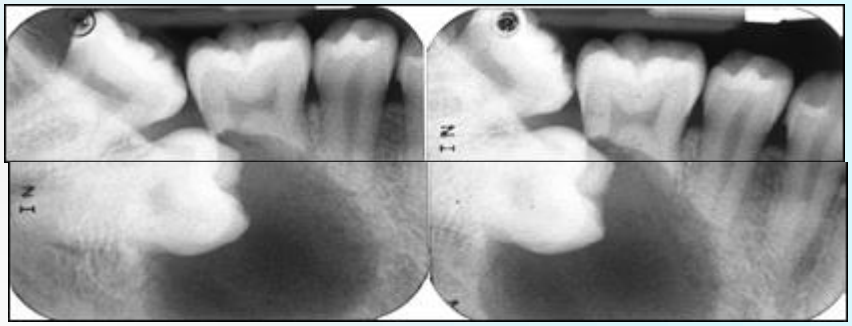
Displacement of 3rd molar, scalloping at margin in ramus

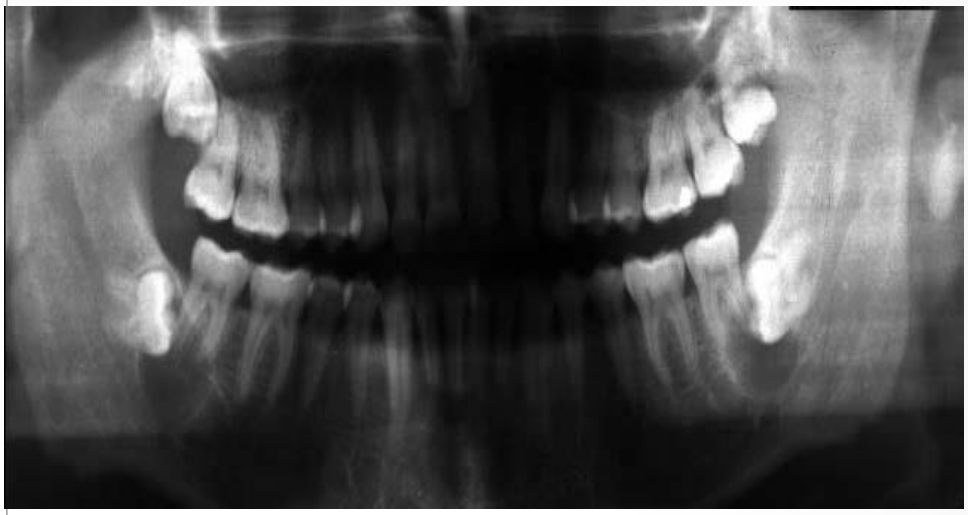


Displacement of 3rd molar and resoption of apex of 2nd premolar



Root Resorption

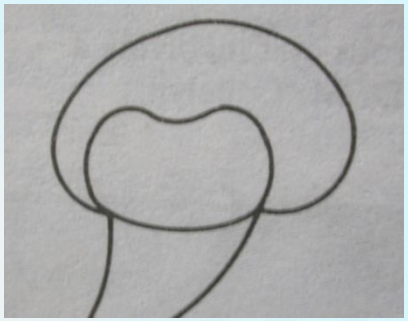




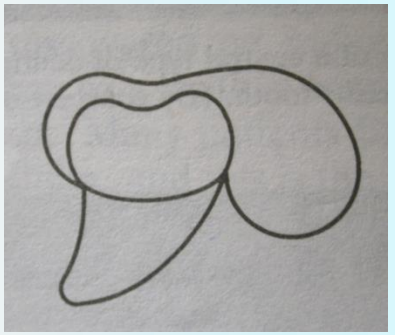
Radiolucencies asso. With both impacted 3rd molar

Radiological types

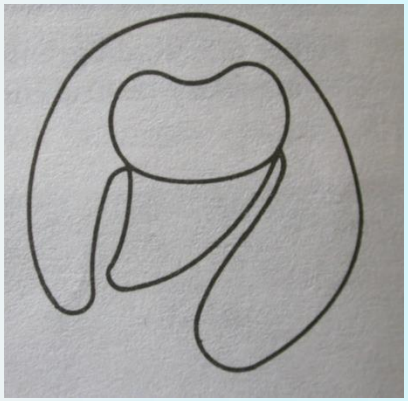
- Central



- Lateral



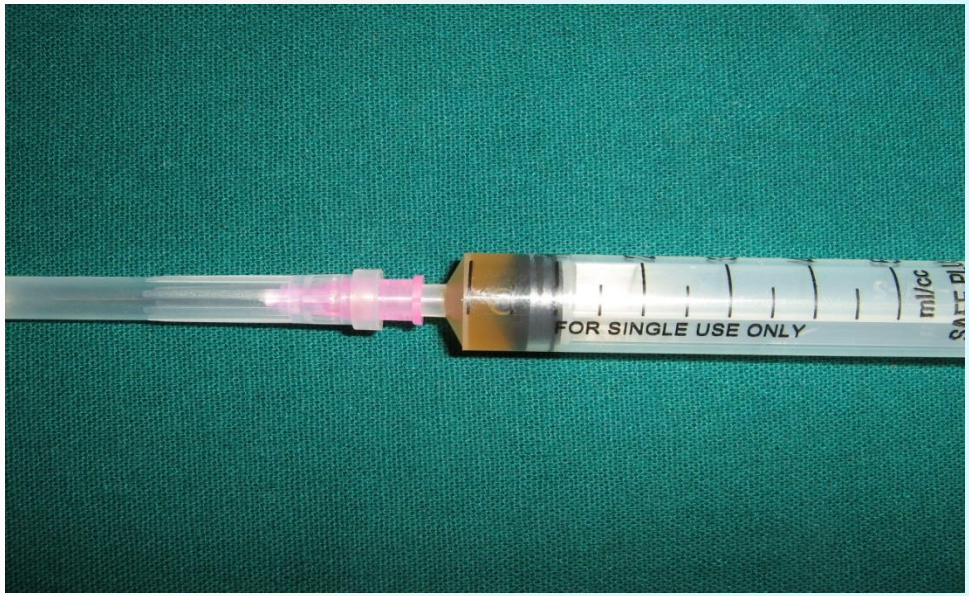
- Circumferential



Diagnostic work-up

Aspiration : straw colored fluid

cholestrol crystals



INVESTIGATIONS

- Clinical examination
- Tooth vitality tests
- Fine needle aspiration cytology (FNAC)
- Radiographs
- Biopsy
- Ultrasound

Differential diagnosis

- Hyperplastic follicle
- Odontogenic keratocyst (OKC)
- Adenomatoid odontogenic tumor (AOT)
- Calcified epithelium odontogenic cyst (CEOC)
- Ameloblastic fibroma or Cystic ameloblastoma
- Radicular cyst

TREATMENT

- ENUCLEATION
- MARUPILIZATION IN SOME CASES

ODONTOGENIC KERATOCYST

'*Odontogenic Keratocyst*' introduced by (Philipsen 1956).

'*Keratocystic Odontogenic Tumour*' (Philipsen, 2005)

CLINICAL FEATURES

3-11% of all odontogenic cysts

Most aggressive and Recurrent

Characteristics resembling : a cyst and a benign tumor

Age: infancy to older age : Peak:2nd - 3rd decade

- Bimodal age distribution - second peak -5th decade

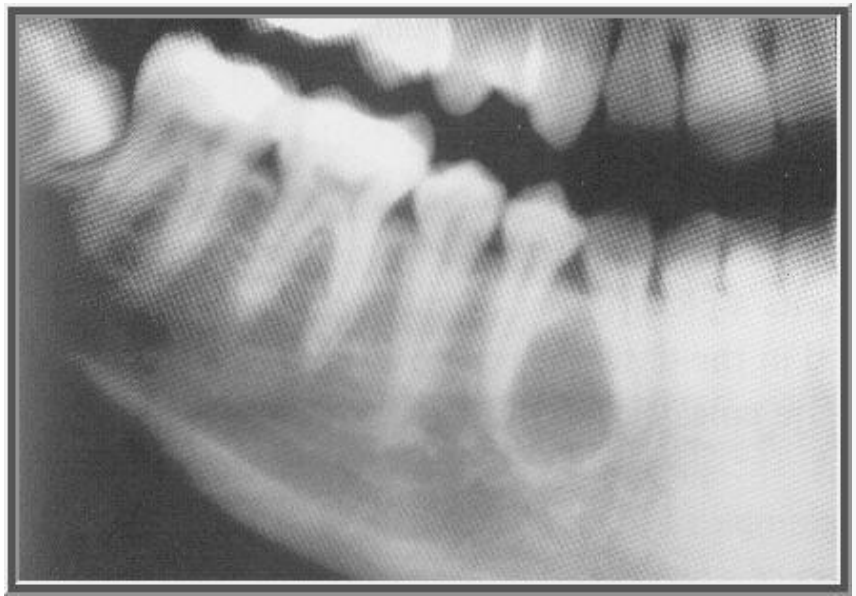
Sex: Males>Females.(1.7:1) { in syndrome F>M }

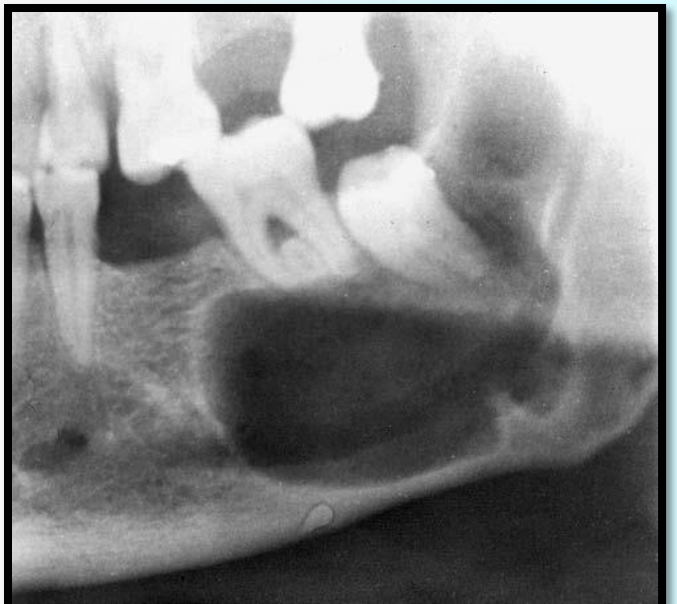
Mandible posterior– 50% Ramus and 3rd molar area >Maxilla tuberosity area >Anterior cuspid.

- Pain, swelling or discharge
- Paraesthesia of lower lip or teeth
- Pathological fractures
- Resorption of bone - cortex and inferior border.
  - Extends further anteroposteriorly than buccolingually
  - Clinically observable expansion of bone occurs late
- Resorb roots of adjacent teeth -smooth and regular pattern
- Enlarge to produce deflection of roots of teeth

RADIOLOGICAL FEATURES

- Small, round or ovoid, radiolucent areas
- Well demarcated - distinct sclerotic margins
- Smooth periphery mostly
- Scalloped margins - suggest unequal growth activity in different parts of cyst lining



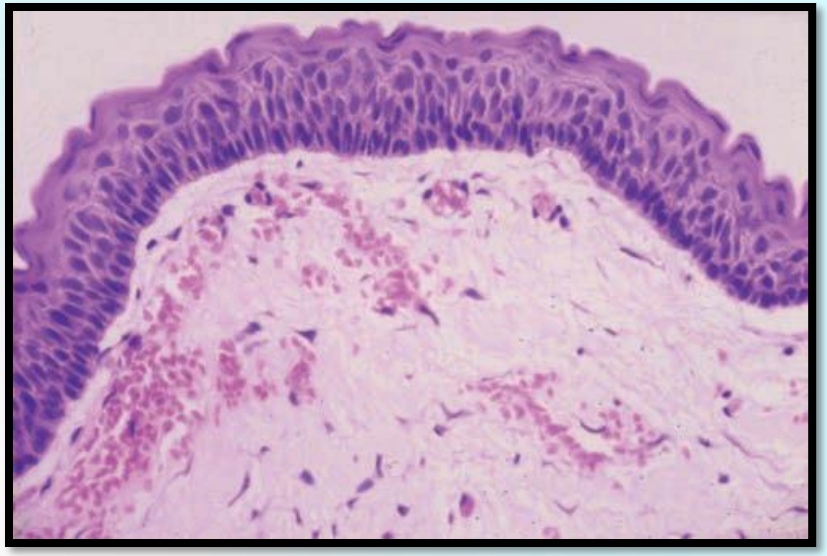


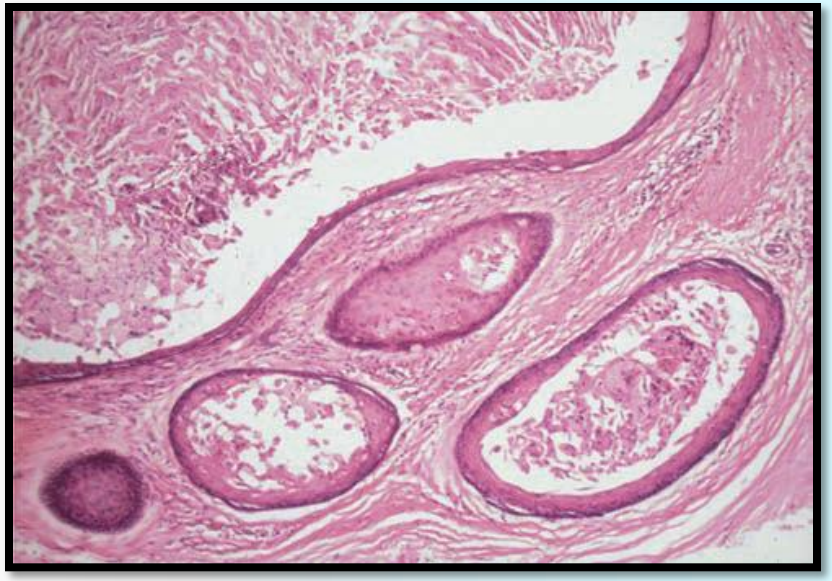
Main (1970)

- OKC- embraces an adjacent unerupted tooth 'Envelopmental'
- Formed in place of a normal tooth 'Replacement'
- Those in ascending ramus away from teeth 'Extraneous'
- Adjacent to roots of teeth - mandibular premolar region, indistinguishable radiologically from lateral periodontal - 'Collateral'

HISTOLOGY

- Lined by a regular, narrow, keratinised, stratified, squamous epithelium, about 5–8 cell layers thick and without rete ridges
- Orthokeratinised OKCs have a substantially lower recurrence rate than parakeratinised





Satellite microcysts in wall of OKC.

PREOPERATIVE DIAGNOSIS

Fluids from keratinising cysts –

- **Soluble protein levels < 3.5g/100mL (mean 2.2g/100mL)**
- Whereas Non-keratinising cysts : 5.0–11.0g /100mL (mean - 7.1g per 100mL)

- *Computerised tomography* - Voorsmit (1984) 1st to use
- *Magnetic resonance imaging* - Minami *et al. (1996)*
- Histopathology
- Transmission electron microscopy
- Immunohistochemistry

DIFFERENTIAL DIAGNOSIS

- **Ameloblastoma**; older age, multilocular, amber colored fluid.
- **Dentigerous cyst** : impacted tooth, thin straw colored fluid,
- **Aneurysmal bone cyst** ; under 20yrs age, trauma, soap bubble\honeycomb, multinucleated giant cells.

- **Odontogenic Myxoma** ; 10-30yrs, mandible, premolar & molar, missing teeth, tennis racket, rarely show root resorption

TREATMENT

- marginal excision - resection
- resection of involved bone followed by primary or secondary reconstruction plates stainless steel titanium and bone grafting procedures with iliac crest grafts.
- In recurrent lesion resection is treatment of choice

- **Carnoys Solution** : **Stoelinga & Vanhoelst (1981)** - treatment with enucleation, excision of the overlying mucosa and or/ muscle, if attachment existed to eliminate epithelial rests and or microcysts and care full cauterization of the bony defect with carnoys solution.

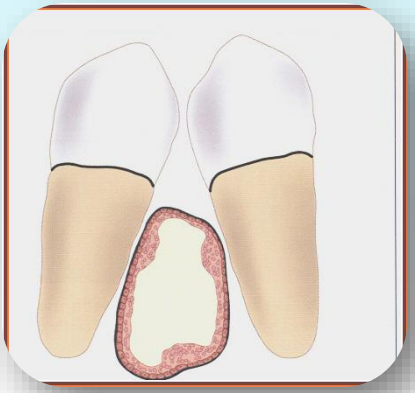
Composition Of Carnoys Solution:

Ethyl Alcohol - 60ml

Glacial Acetic Acid - 10ml

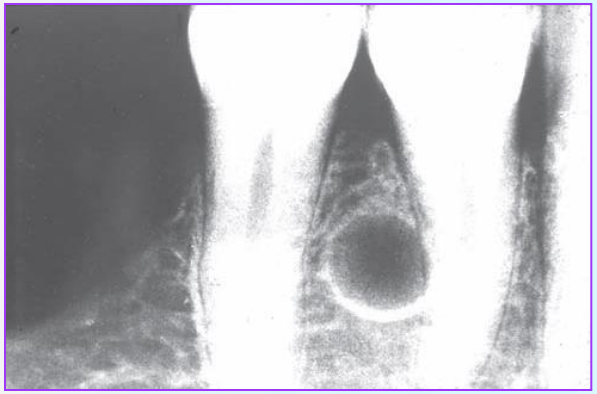
Chloroform - 30 ml

LATERAL PERIODONTAL CYST



Arises from ***dental lamina rests*** that lie within the interradicular crestal or midroot-level bone ; develops between teeth

- Age – 22-85 yrs (mean -50 yrs)
- Equal gender distribution (males slightly ↑)
- Mandibular premolar followed by maxillary premolar region
- May be symptomless
- Associated teeth – vital, nonmobile
- May show root divergence
- No soft tissue swelling
- No root resorption



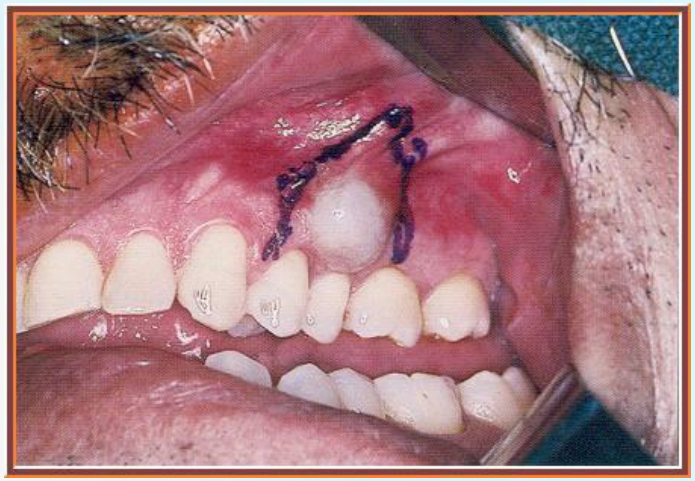
- Radiographs - round or oval well circumscribed radiolucent area, usually with a sclerotic margin.

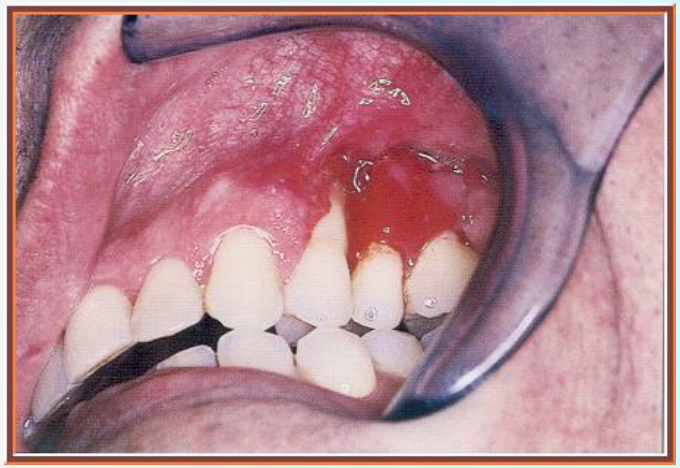
DIFFERENTIAL DIAGNOSIS

- Mental foramen
- Botryoid odontogenic cyst – a variant – differs histologic features, ↑ recurrence
- Odontogenic keratocyst
- Early ameloblastoma
- Idiopathic bone cavities

TREATMENT

- Treated by surgical enucleation- mucoperiosteal flap



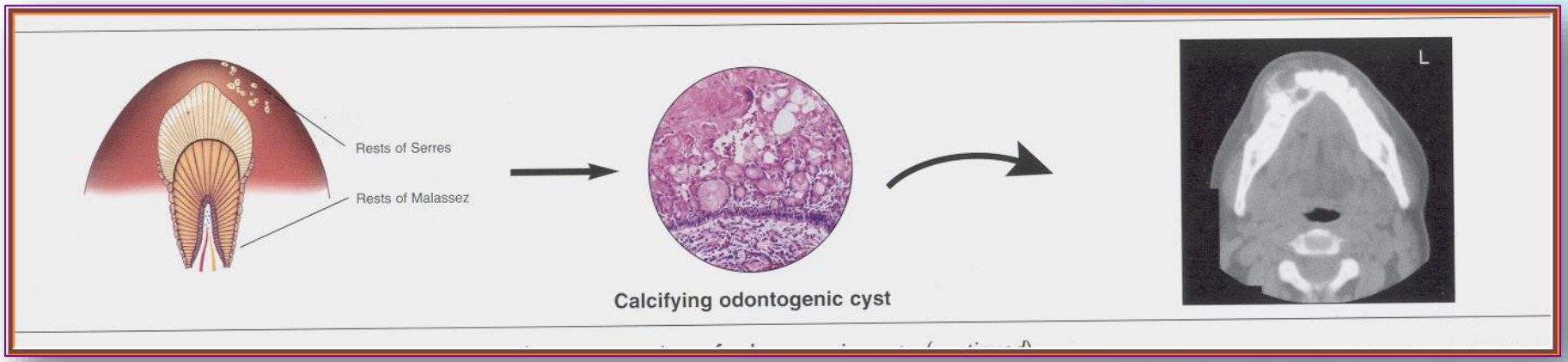


CALCIFYING ODONTOGENIC CYST

- 0.9% of all cysts

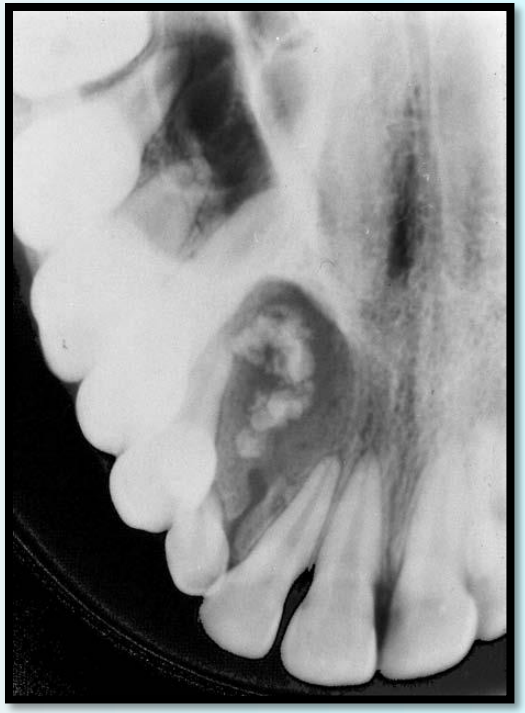
Majid Sanatkhani, Hosein Hoseini Zarch, Atessa Pakfetrat, FarnazFalaki Odontogenic Cysts: a Clinical and Radiographic Study of 58 Cases. Australian Journal of Basic and Applied Sciences, 5(5): 329-333, 2011

- Age – 1-82 yrs (peak : 2nd decade)
- Equal gender distribution
- Maxilla> Mandible (anterior region)
- Swelling present
- Intra-osseous lesions - hard bony expansion
- Extraosseous lesions -pink to red, circumscribed elevated masses measuring up to 4cm in diameter



RADIOLOGICAL FEATURES

- Regular/ irregular outline- ill defined or well demarcated margins
- Irregular calcified bodies of varying size and opacity may be seen in the radiolucent area
- Displacement of teeth
- Resorption of roots

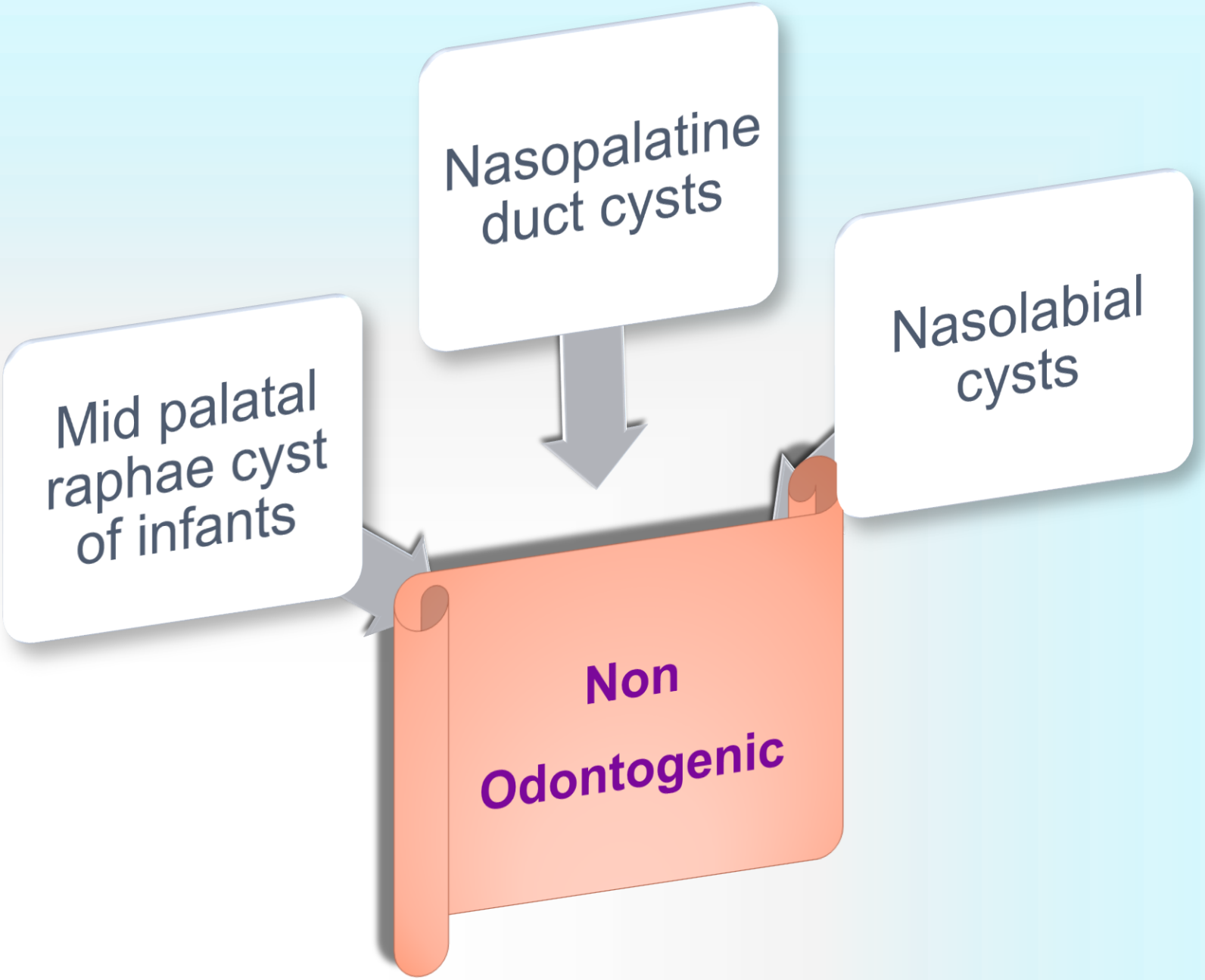


5 Radiologic Signs :-

1. Radiopaque foci- clustered around occlusal or incisal surface of impacted tooth
2. Radiopaque material – clustered towards edge of lesion
3. Radiopaque foci resemble- compound / complex odontome
4. Impacted tooth- not a permanent molar
5. Expanded bone appears perforated

Cyst Type	Site - tooth relationship	Sex M:F	Age Range	Radiographic Features
Radicular periodontal	At apex of non vital tooth	3:2	20-50yrs	Unilocular
Residual cyst	Causative tooth is extracted	Equal	>50yrs	Unilocular
Paradental cyst	Related to inflammed third molar follicle	4:1	20-29	Unilocular over roots of third molar
Dentigerous cyst	Upper 3s and lower 8s	2;1	10-40	Unilocular containing crown of unerupted tooth
OKC parakeratinized	Molar region, impacted tooth	2:1	40+	Multilocular
OKC Orthokeratinized	Molar region	3:2	20-40 to 60+	Unilocular
Calcifying odontogenic cyst	Canine and incisor region	1:3	20-30	Unilocular with calcifications Vital teeth Associated with odontomas

Cysts of Orofacial Region


Nasopalatine duct cysts
Mid palatal raphae cyst of infants
Nasolabial cysts
Non Odontogenic

Midpalatal Raphé Cyst Of Infants

Arise from epithelial inclusions at line of fusion of palatine shelves and nasal processes

Small and white or cream coloured

Rarely seen after 3months of age

Undergo involution and disappear, or rupture through surface epithelium & exfoliate

Nasopalatine duct cyst

Incisive canal cyst

Soft tissue swelling of palatal midline

Smaller cysts - swelling behind maxillary central incisors

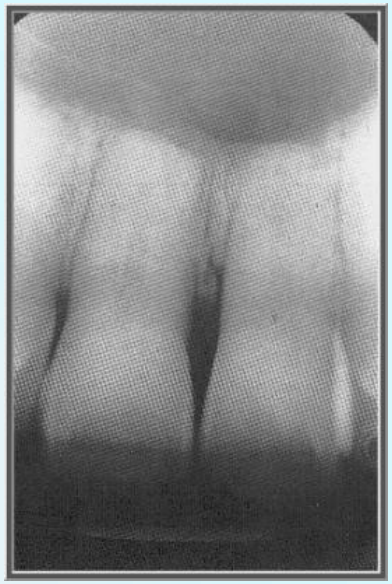
Larger cysts -labial expansion , midpalatal expansion often compressible - palatal bone resorbed beneath mucosa

drainage - salty or unpleasant taste

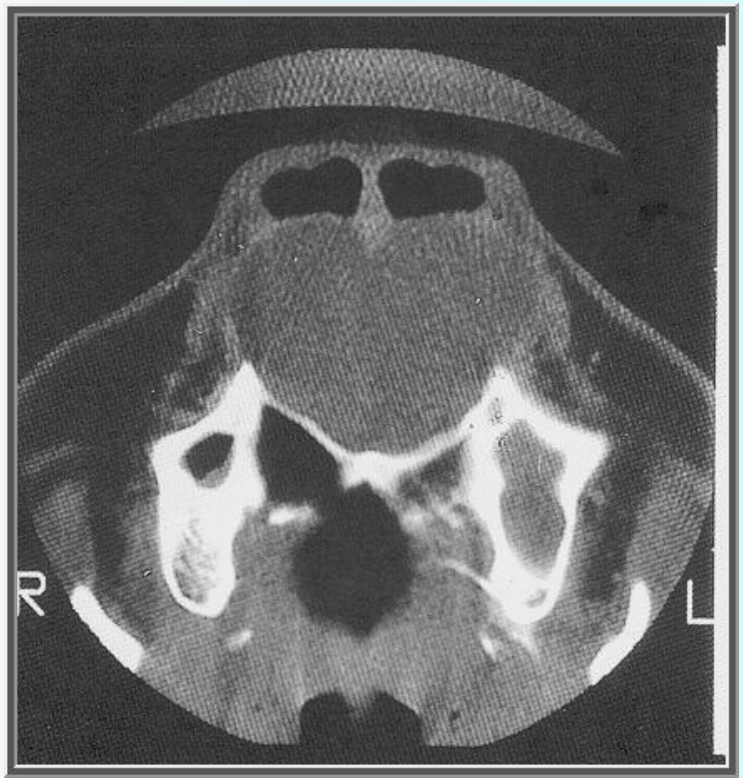
M>F (2:1 ratio)

Age range : 30- 60 years

Radiographic findings



- Large lesions revealing a midline, heart-shaped, unilocular radiolucency
- Create a smooth, regular resorption of incisor roots



Differential diagnosis

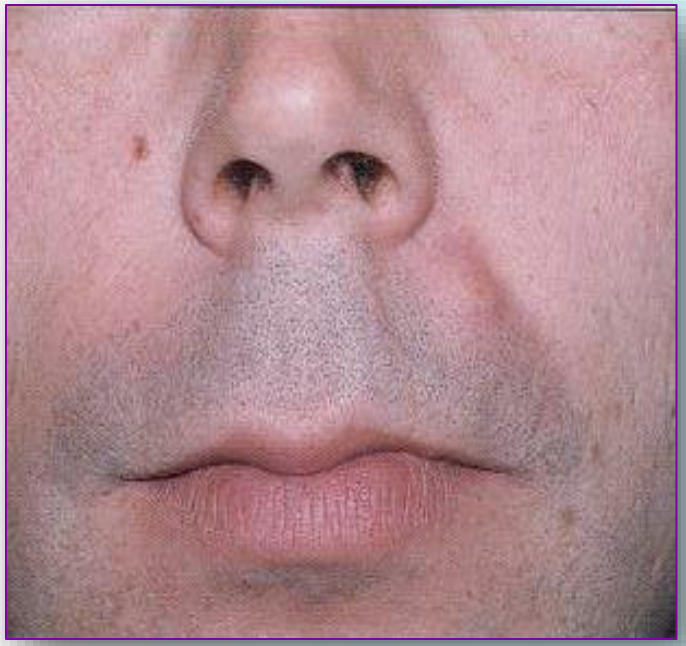
- Periapical granuloma
- Radicular cyst
- Primordial cyst related to supernumerary tooth

Diagnosis & Treatment

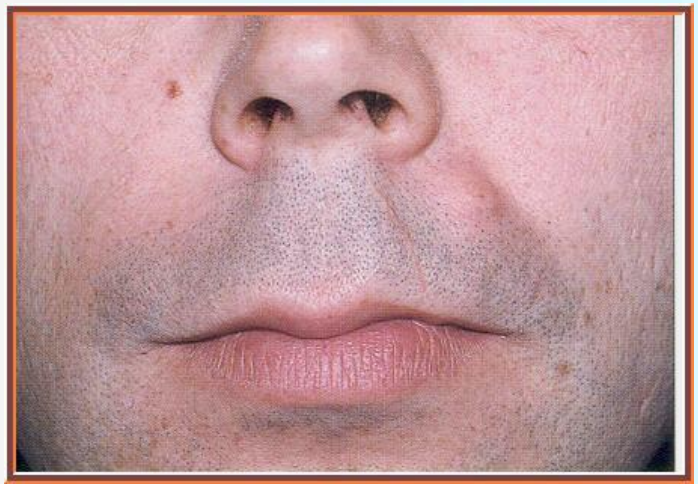
- Pulp testing
- Plain radiographs
- Aspiration provide strong evidence of its cystic nature
- Enucleated from bony cavity and separated from palatal periosteum by direct vision.
- Palatal approach is best

Nasolabial cyst

- Very rare cyst limited to soft tissue
- Because no bone is involved, its former name, nasoalveolar cyst, inappropriate



- Middle-aged adults
- 4:1 predilection for women
- Painless round mass within skin adjacent to ala of nose around uppermost portion of nasolabial crease
- Doughy and sometimes compressible
- Location - subcutaneous & external to facial musculature, may cause oral mucosa to bulge



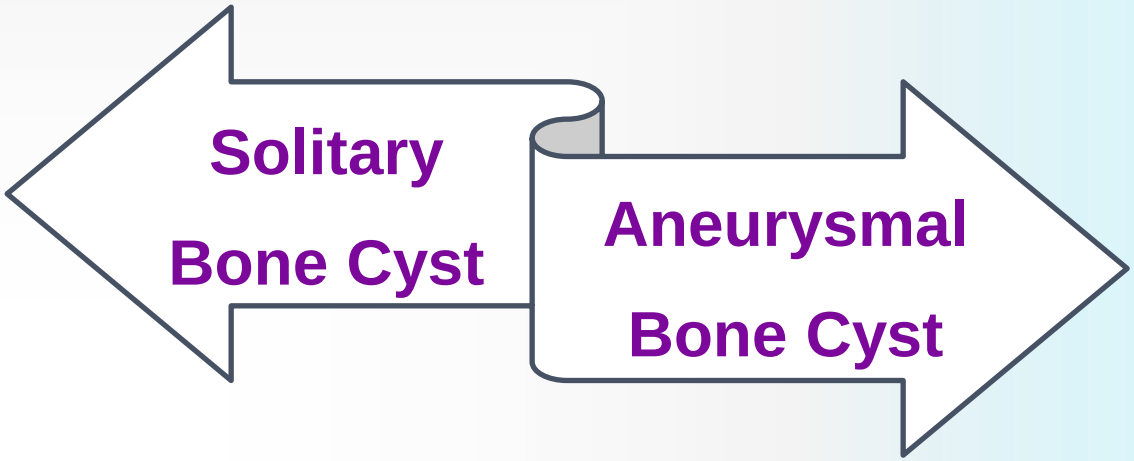
Differential Diagnosis

- Canine space abscess from an odontogenic infection
- Sebaceous cyst or an implanted epidermal inclusion cyst (stratified squamous cells) ; nasolabial cyst (pseudostratified columnar cells)

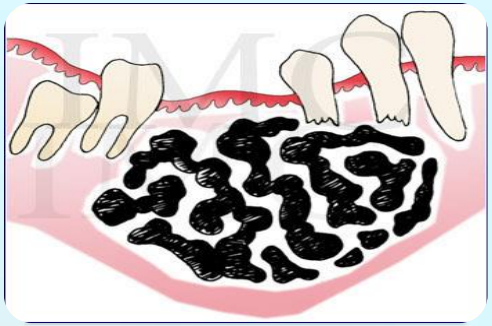
Diagnosis & Treatment

- Pulp testing of maxillary teeth in the affected area - to rule out odontogenic infection
- Surgical pericapsular excision

Non-Epithelial-lined Cysts



Aneurysmal bone cyst



1st - **Jaffe and Lichtenstein (1942)** -characteristic 'blown-out' contour of bone seen in radiographs

1st report involving craniofacial skeleton - **Bernier and Bhaskar (1958)**

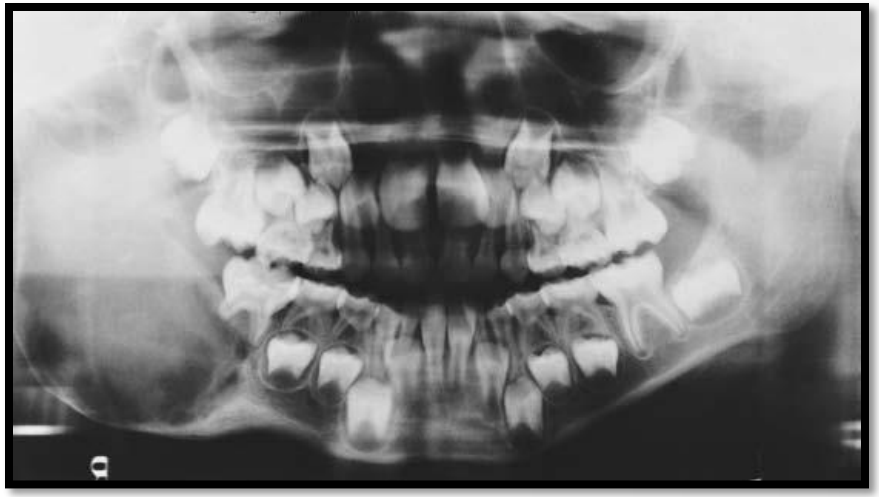
Its cavities or spaces - lined with young fibroblasts rather than epithelium.

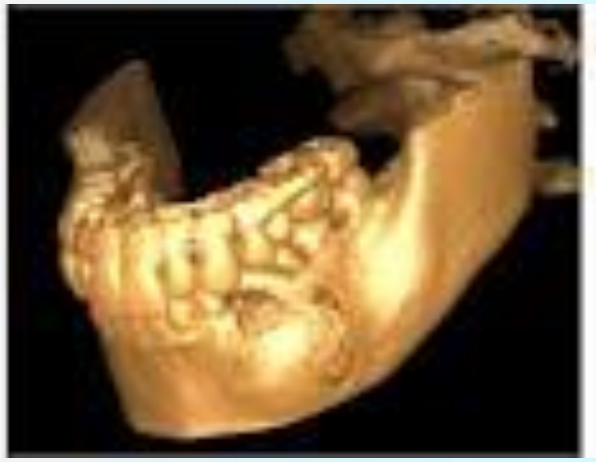
Clinical Features

- Age- 1st 3 decades (peak- 2nd decade)
- Gender- F>M
- Site - mandible - (molar region, ramus) rare- anterior
- Firm swellings – painful
- Relatively rapid – onset
- H/o- recent displacement of teeth – vital
- Lesion perforates cortex , covered by periosteum / only a thin shell of bone - springiness or egg-shell crackling
- Not pulsatile, bruits are not heard

Radiological Features

- '**Ballooning**' growth pattern -radiolucent area - elevation of periosteum ➔ ovoid or fusiform expansion of bone with the typical 'blown-out' cortical expansion
- Unilocular
- Longer-standing lesions -'soap-bubble' appearance
- May become progressively calcified (Kransdorf and Sweet, 1995).





ballooning expansion of the cortex

Treatment

- Curettage
- 19% recurrence rate


Thank You!
Blingee