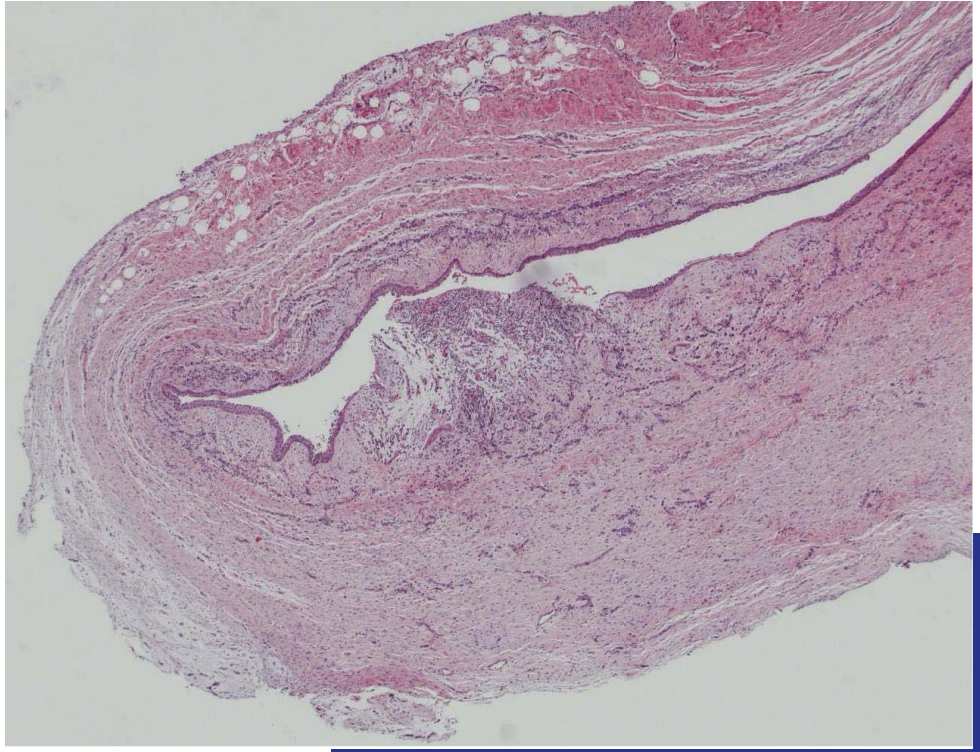


THE UNIVERSITY OF WESTERN AUSTRALIA

Oral Pathology module

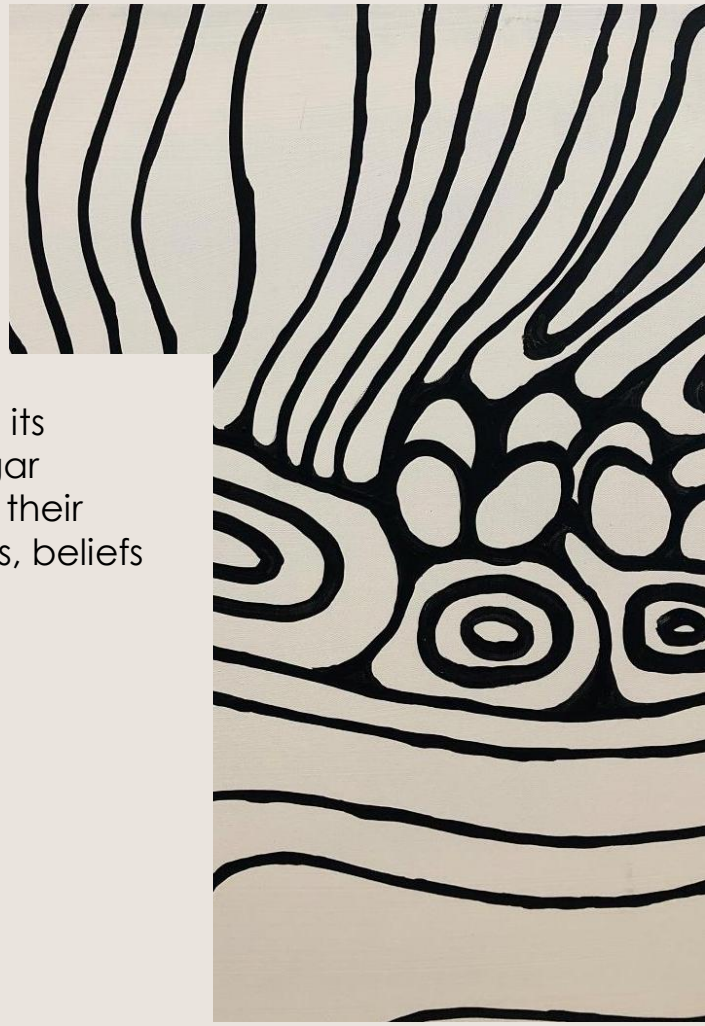
Odontogenic and non-odontogenic cysts

A/Prof Omar Kujan

BDS DipOPath MDSc MFDS RCPS FHEA FRCPath FFOMP(RCPA) PhD

Acknowledgement of country

The University of Western Australia acknowledges that its campus is situated on Noongar land, and that Noongar people remain the spiritual and cultural custodians of their land, and continue to practise their values, languages, beliefs and knowledge.



Artist: Dr Richard Barry Walley OAM

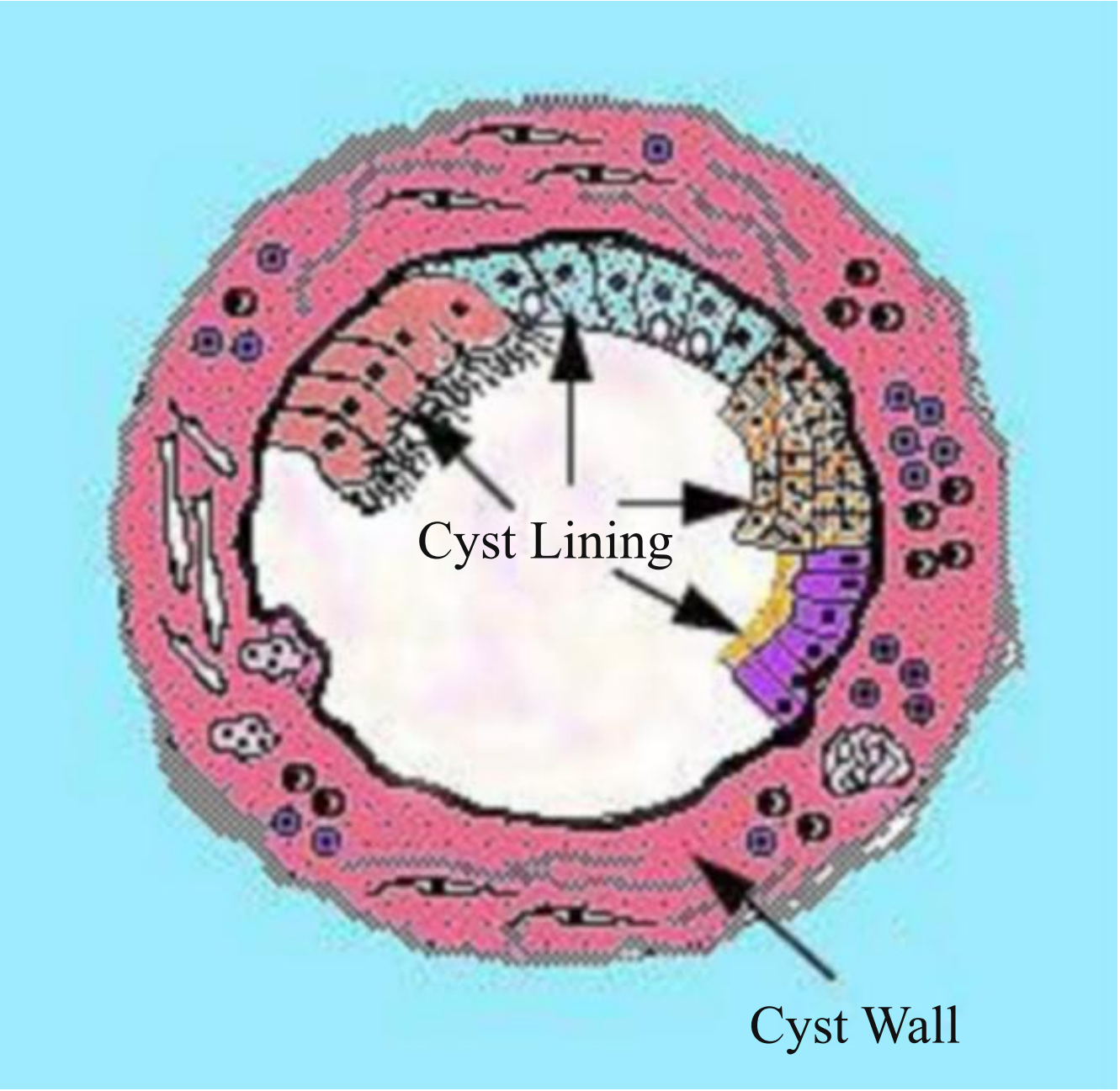
Learning outcomes

1. Describe the different entities of odontogenic and non-odontogenic cysts
2. Outline the pathology features of common odontogenic and non-odontogenic cysts

Definition

A cyst is a pathological cavity filled with fluid, semi-fluid or gaseous contents and is not created by an accumulation of pus.

Kramer 1974.


Cyst Lining
Cyst Wall

Aetiology and pathogenesis

- Epithelial proliferation
- Hydrostatic or osmotic factors
- Keratin formation
- Bone resorbing factors (prostaglandins, collagenase)

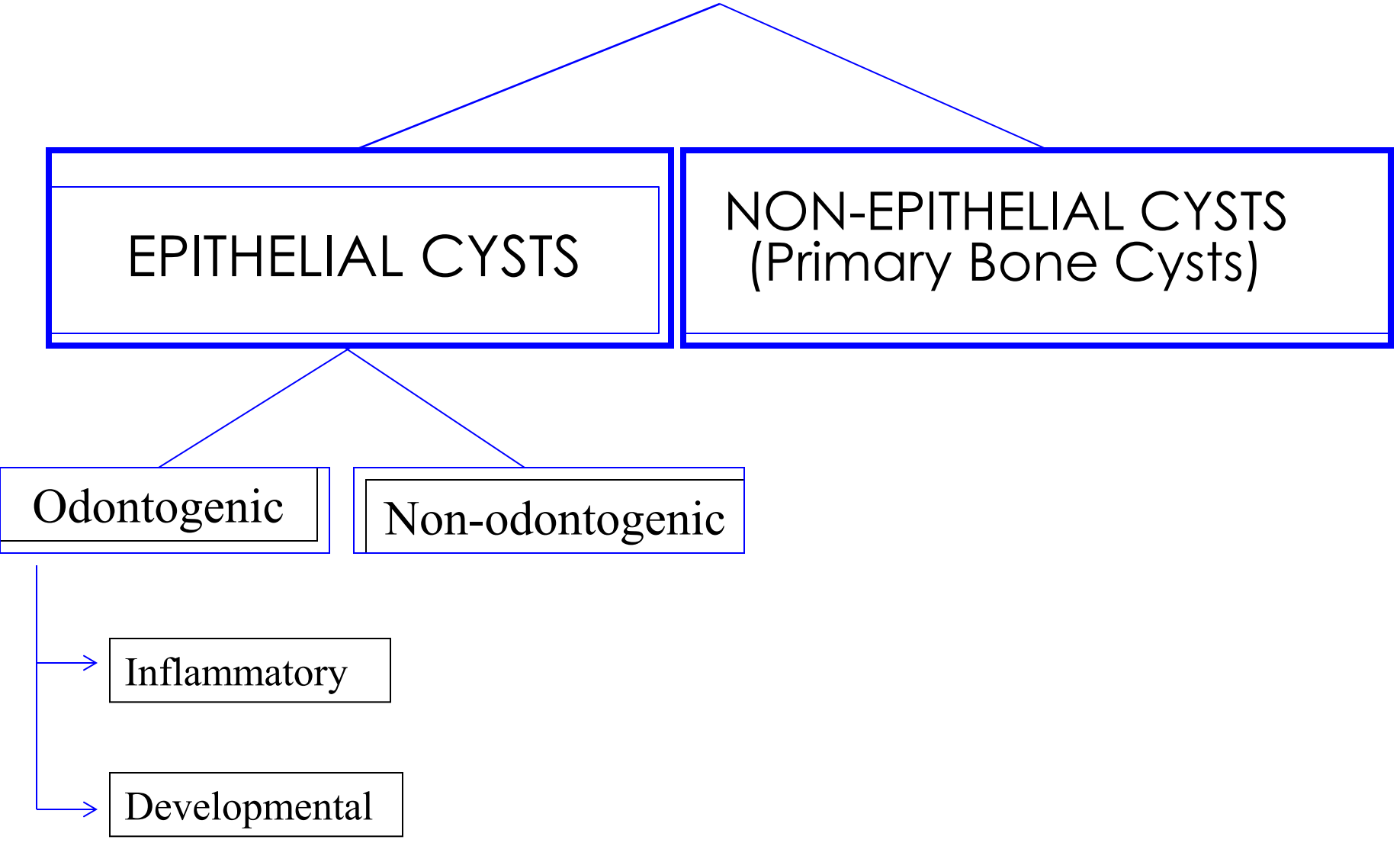
Clinical features

- Noticeable swelling
- Discharge into the mouth
- Pain due to secondary infection

Diagnosis

- Combination of adequate history, clinical examination and selected investigation (radiographs)

CLASSIFICATION
Cysts of the jaws



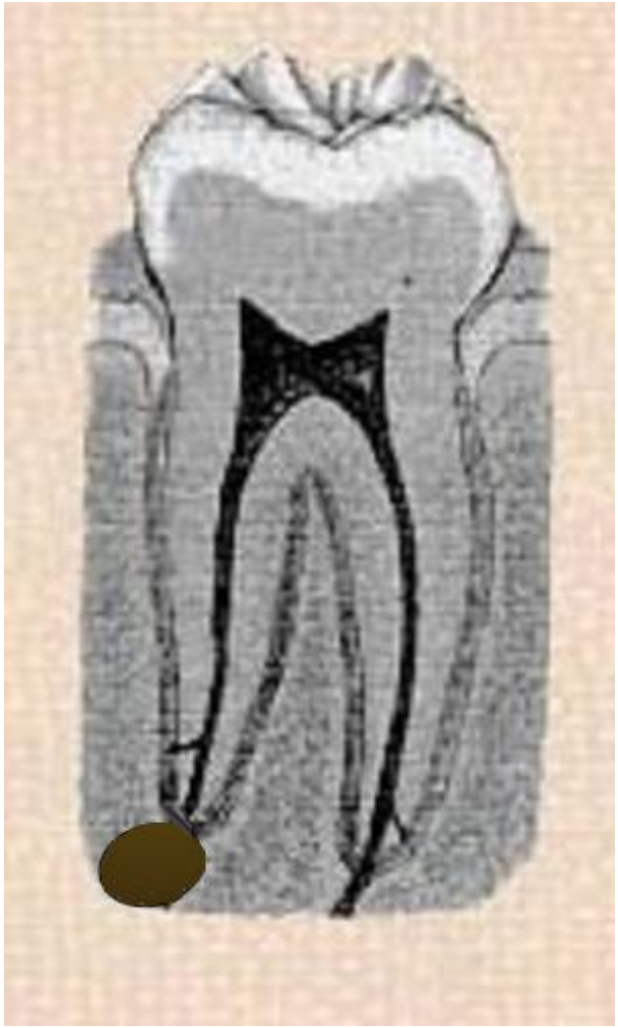
Inflammatory Odontogenic Cysts

- Radicular (dental) cyst
  - periapical
  - lateral
  - residual
- Paradental cyst

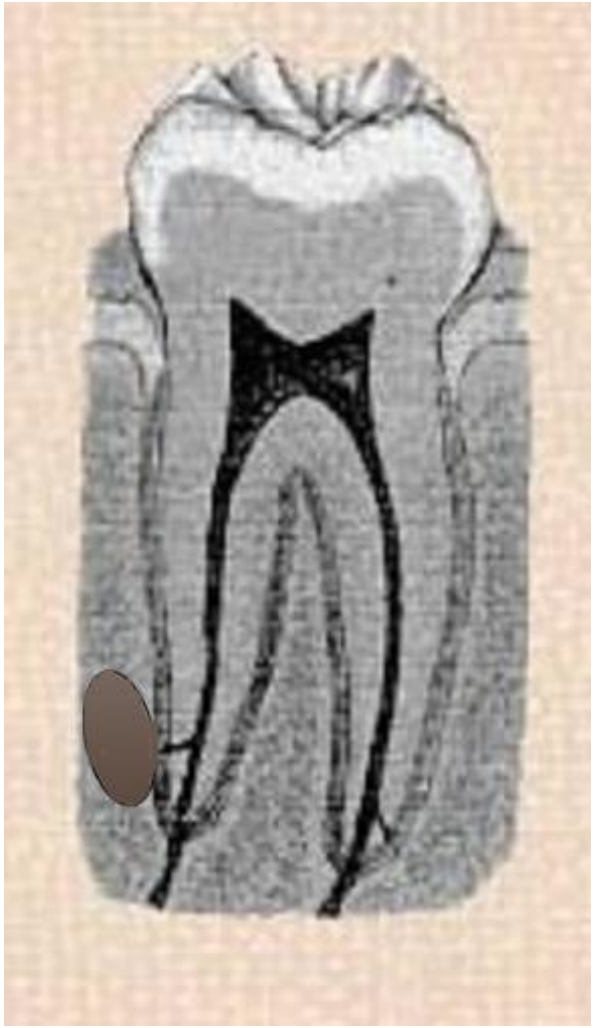
RADICULAR CYSTS
Clinical Features

- 60-75% of all jaw cysts (Most Common)
- Peak in 4th and 5th decades
- Non-vital tooth
- Upper lateral incisor - most common tooth
- Rare in deciduous teeth
- Asymptomatic or expansion → springy → egg-shell crackling → fluctuation
- Infection → pain

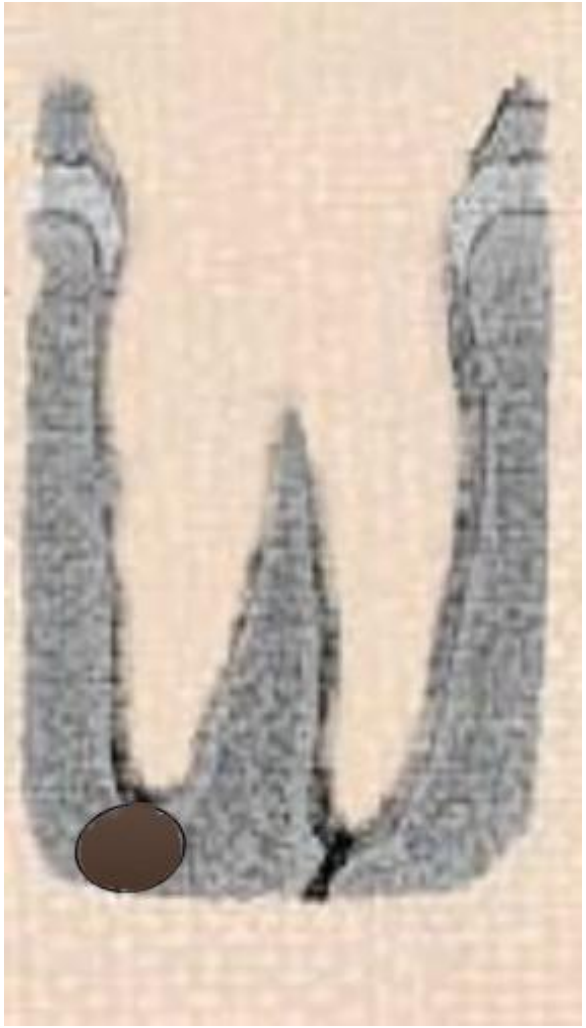
Radicular Cyst



Apical



Lateral



Residual

Radicular Cyst

Radicular cyst

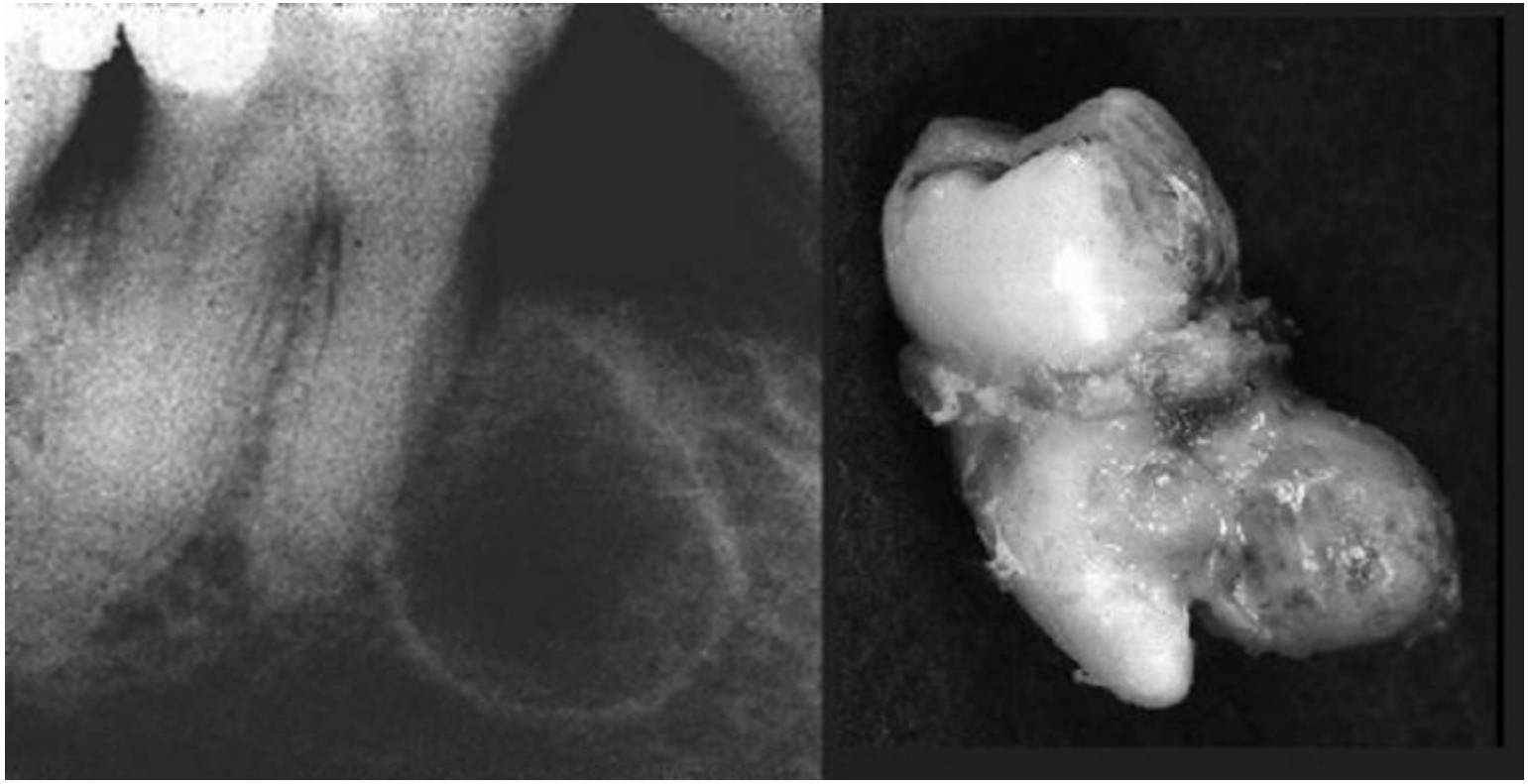
Shape: Monolocular

Outline: Well defined

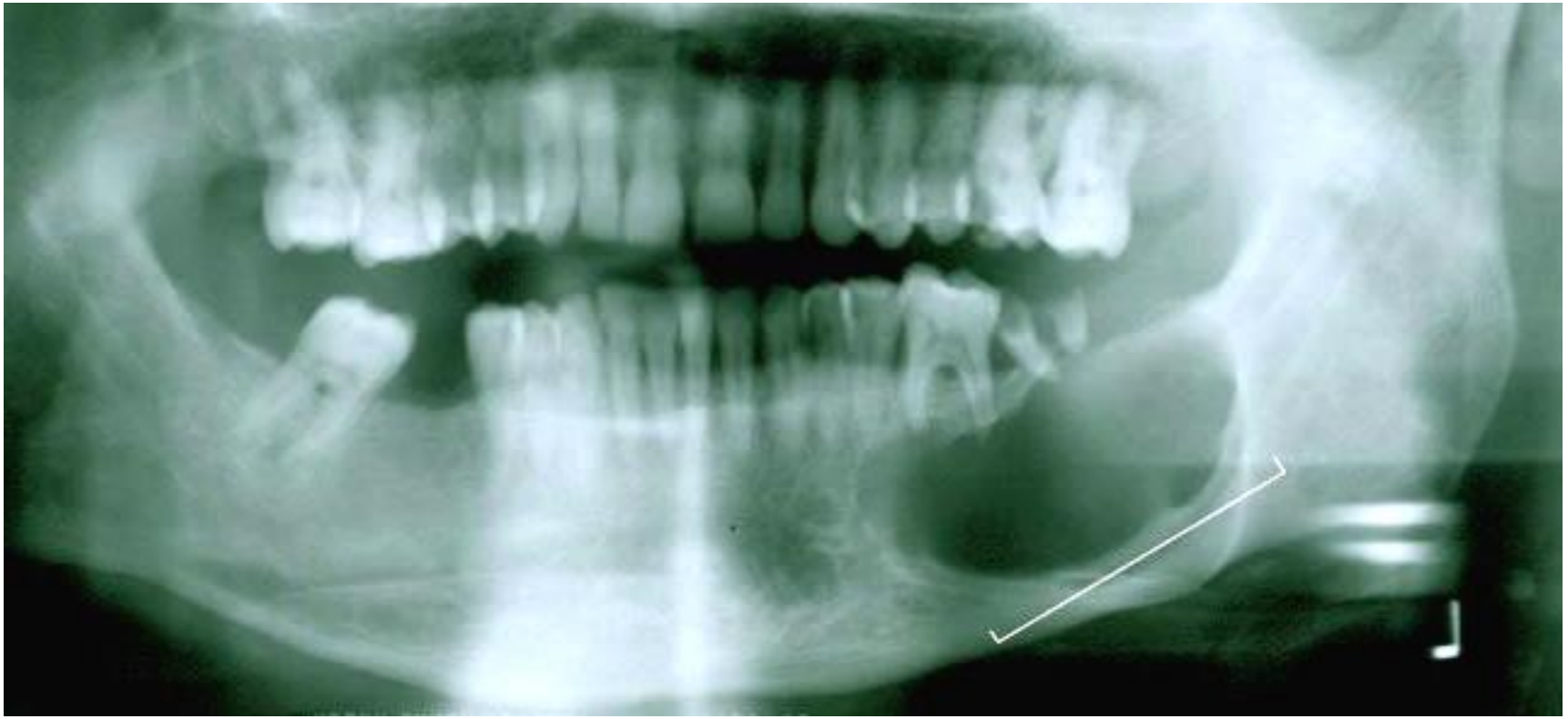
Well corticated

Radiodensity: Uniformly radioucent

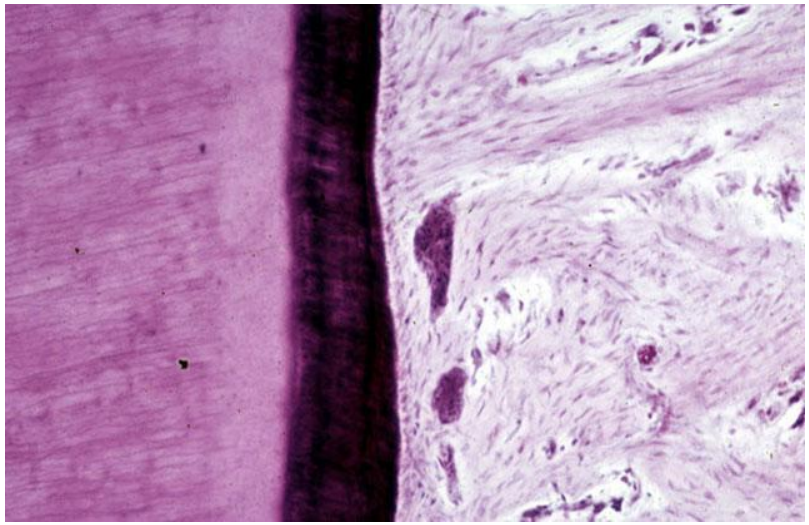
Radicular Cyst

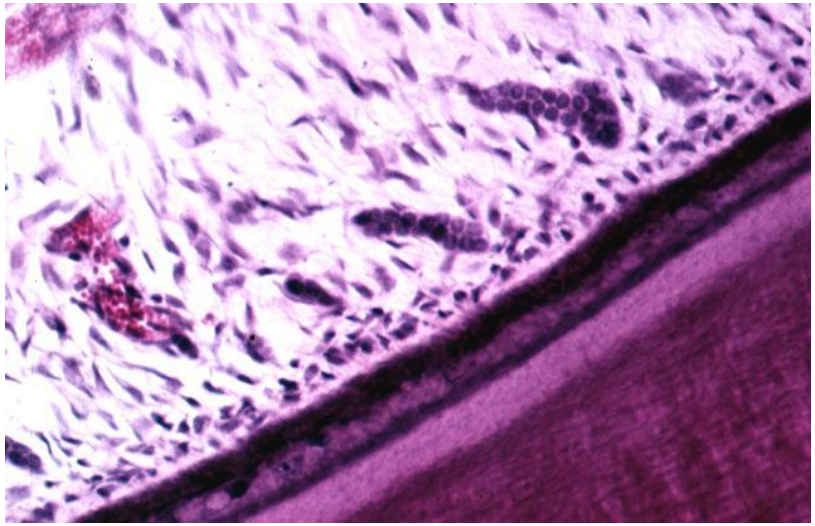


Radicular Cyst



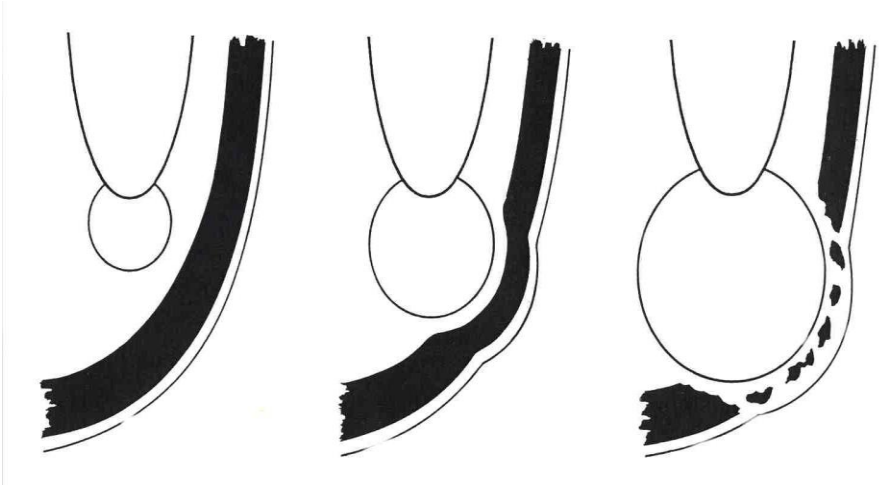
RADICULAR CYST
Pathogenesis





- INITIATION
  - Cell rest of Malassez activated
  - Activated by products of necrotic pulp
- CYST FORMATION
  - Degeneration and death of central cells leads to cavitation

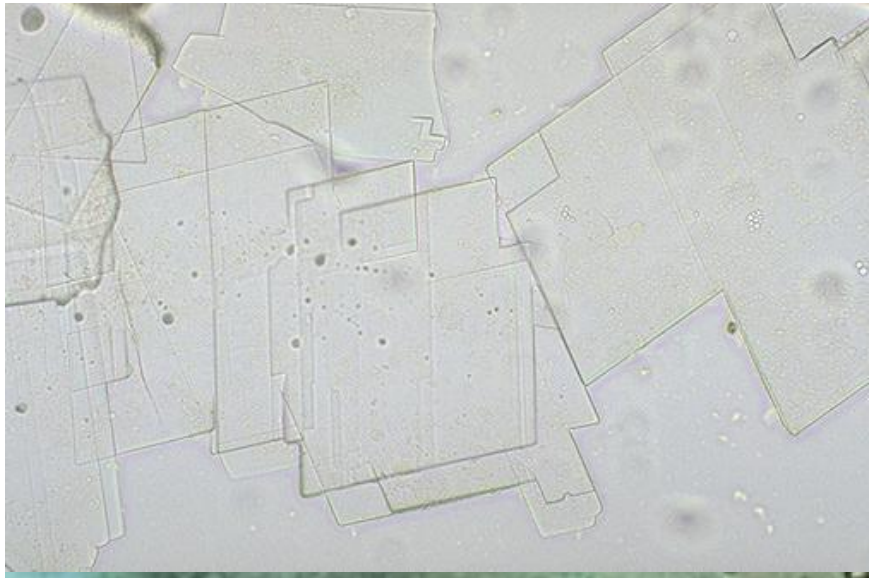
RADICULAR CYST
Pathogenesis

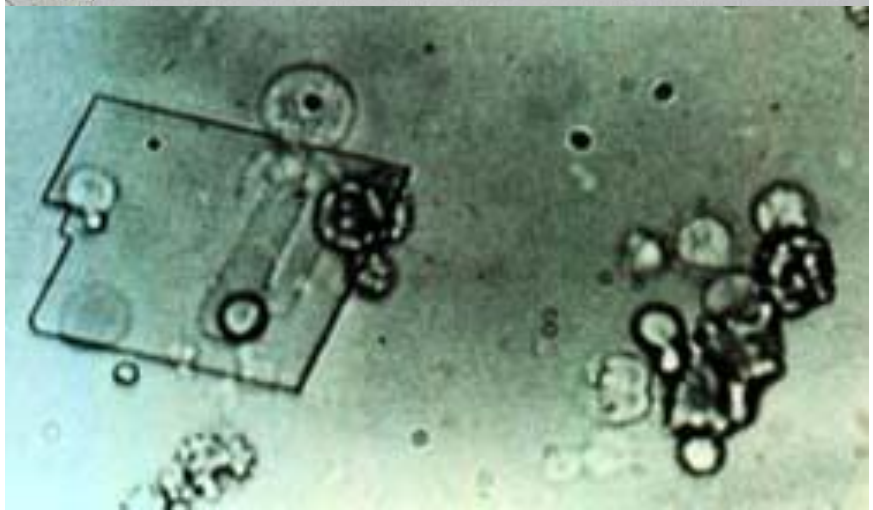


- CYST ENLARGEMENT
  - increased osmolality due to breakdown products becoming smaller and more osmotically active
  - wall acts as semi-permeable membrane

RADICULAR CYST
Cysts Contents

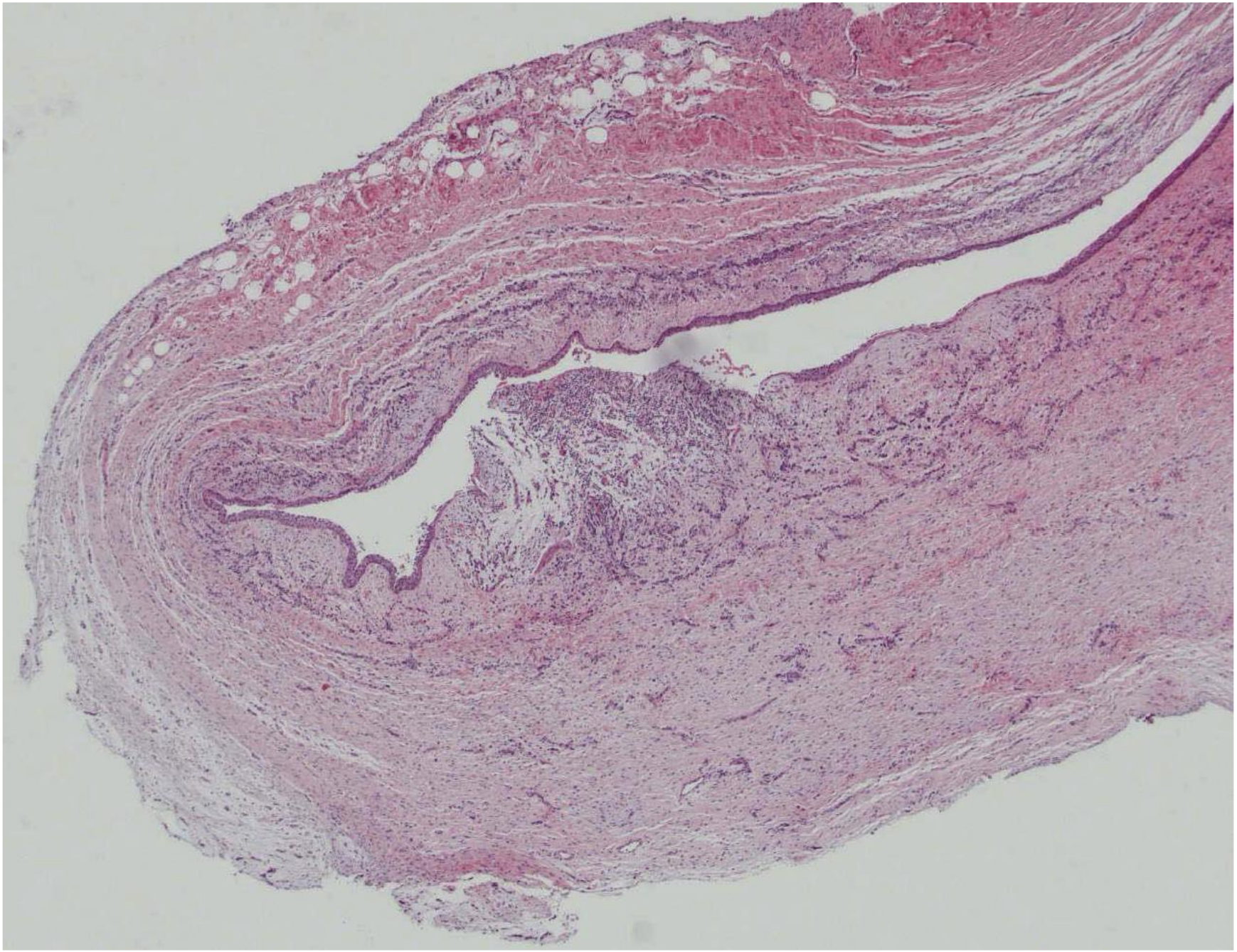
- Breakdown products of cells
- Serum proteins
- Water and electrolytes
- Cholesterol crystals

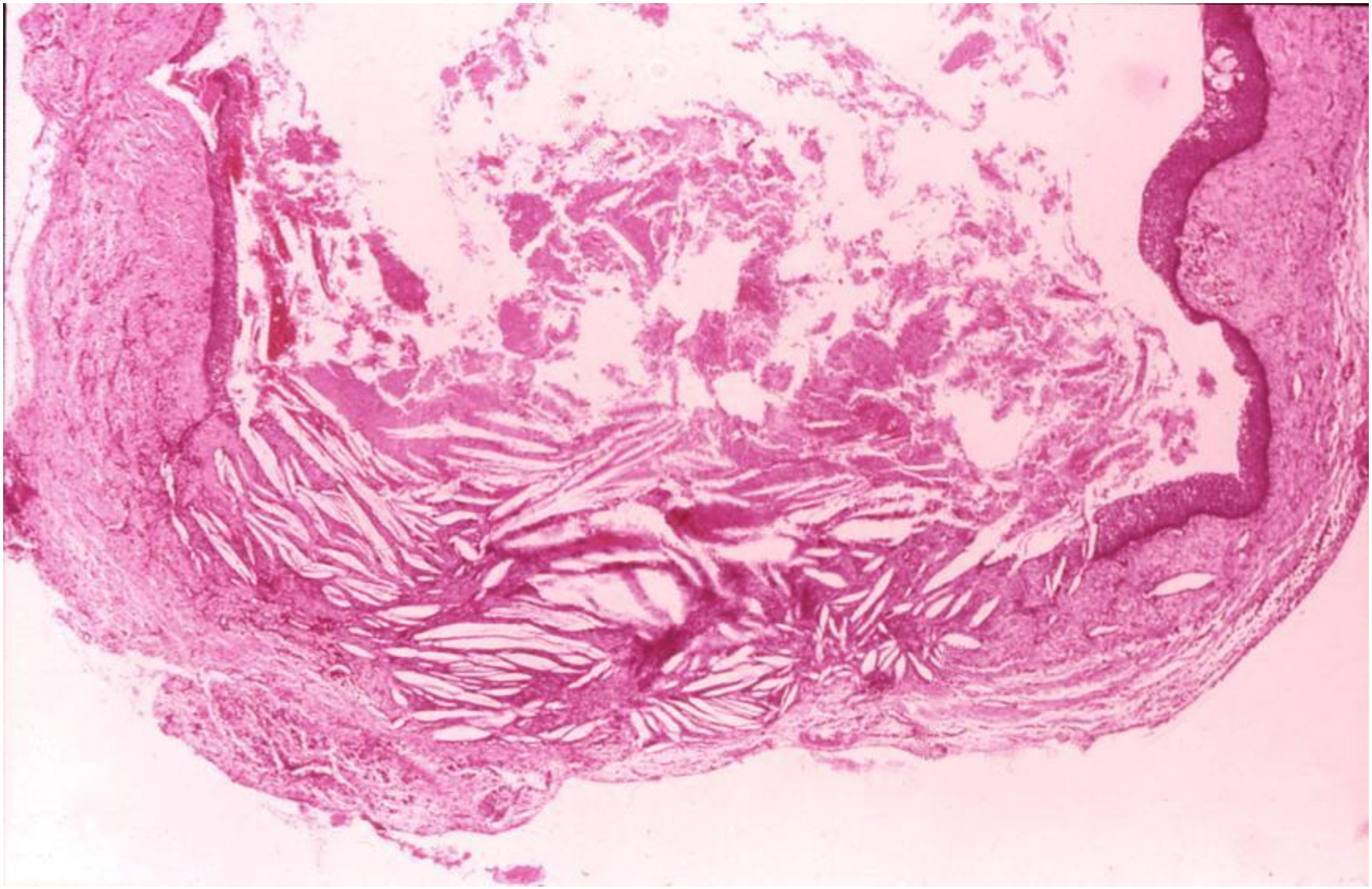


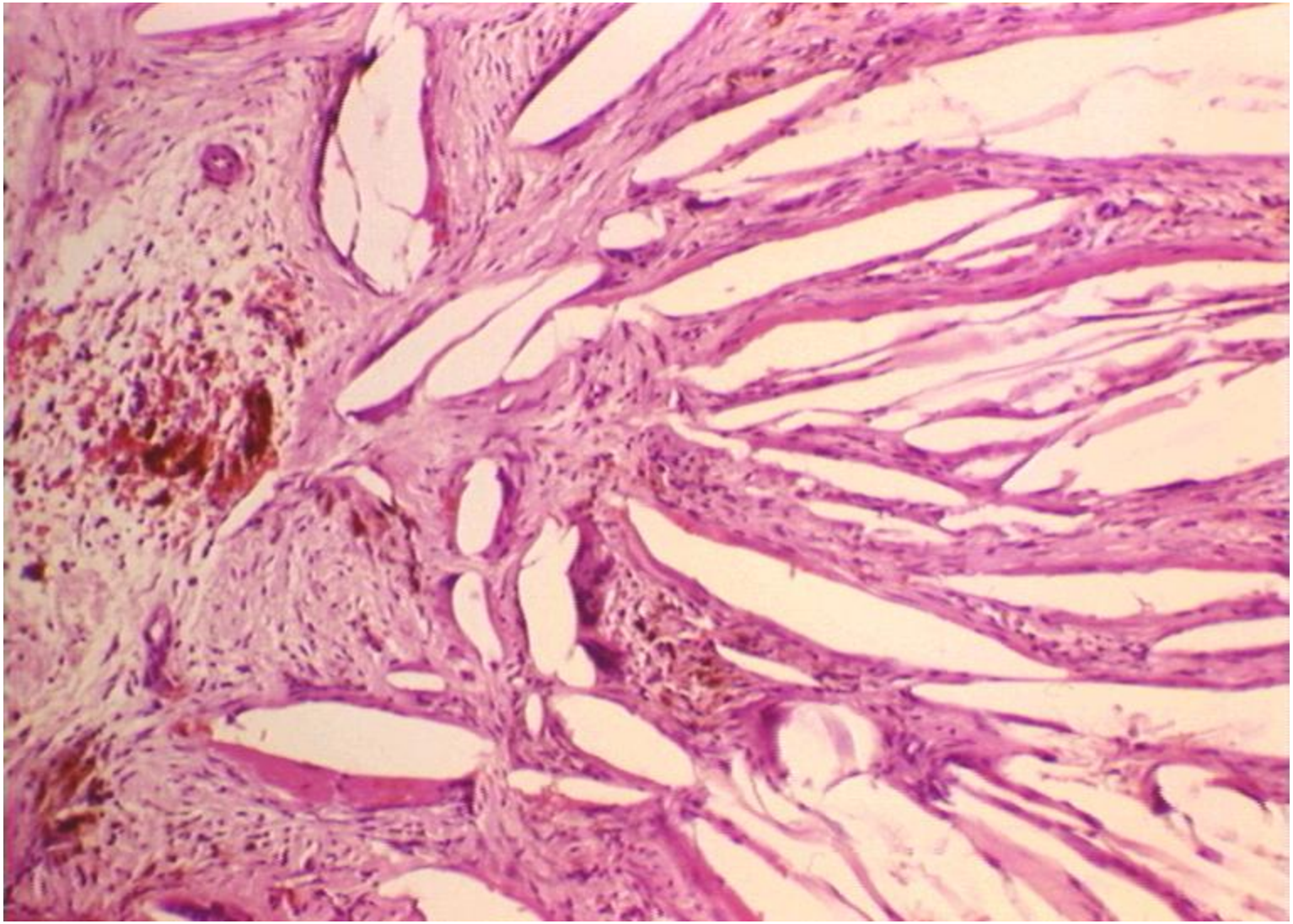


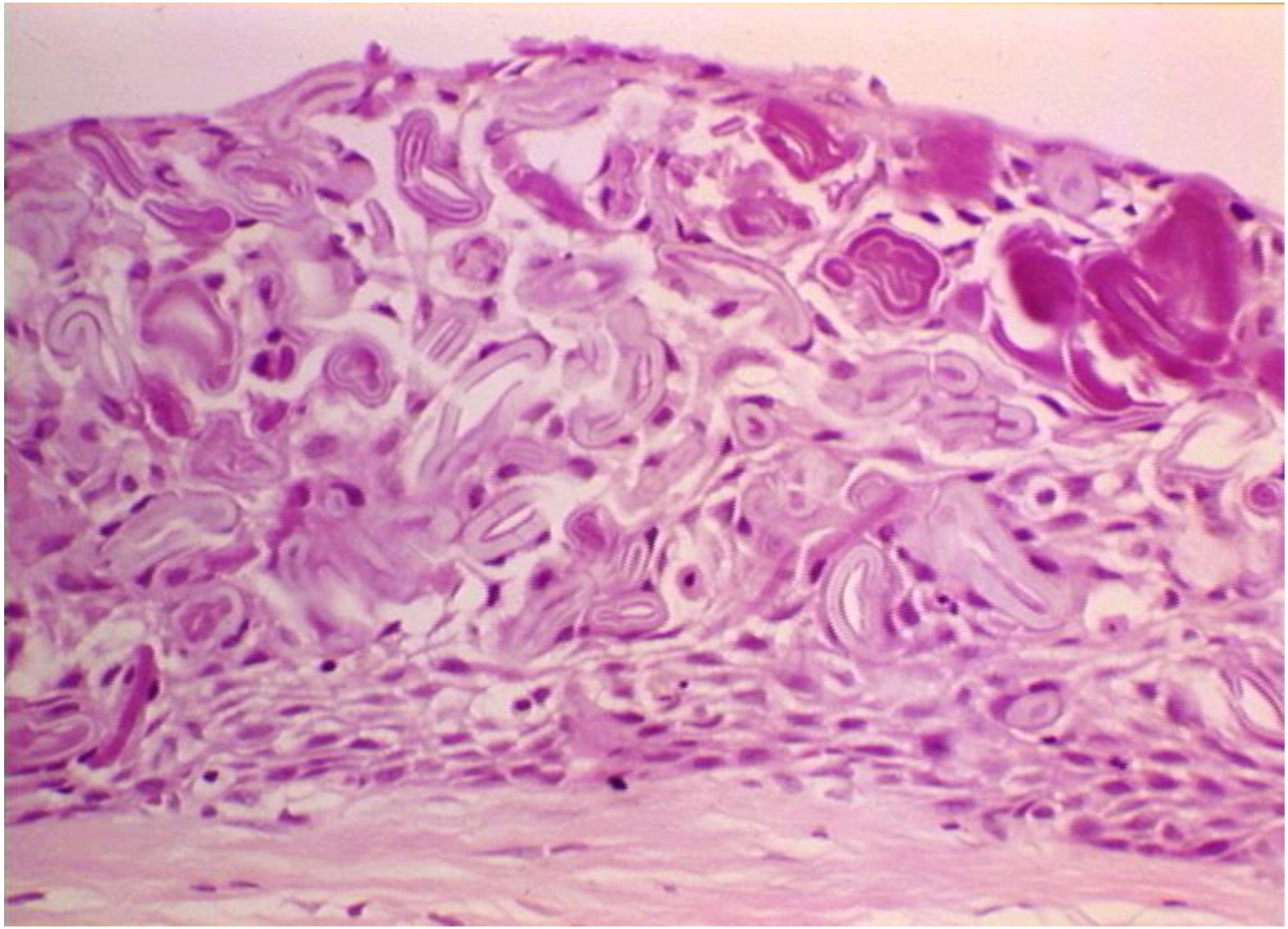
RADICULAR CYST
Histopathology

- Periapical granuloma with epithelial proliferation - polymorphs in epithelium
- Cyst lined by irregular, non-keratinised stratified squamous epithelium
- Foam cells, lymphocytes, plasma cells, cholesterol clefts, surrounding fibrosis
- Lining becomes thinner and less inflamed
- 10% contain hyaline (Rushton) bodies



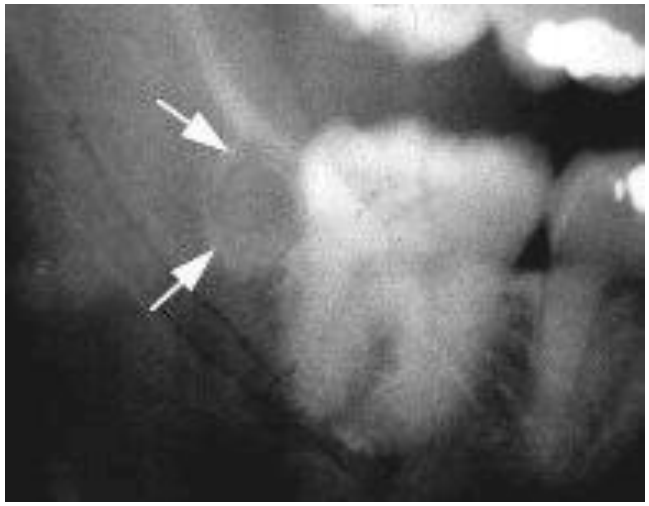


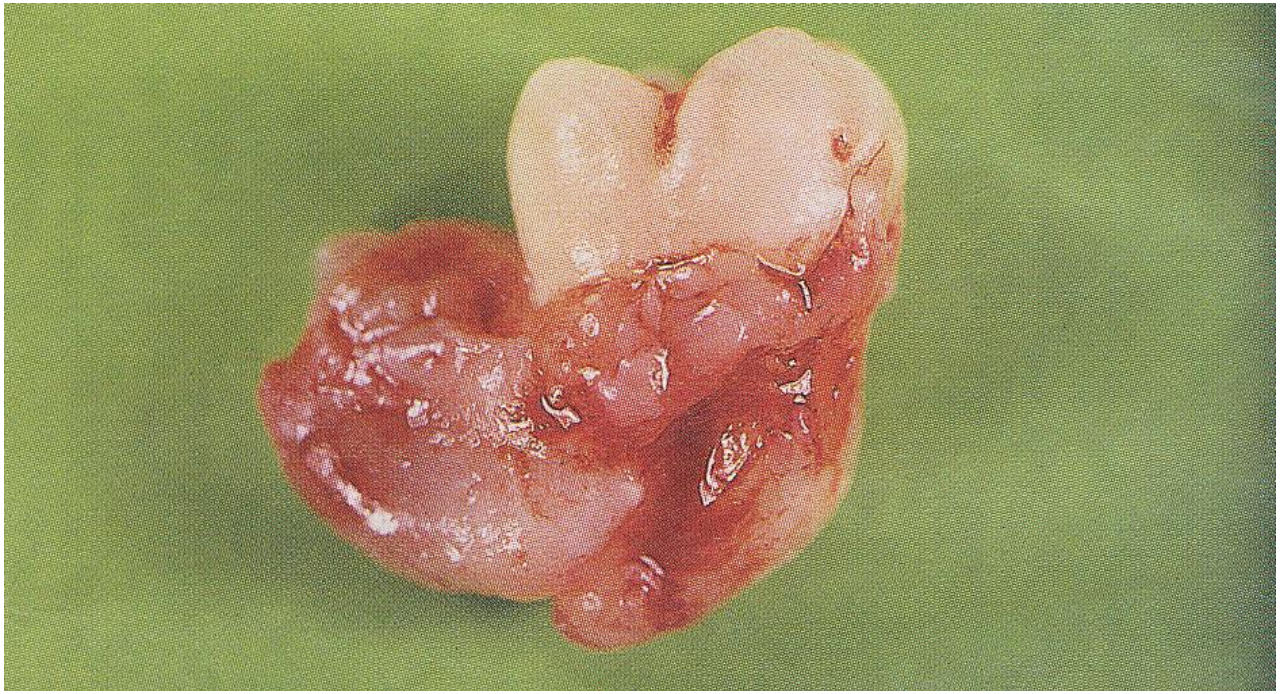




PARADENTAL CYST

- Partially erupted lower 3rd molar usually with pericoronitis
- Buccal/Disto-buccal aspect
- Enamel spur from bucco-cervical margin of root furcation
- Histologically resembles radicular cyst
- Derived from reduced enamel epithelium

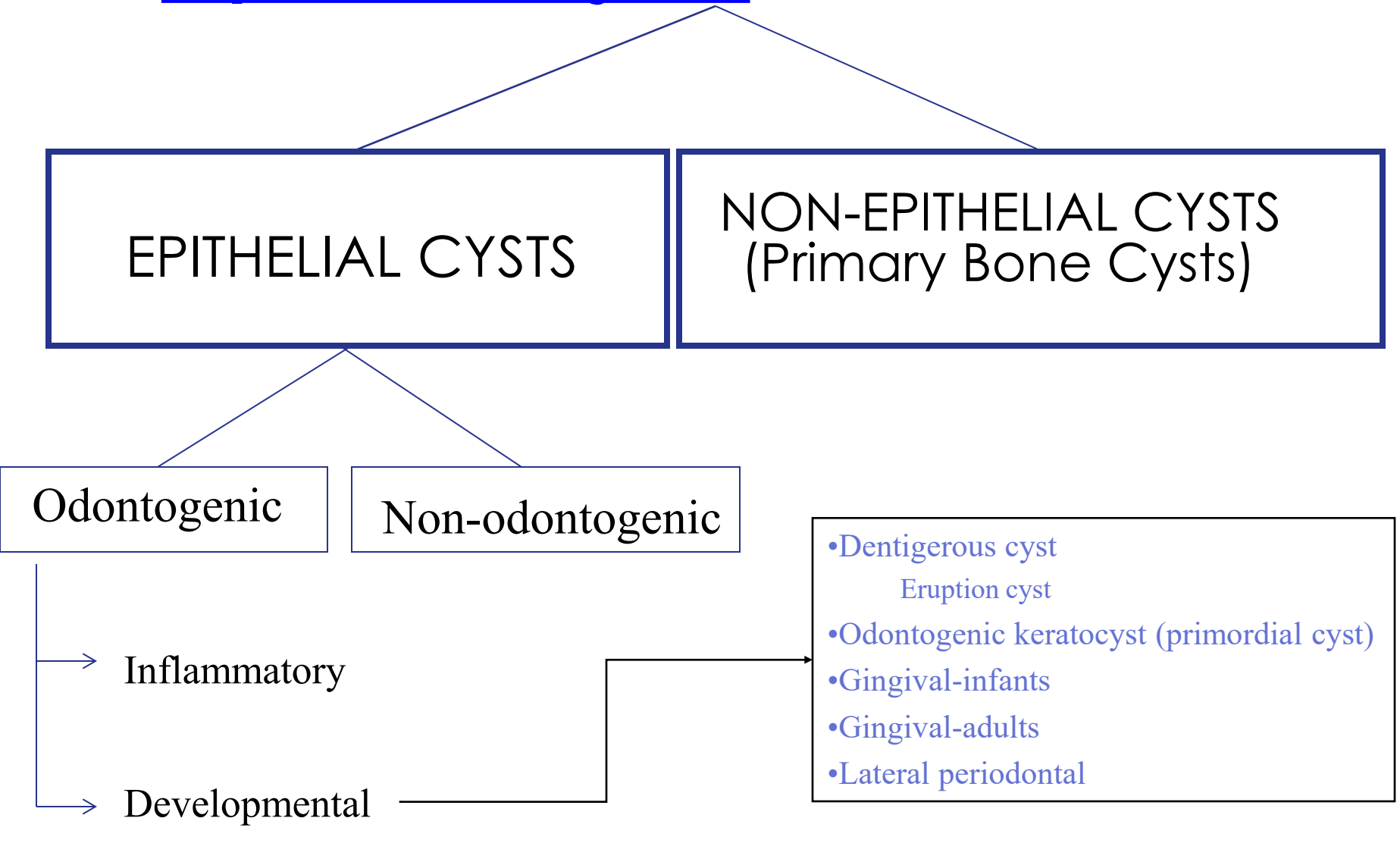




Paradental Cyst

CLASSIFICATION

Cysts of the jaws



DENTIGEROUS CYST

- Cyst enclosing crown of an unerupted tooth
- Attached to cemento-enamel junction
- Follicular cyst

PATHOGENESIS

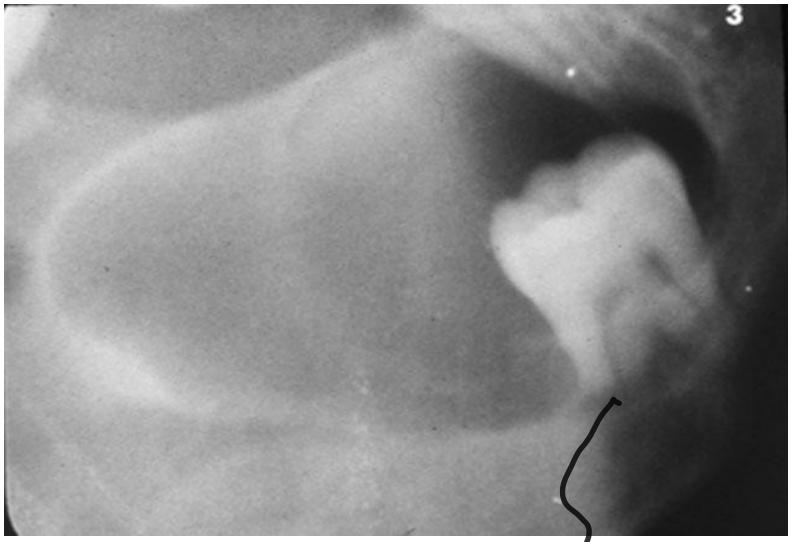
- Intrafollicular fluid accumulates between REE and enamel

- Pressure of tooth on impacted follicle
  - Obstruction of venous outflow
  - Serum transudation
  - Exudation

CLINICAL FEATURES

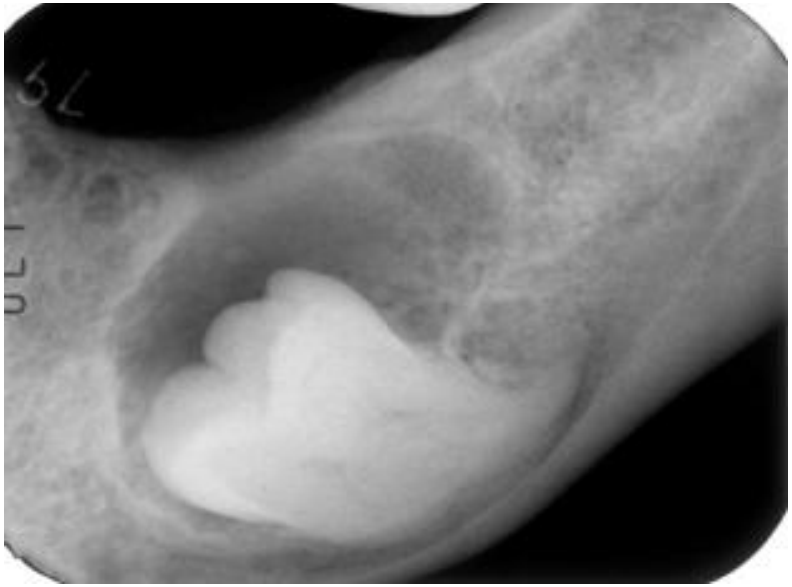
- 10-15% of cyst
- Children and young adults
- Permanent teeth
- Upper canine and lower 3rd molar – teeth likely to be impacted
- M:F 1.6:1
- Painless enlargement – missing tooth
- Tilting of tooth
- Root resorption

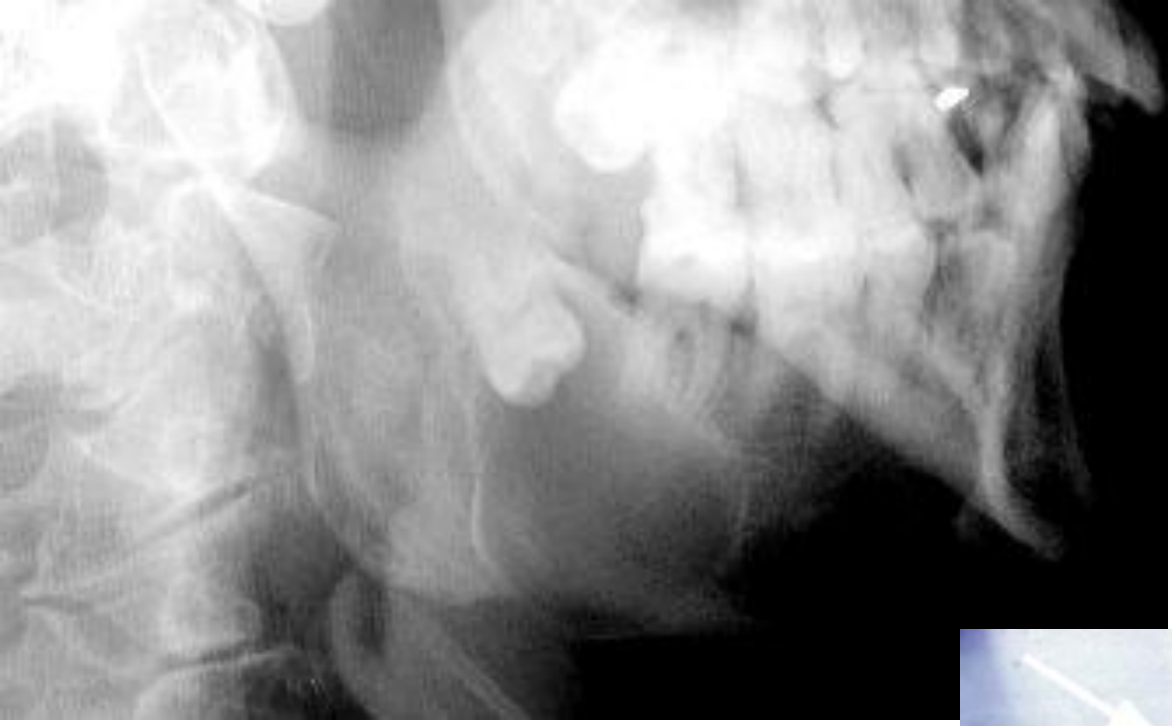
Dentigerous cyst

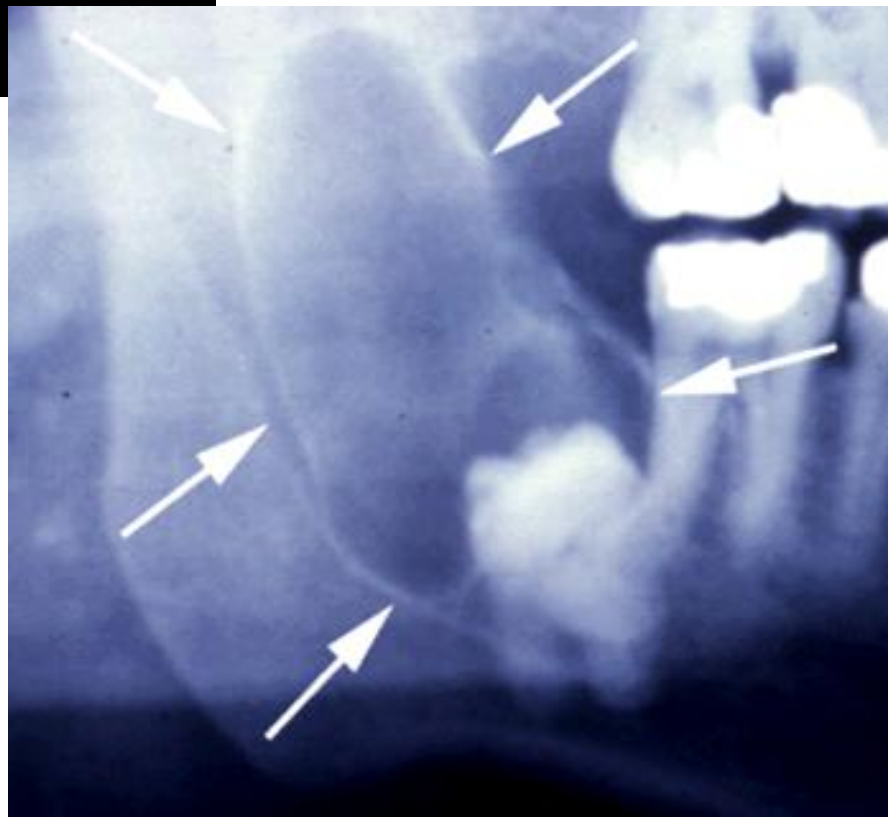


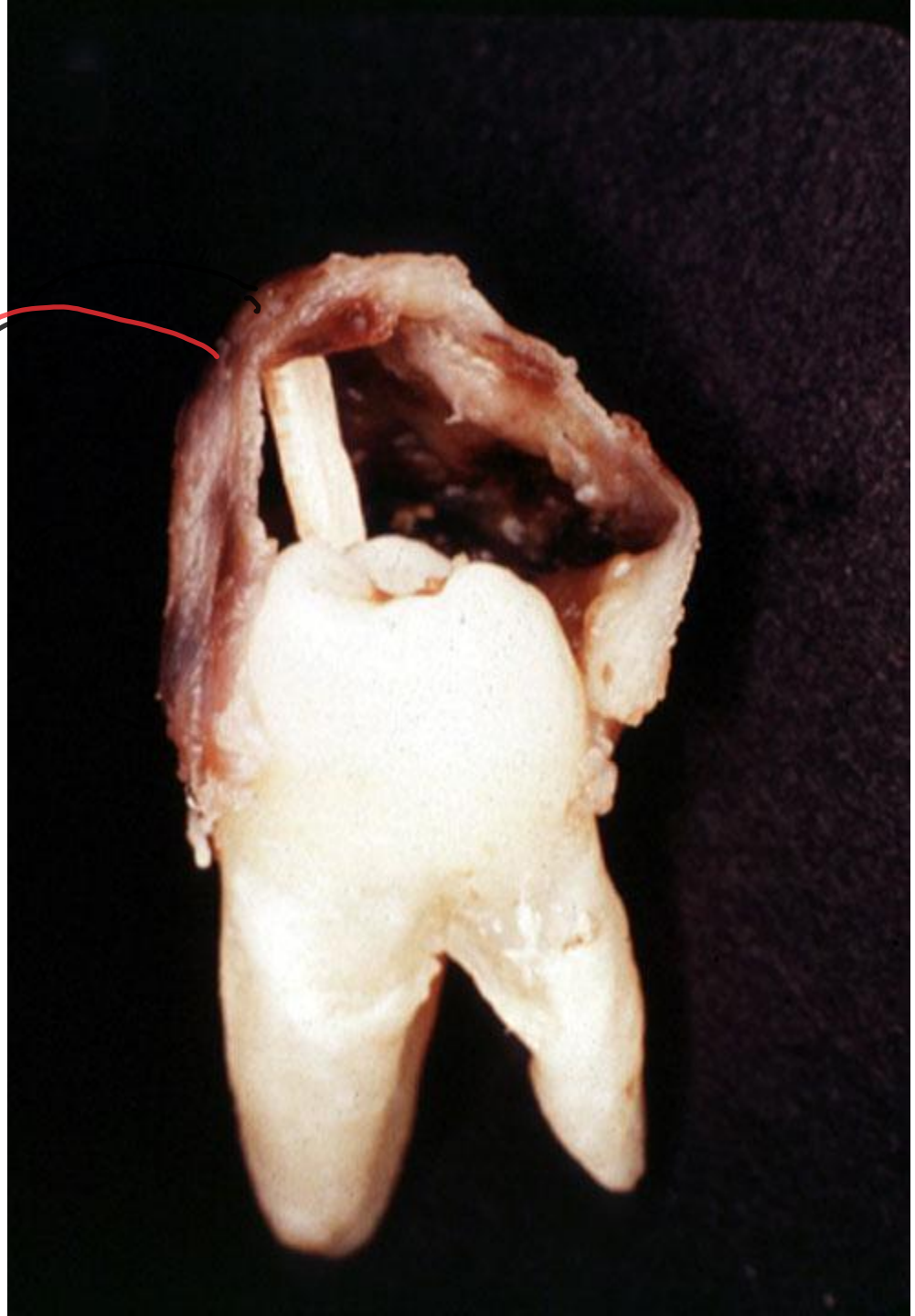
↳ Monolocular

Lower &



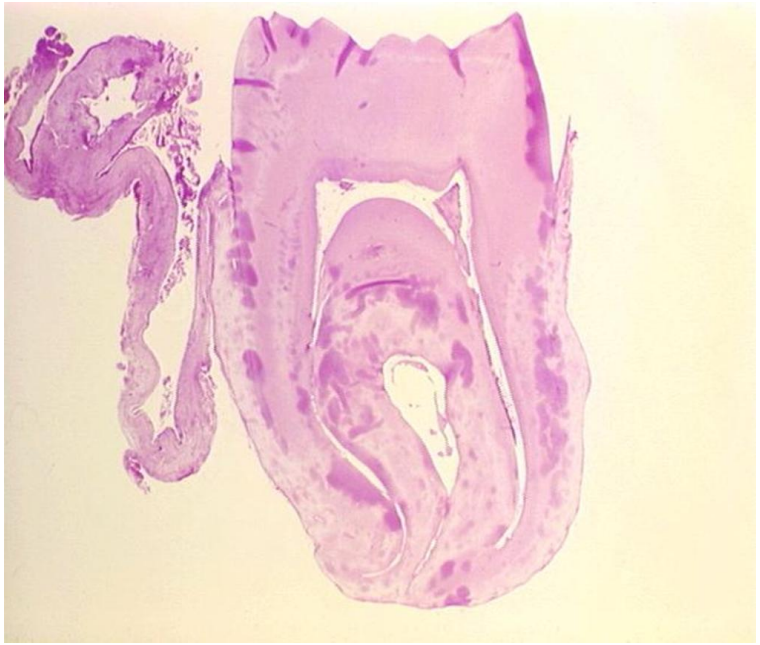


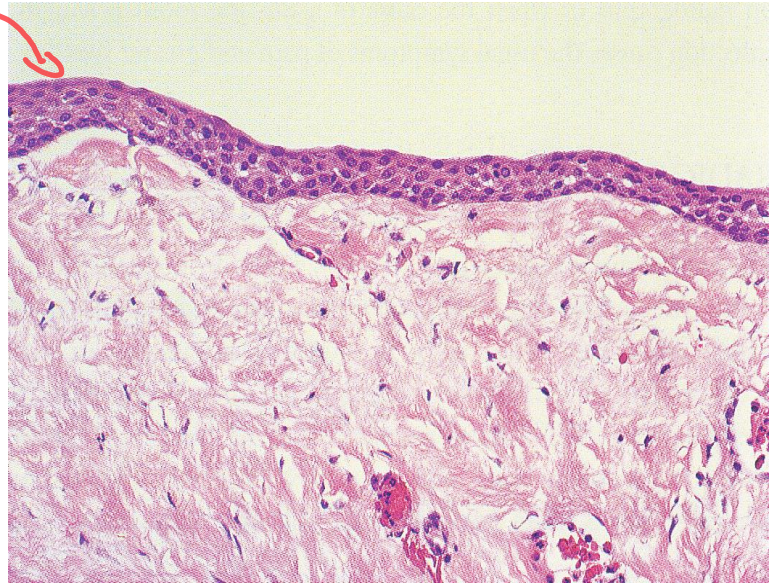



Cyst wall
LI ATTACHED
TO CEJ

PATHOLOGY

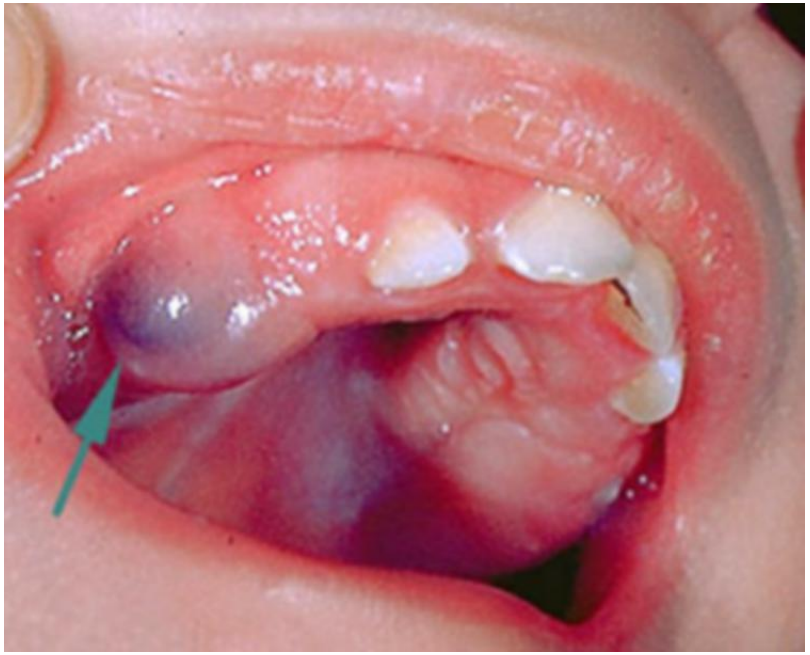
- Clear yellow fluid – cholesterol
- Purulent if infected
- Lined by flattened, non-keratinised stratified squamous epithelium
- Continuous with reduced enamel epithelium
- Mucous and ciliated columnar metaplasia
- Fibrous wall with variable inflammation

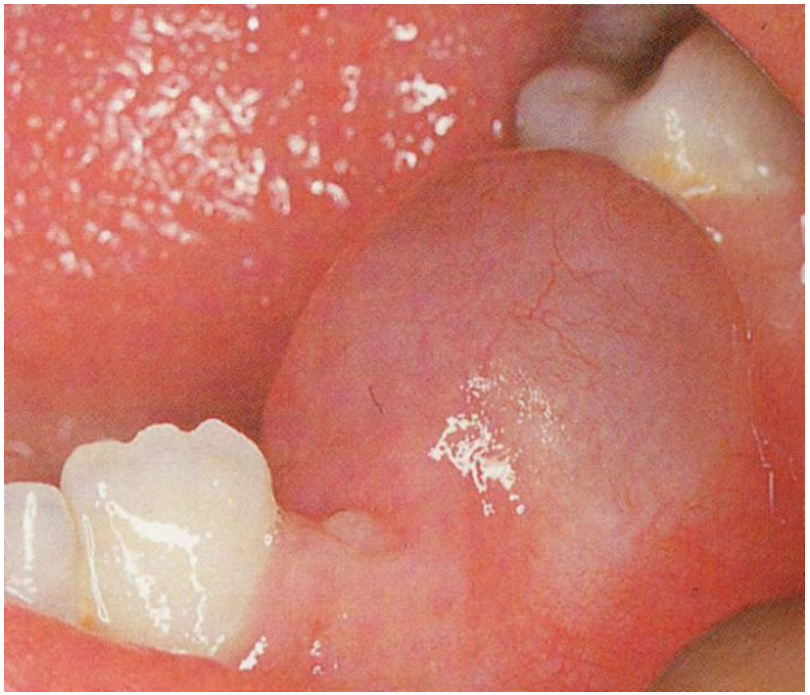


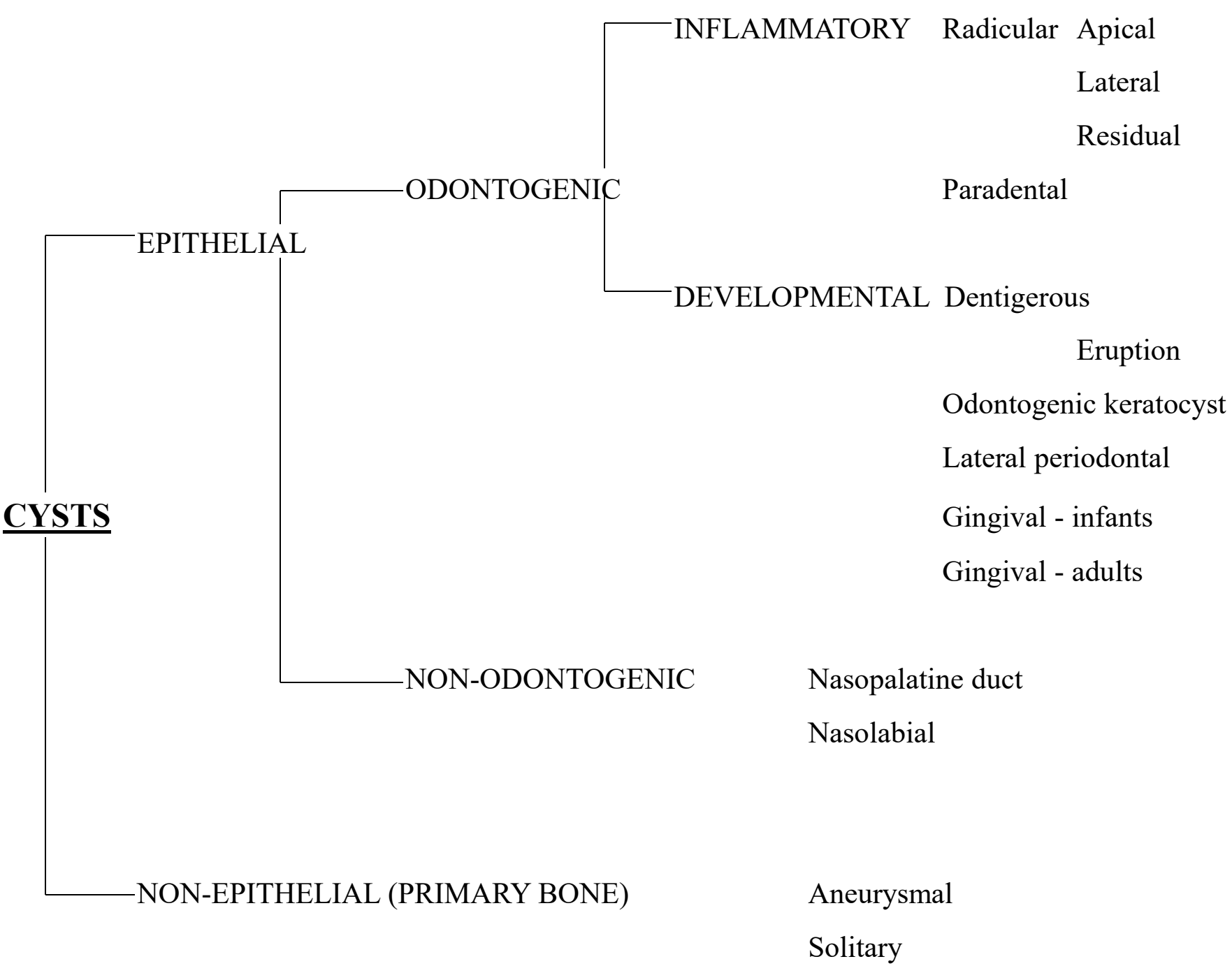


ERUPTION CYST

- Extra-alveolar dentigerous cyst
- Deciduous tooth or permanent molar
- Fluctuant bluish swelling
- Haemorrhage into cyst common
- Most spontaneously resolve






CYSTS
EPITHELIAL
ODONTOGENIC
INFLAMMATORY
Radicular
Apical
Lateral
Residual
Paradental
DEVELOPMENTAL
Dentigerous
Eruption
Odontogenic keratocyst
Lateral periodontal
Gingival - infants
Gingival - adults
NON-ODONTOGENIC
Nasopalatine duct
Nasolabial
NON-EPITHELIAL (PRIMARY BONE)
Aneurysmal
Solitary

Relative frequency

Odontogenic (90%)		Non-odontogenic (10%)	
Radicular	60-75%	Nasopalatine	5-10%
Dentigerous	10-15%	Others	1%
Keratocyst	5-10%		
Paradental	3-5%		
Gingival	1%		
Lateral periodontal	1%		

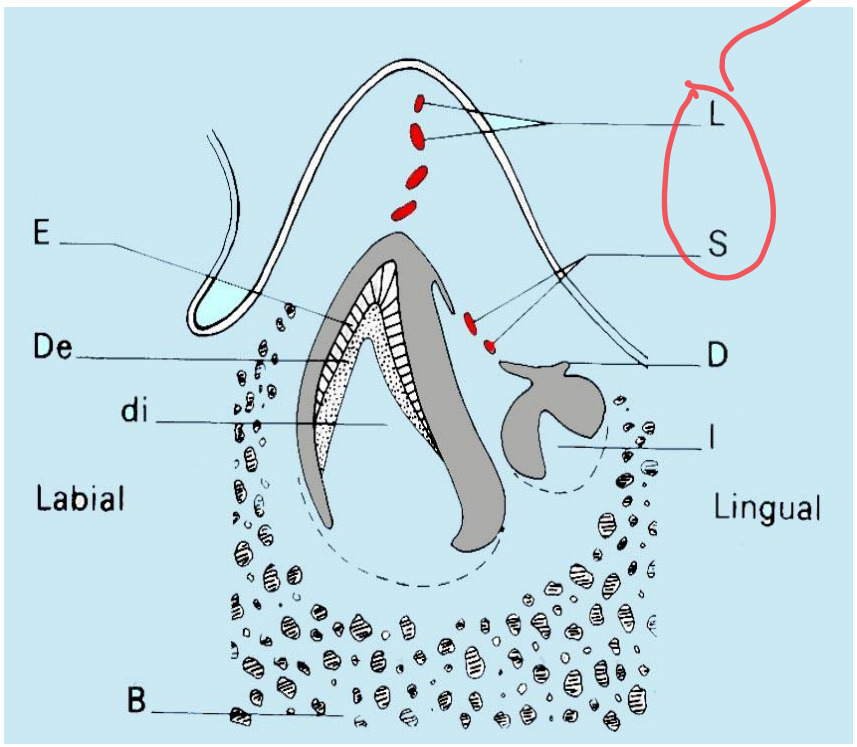
ODONTOGENIC KERATOCYST

CLINICAL

- 5-10% of all jaw cysts
- SITE
  - 70-80% mandible
  - 50% angle/ramus
- Often asymptomatic
- M>F
- Swelling, discharge, pain, pathological fracture, tooth displacement, rarely buccal expansion
- 10% multiple
- High recurrence rate

PATHOGENESIS

rest of Serres
↳ get actL in pathology



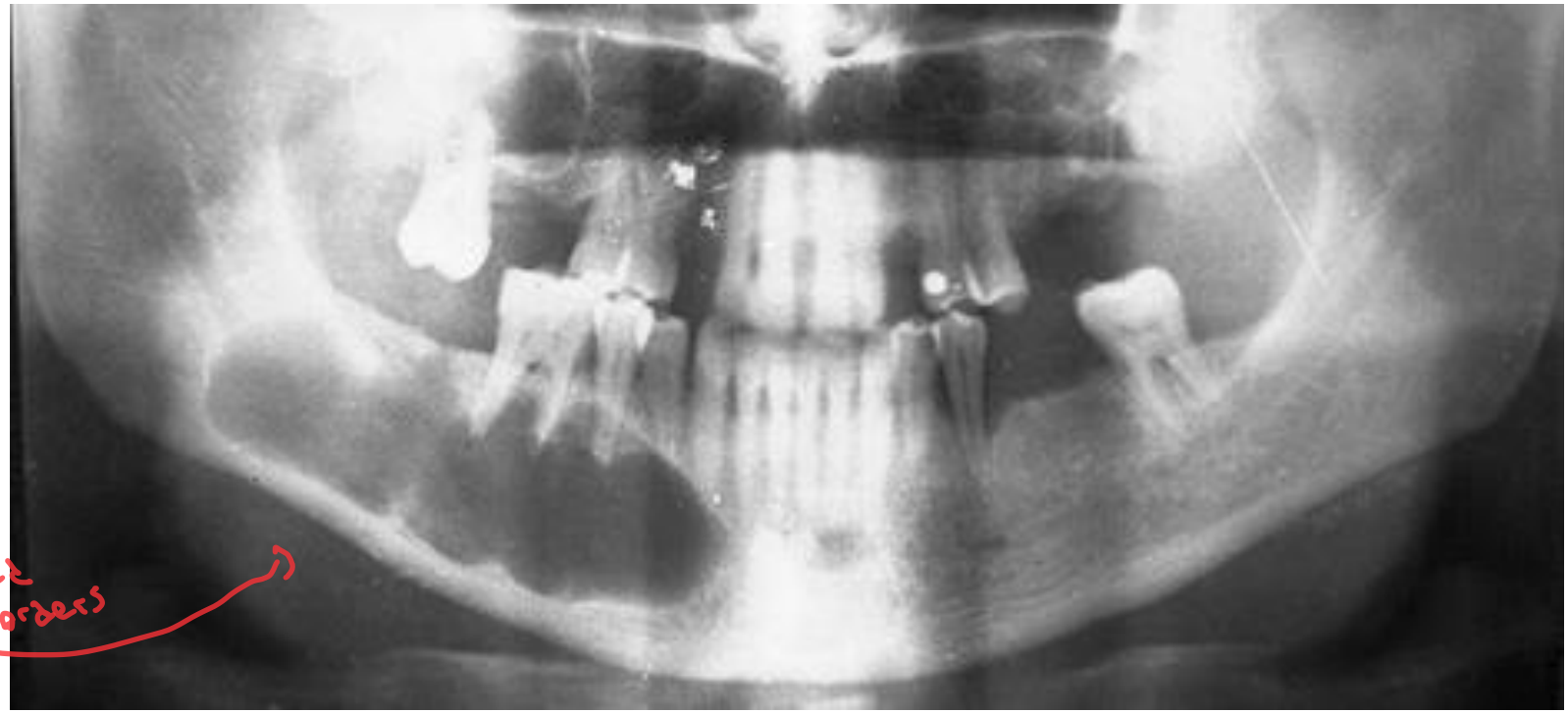
- Derived from the dental lamina or it's remnants - cell rests of Serres
- Originate from enamel organ (tooth primordium) of a tooth before hard tissues develop:
  - normal tooth
  - supernumerary

RADIOLOGICAL APPEARANCE

- Well demarcated radiolucency
- Pseudolocular or multilocular, often with scalloped periphery
- Root or tooth displacement

multilocular

NO tooth



Scalloped borders

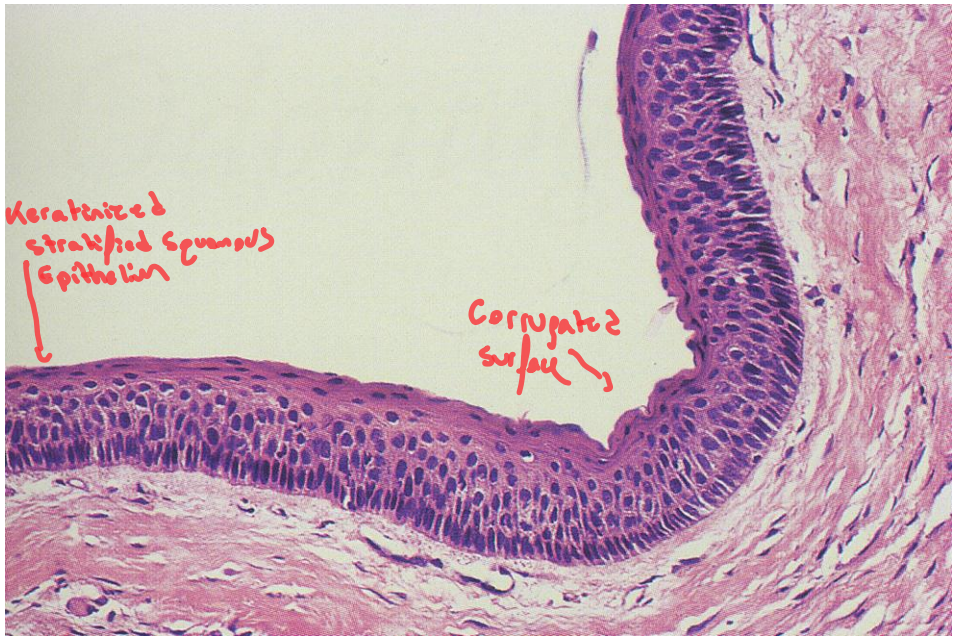
HISTOPATHOLOGY

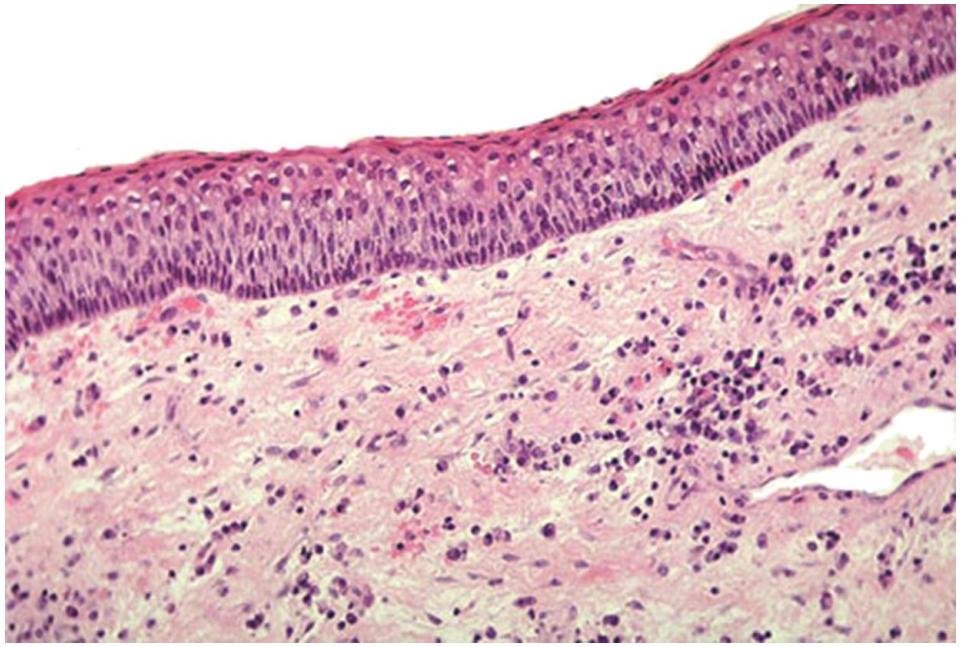
- Regular stratified squamous epithelium
- Thin epithelial layer (5-8 cells thick)
- Palisaded basal layer
- Corrugated surface which can be parakeratinised or orthokeratininsed
- Thin, friable fibrous capsule - little inflammation
- Satellite (daughter) cysts

Enlargement

- Cancellous enlargement antero-posteriorly

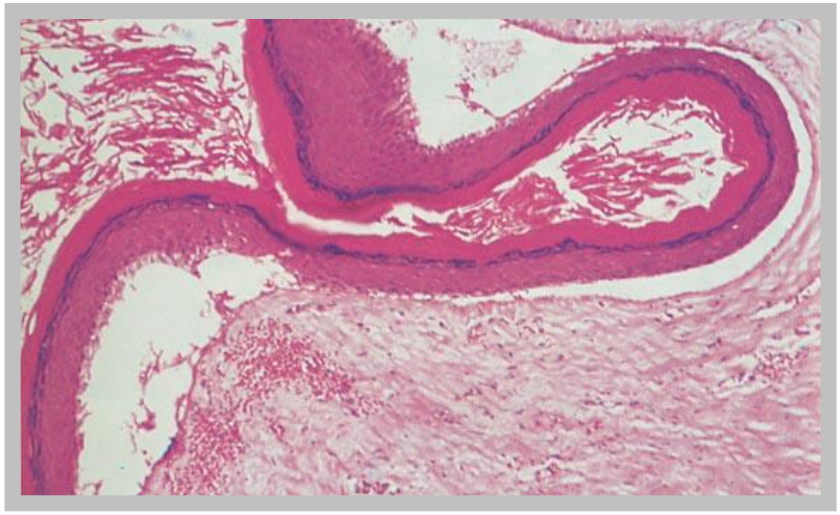
- Little or no bucco-lingual expansion → large, especially in angle and ramus of mandible

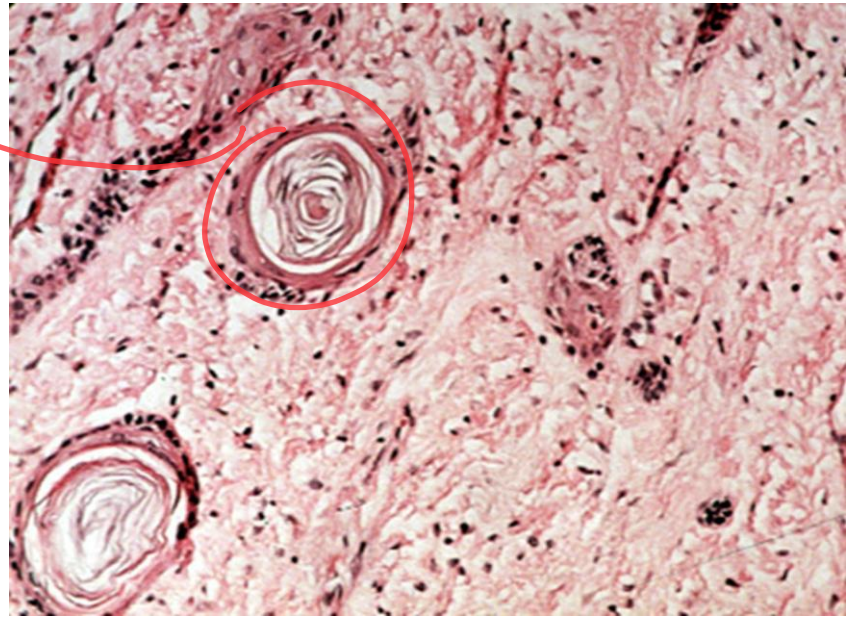


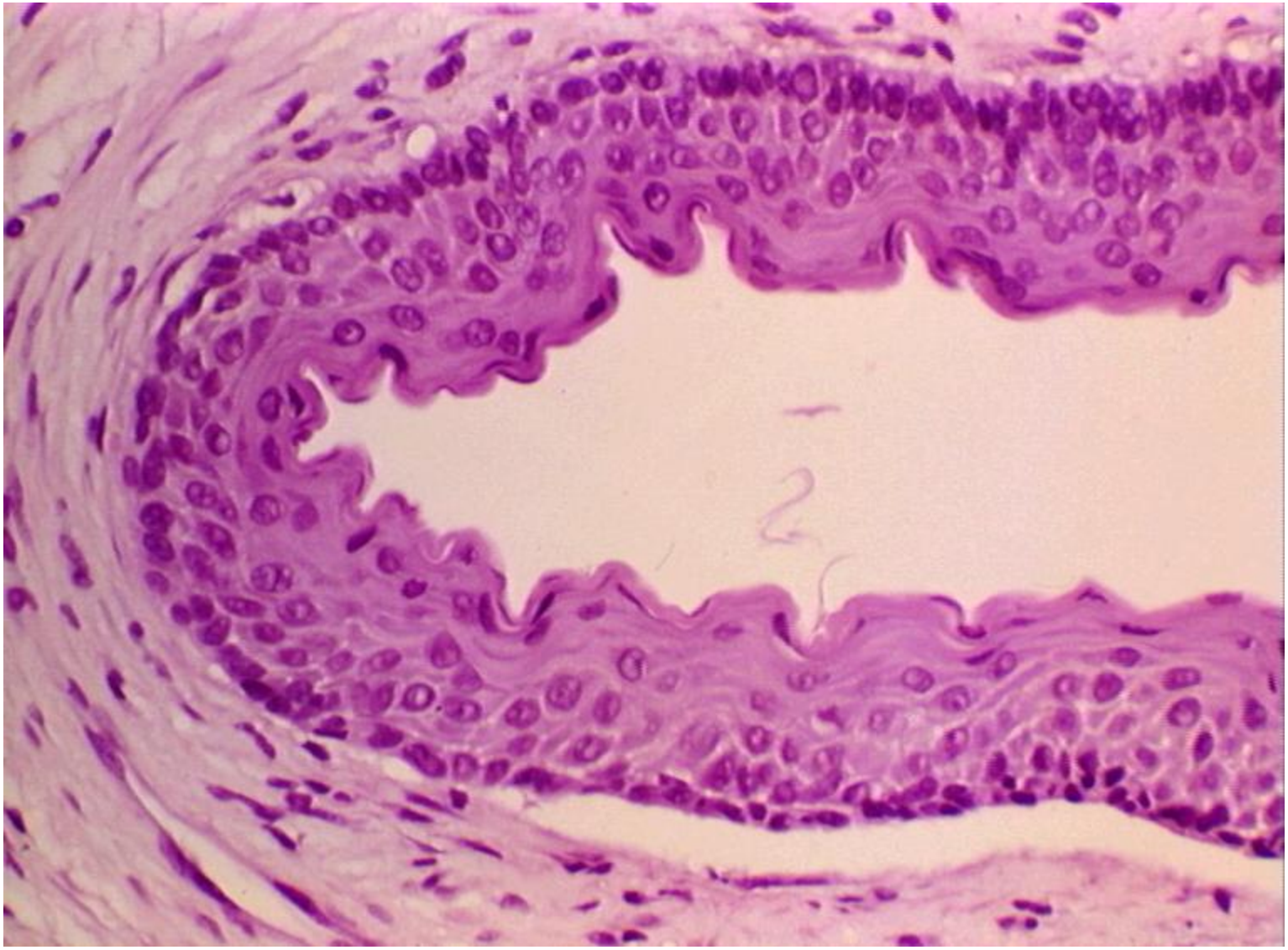


RECURRENCE

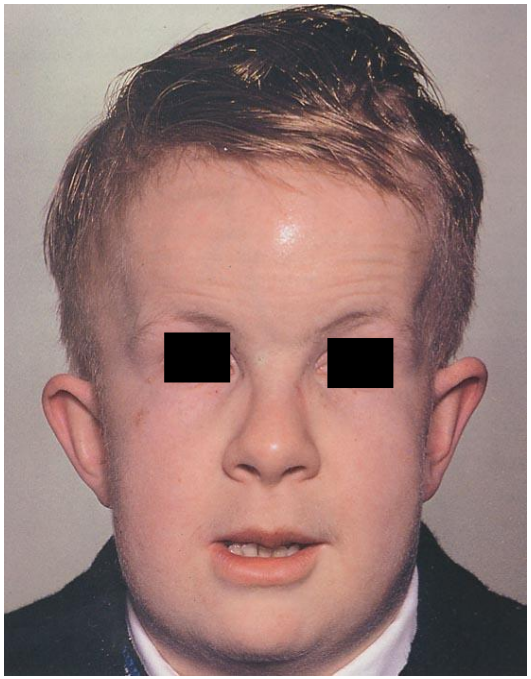
- Up to 60%
- Size and infiltrative nature
- Tendency to multiplicity and satellite cysts
- Intrinsic growth potential
- Thin, friable capsule
- Genetic - multiple basal cell naevus syndrome (Gorlin-Goltz)



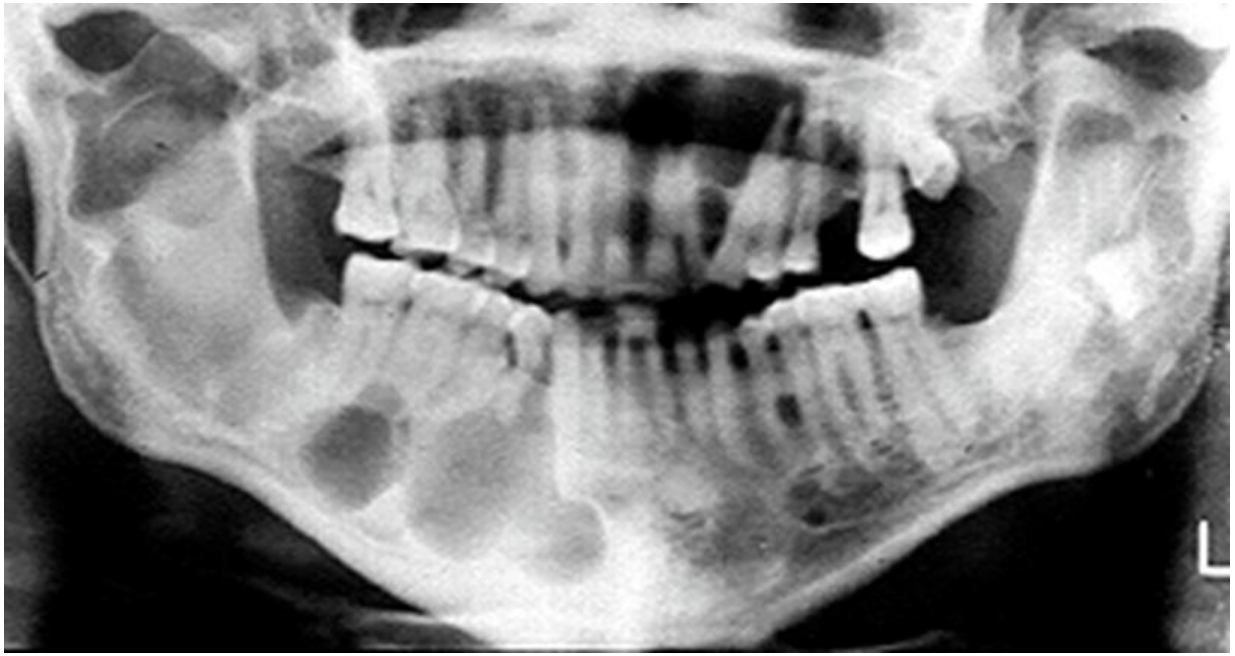




GORLIN - GOLTZ SYNDROME



- Multiple keratocysts
- Multiple basal cell naevi → carcinomas
- Skeletal abnormalities
  - bifid ribs
  - spine defects
- Frontal bossing and hypertelorism
- Calcification of the falx cerebri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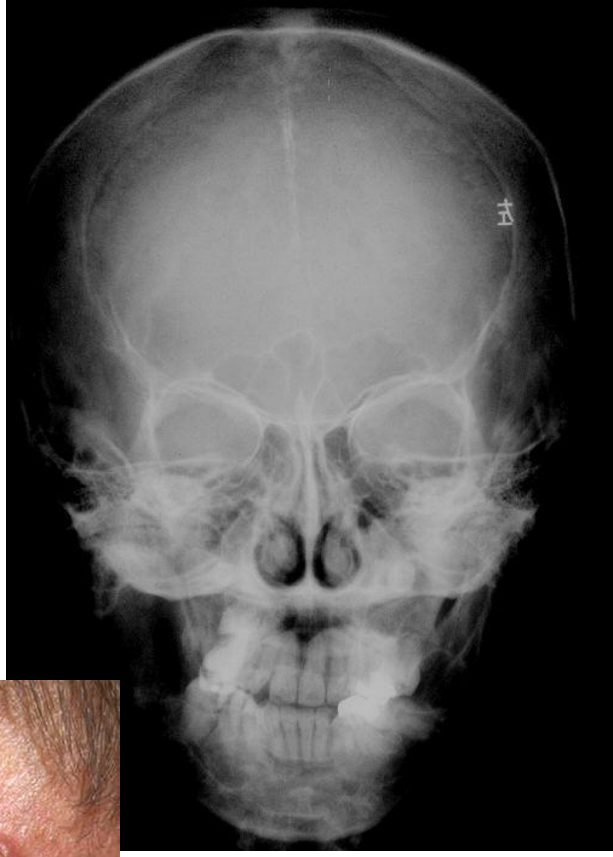


LATERAL PERIODONTAL CYST

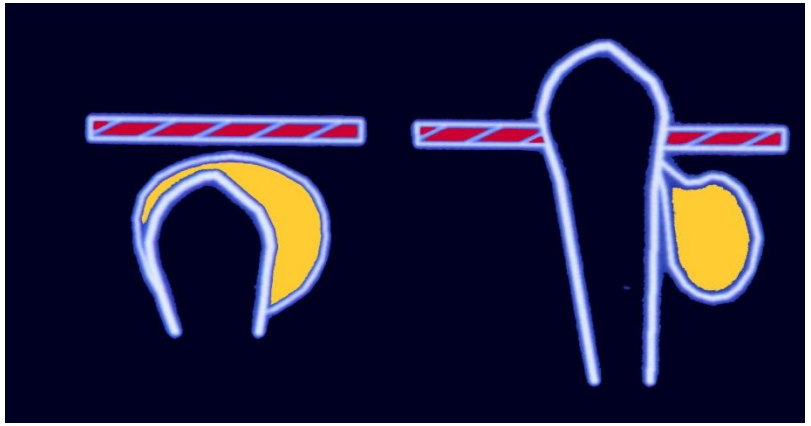
CLINICAL FEATURES

- Canine/premolar area
- Rare < 20 years
- Adjacent teeth vital

NB - Differential diagnosis

RADIOGRAPHY

- Well defined radiolucent area lateral to tooth



LATERAL PERIODONTAL CYST

RADIOGRAPHY

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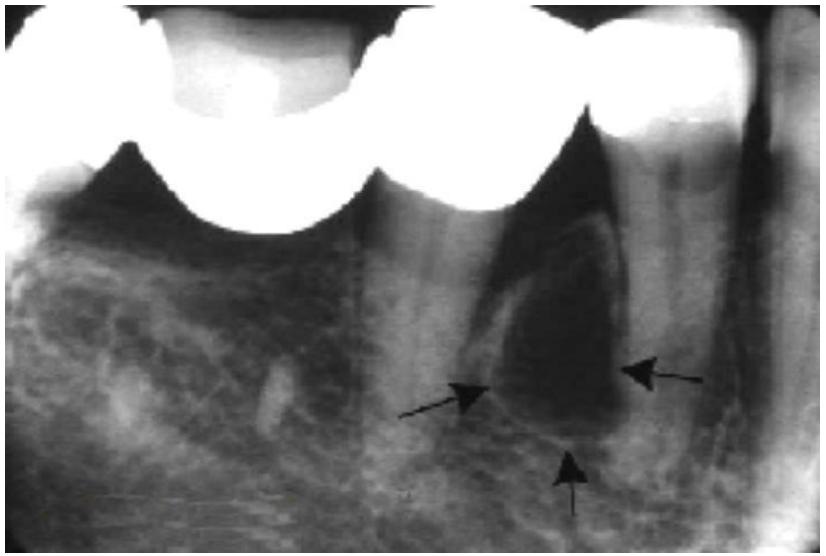
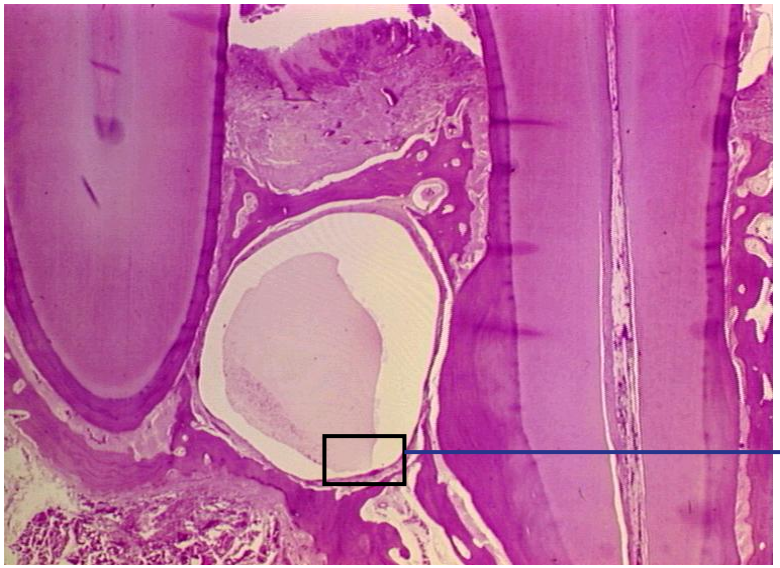


LATERAL PERIODONTAL CYST

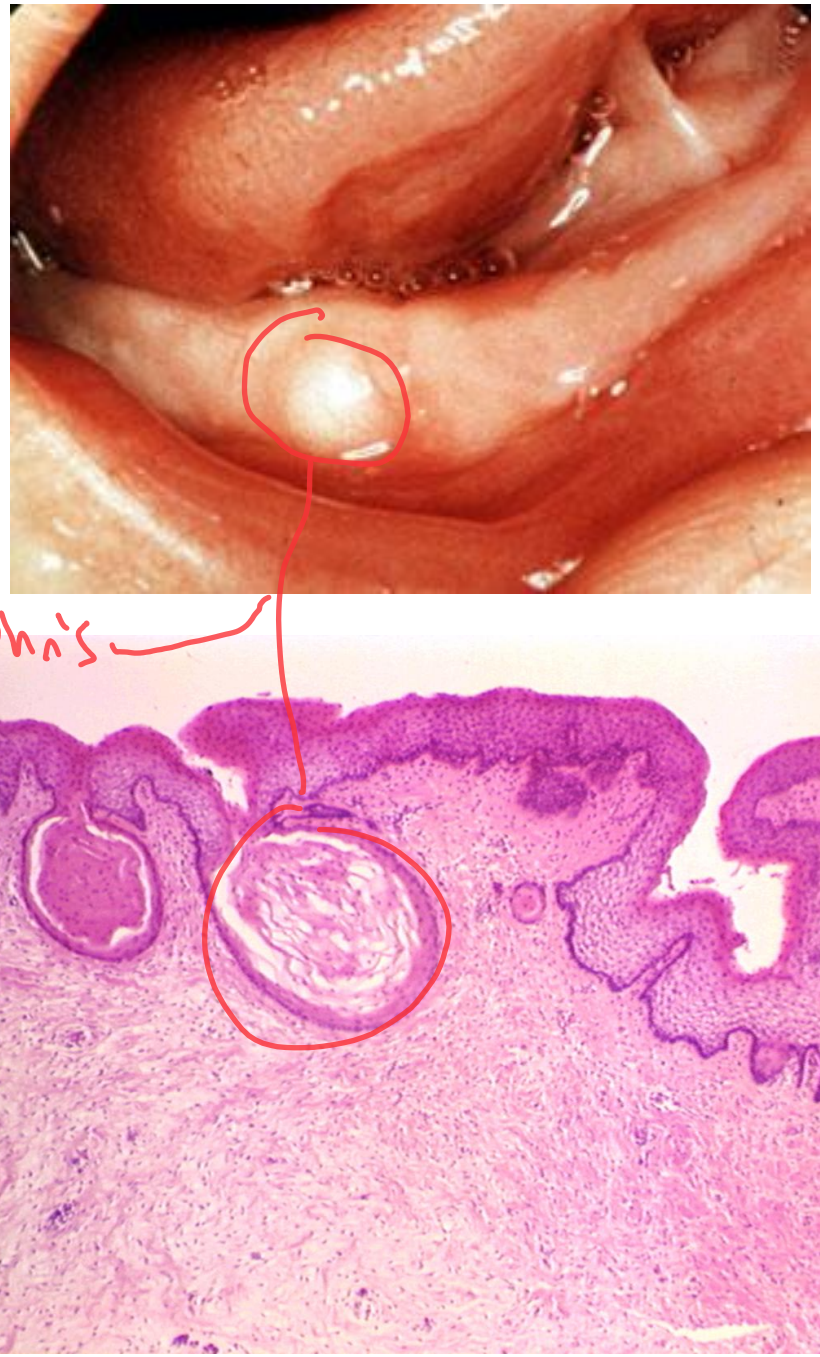


HISTOPATHOLOGY

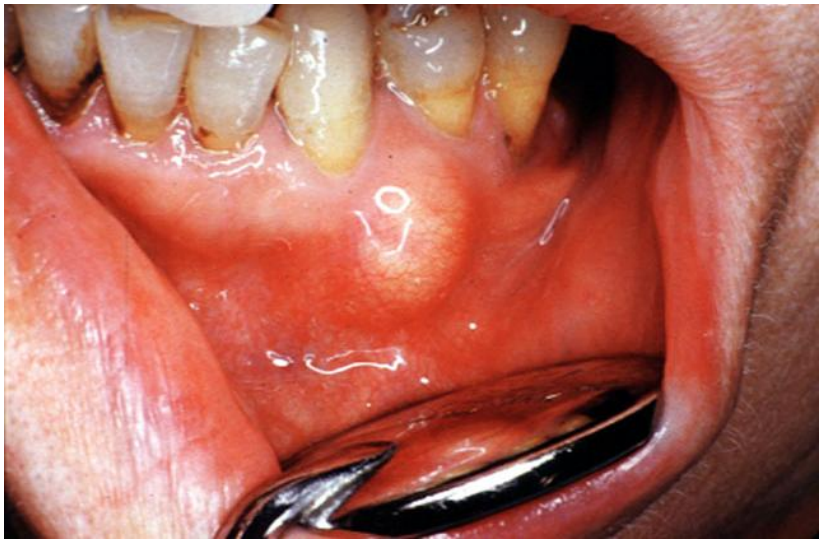
- Derived from reduced enamel epithelium or cell rests of Malassez
- NKSSE 2-6 cells thick
- Periodic thickening in luminal surface of epithelium

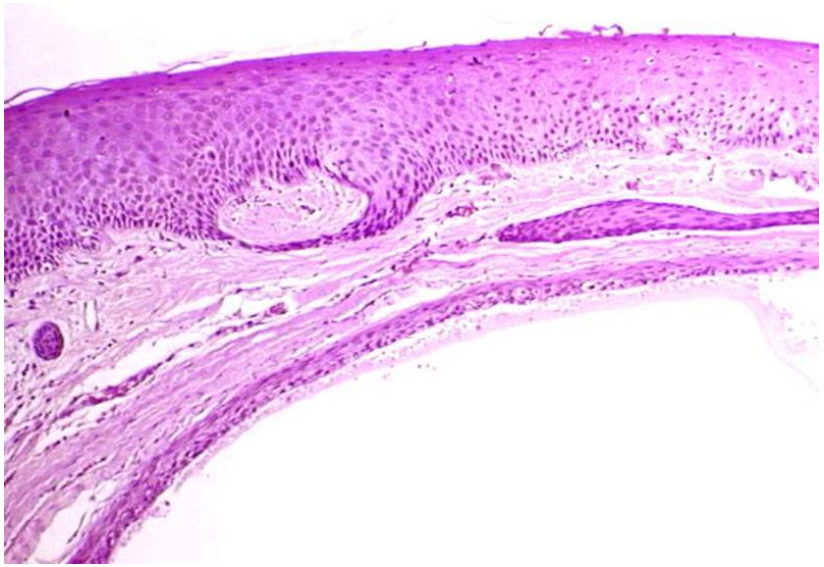
GINGIVAL CYSTS
INFANTS

- Bohn's nodules, Eptein's pearls
- Common in newborns and up to 3 months
- Usually rupture or spontaneously involute
- 2-3 mm keratinising stratified squamous epithelium
- Arise from the cell rests of Serres

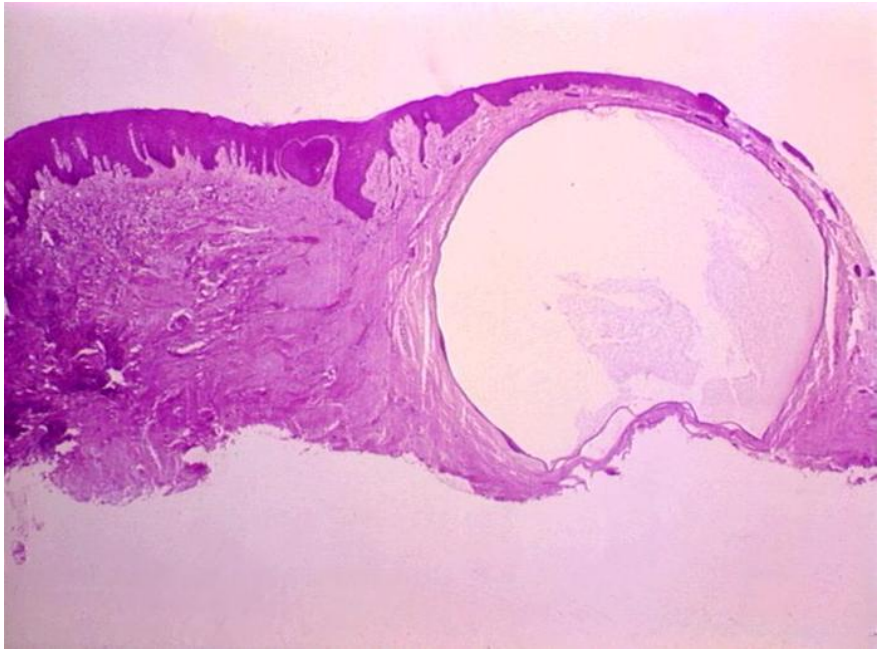


GINGIVAL CYST
ADULT

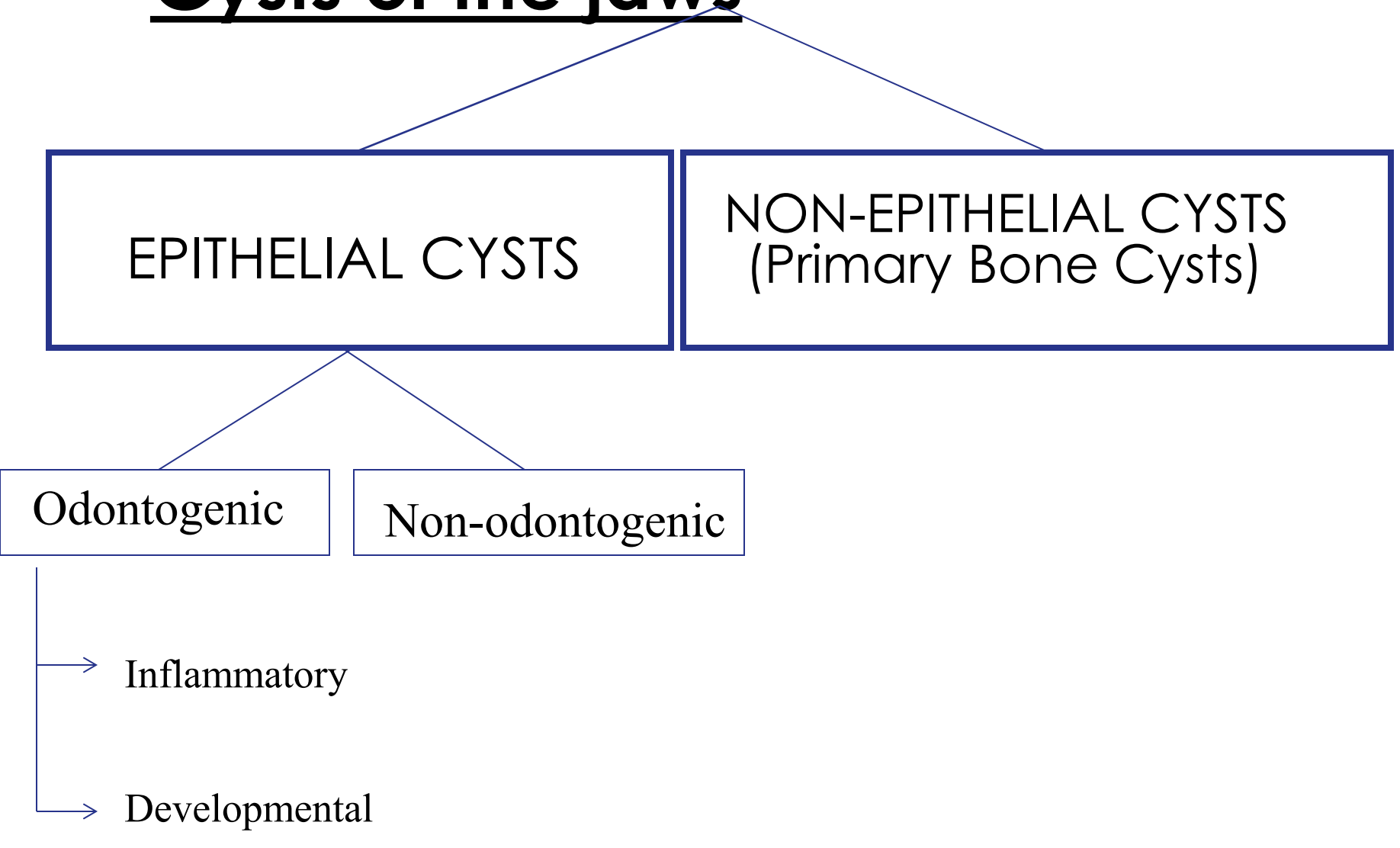




- Slow -growing, usually < 1cm diameter
- Free or attached gingiva or interdental papilla
- Tooth vital
- Pathogenesis
  - odontogenic
  - implantation



CLASSIFICATION
Cysts of the jaws



NON-ODONTOGENIC DEVELOPMENTAL CYSTS

- Nasopalatine duct cyst

- Nasolabial (naso-alveolar) cyst

*Median cysts ✗
*Globulomaxillary cyst ✗

NASO-PALATINE DUCT CYST

- Incisive canal cyst
- Remnants of nasopalatine duct
- M:F 4:1
- 30-60 years
- Swelling of midline of palate
- Pain and discharge
  - Mucoid and salty
- Vitality of anterior teeth

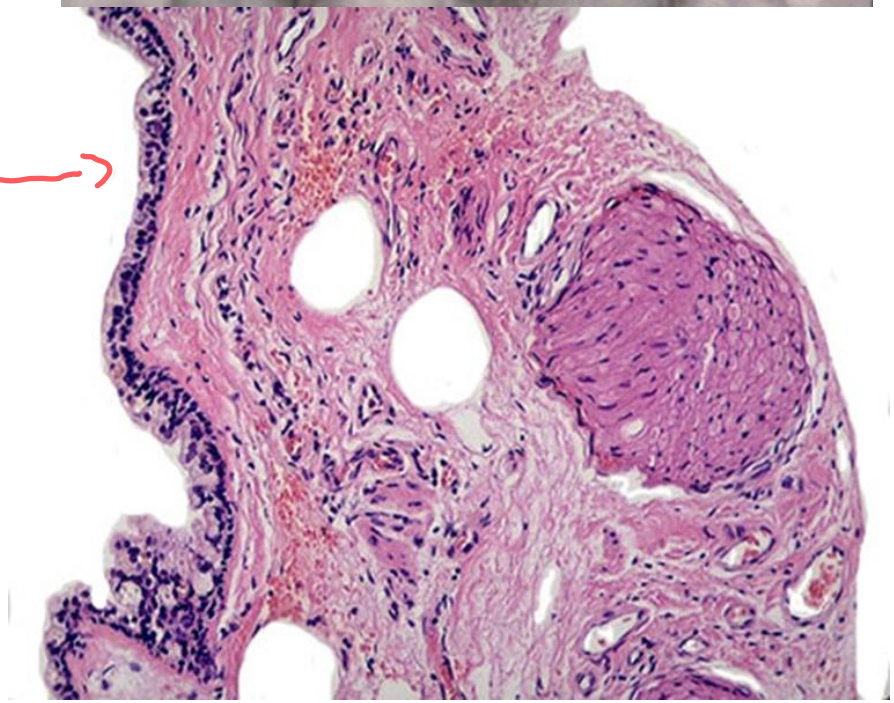
NASO-PALATINE DUCT CYST

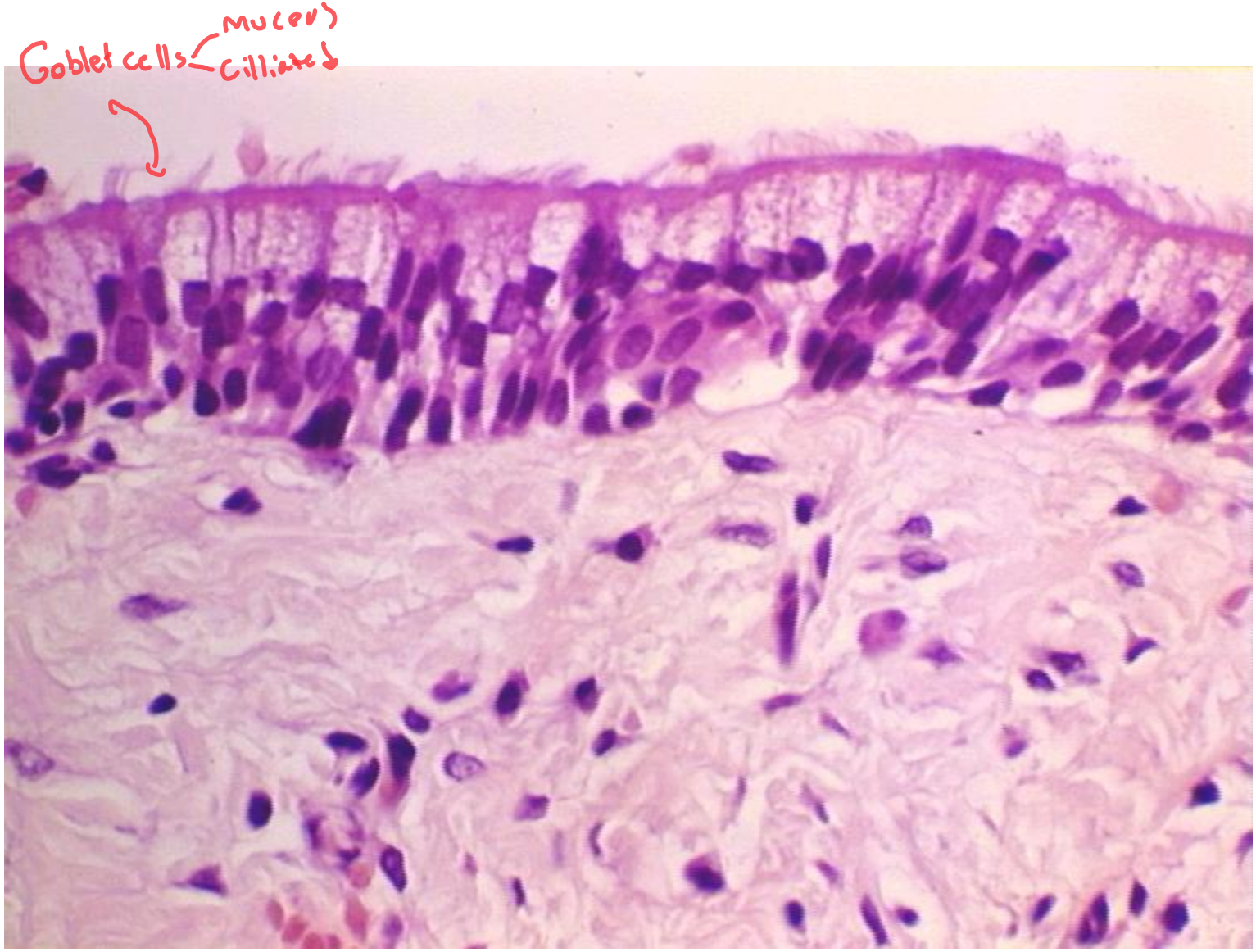
RADIOLOGY

- Well defined radiolucency between roots of central incisors
- Roots may diverge
- Intact lamina dura

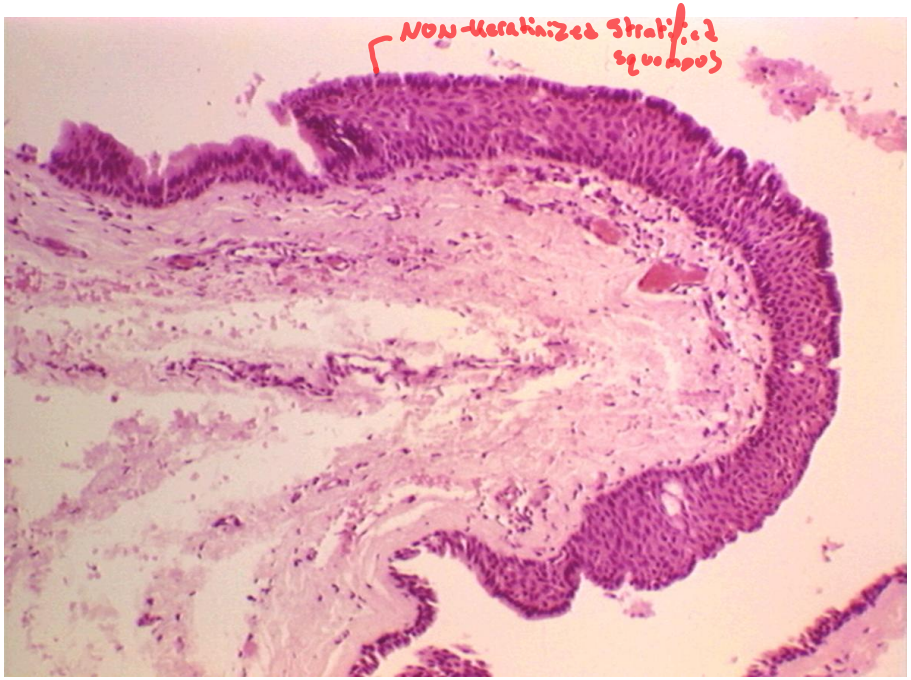
HISTOPATHOLOGY

- Respiratory type epithelium
- Stratified squamous epithelium
- Blood vessels and nerves in wall




Goblet cells
mucous
ciliated

NASOLABIAL CYST



- Swelling in nasolabial fold below alae and leading to loss of fold
- Sometimes bilateral
- Swelling, pain, difficulty in nasal breathing

PATHOGENESIS

- epithelium enclosed at a site of 'fusion' of globular, lateral nasal and maxillary processes – unlikely
- remnants of embryonic nasolacrimal rod or duct

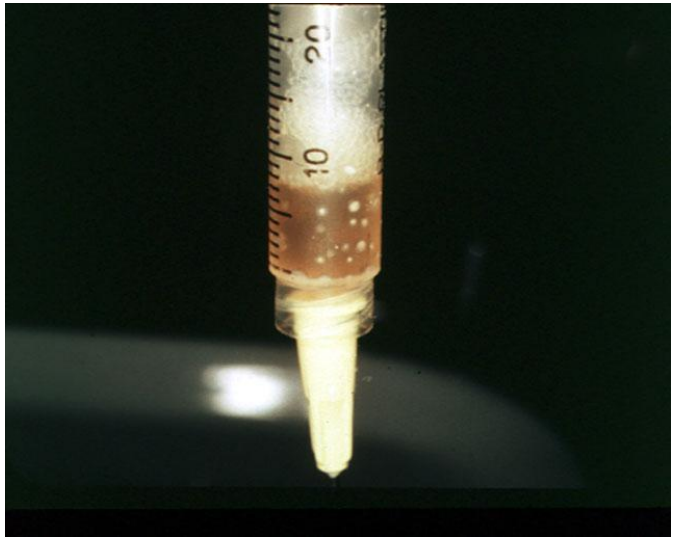
HISTOPATHOLOGY

- Non-ciliated columnar, respiratory type or stratified squamous epithelium

SOLITARY BONE CYST

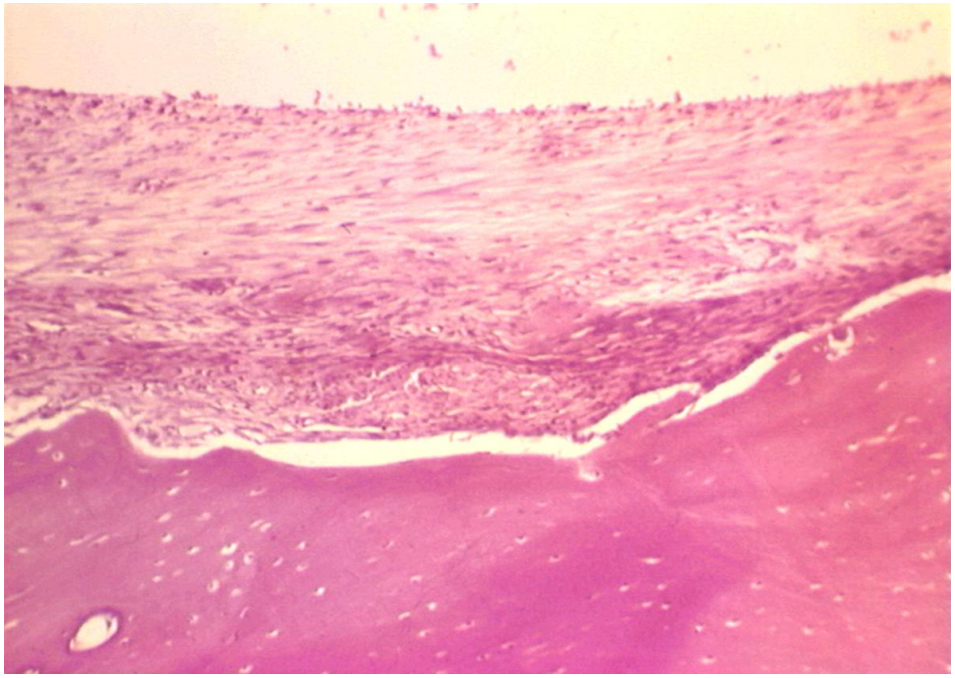
- Also called simple, haemorrhagic, traumatic bone cysts
- Rare
- Mandible, usually in second decade
- Radiolucent area extending between roots (scalloping), usually without expansion
- Resolves with minimal intervention

SOLITARY BONE CYST

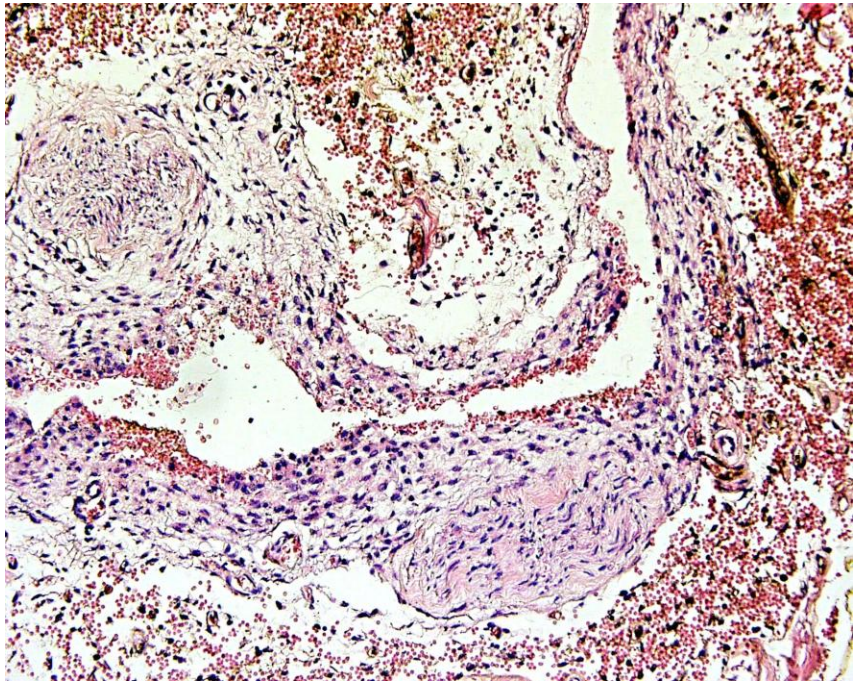


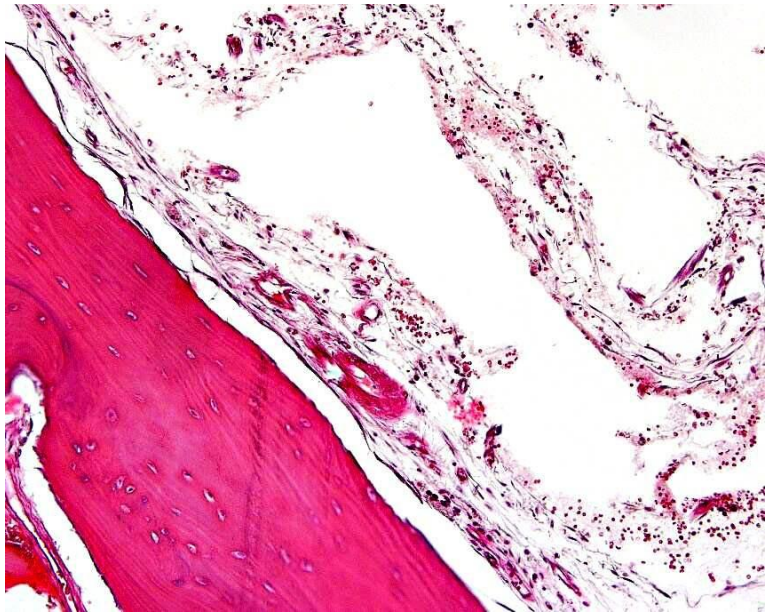
HISTOPATHOLOGY

- No epithelium
- Vascular fibrous tissue in the cyst wall



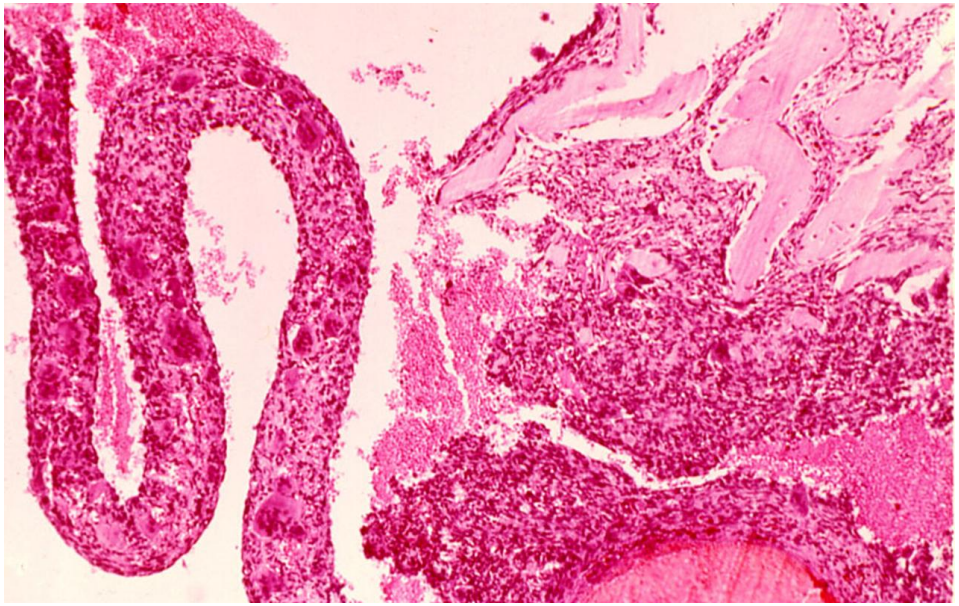
Solitary Bone Cyst

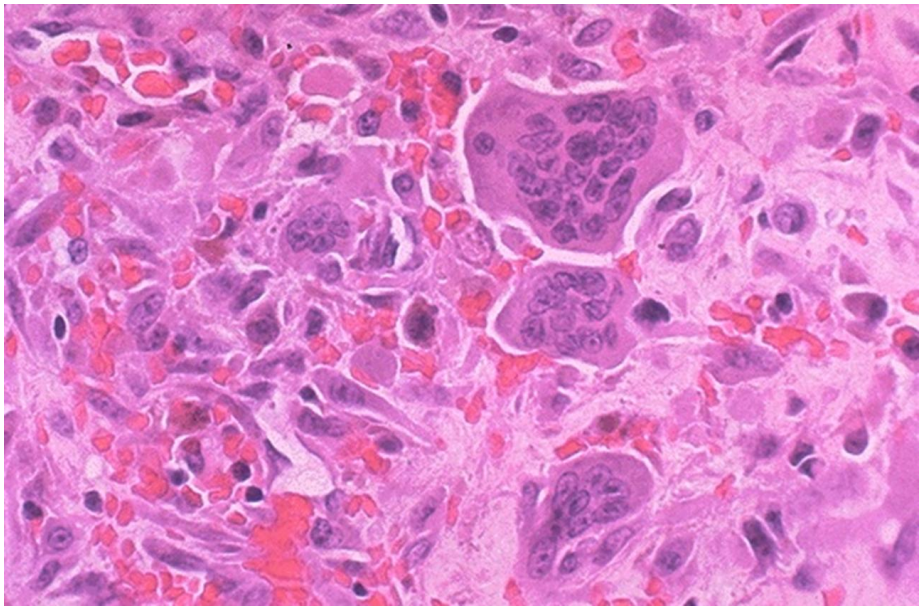




ANEURYSMAL BONE CYST

- Radiolucent area bulging into adjacent soft tissue
- Mostly in children and young adults
- Blood filled spaces - non endothelial lined
- Giant cells, haemorrhage, osteoid
- Giant cell lesion





Questions