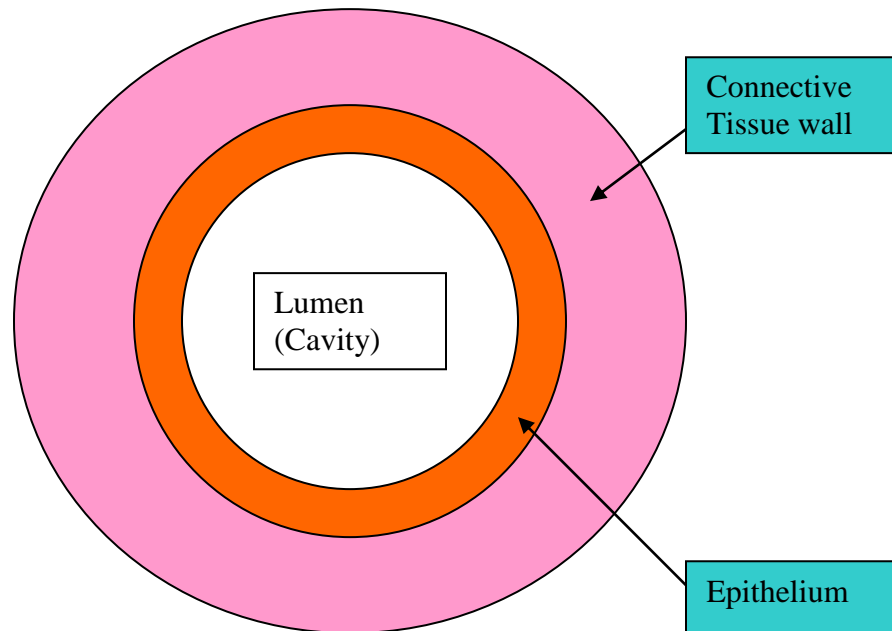


ODONTOGENIC CYSTS

DEFINITION OF A CYST

- A pathological cavity lined by epithelium and filled with a fluid, or a semi-solid material.



NEW :CLASSIFICATION OF ODONTOGENIC CYSTS

A: INFLAMMATORY

- **RADICULAR CYST**
 - **RESIDUAL (RADICULAR) CYST**
- **PARADENTAL CYST**

B: DEVELOPMENTAL

- **DENTIGEROUS CYST**
- **LATERAL PERIODONTAL CYST**
 - **BOTRYOID ODONTOGENIC CYST**
 - **GINGIVAL CYST OF THE ADULT**
 - **GLANDULAR ODONTOGENIC CYST**
- **ORTHOKERATINIZED ODONTOGENIC CYST**
- **GINGIVAL CYST OF THE NEWBORN**

C: NEOPLASTIC

- KERATOCYSTIC ODONTOGENIC TUMOR**
- CALCIFYING CYSTIC ODONTOGENIC TUMOR**

A: INFLAMMATORY ODONTOGENIC CYSTS

1) RADICULAR CYST (SEE OD1 NOTES)

Cyst at apex (or around root) of a non-vital tooth.

Pathogenesis:

- Long-standing chronic inflammation in a periapical granuloma secondary to pulpal necrosis stimulates epithelial proliferation.
- Source of epithelium:
 - Cell rests of Malassez.

Clinical features:

- Usually asymptomatic, or intermittent dull ache
- Sometimes pain, with acute flare-ups
- Destroys bone, rarely bony expansion
- Sometimes root resorption
- At root apex, but sometimes laterally if there is a lateral canal.

Radiological features:

- Radiolucent, may have sclerotic margin
- Sometimes root resorption

Histology:

- Epithelium:
 - Squamous
 - Not keratinized
 - Thickness varies
 - Sometimes rete ridges which form arcades and loops
 - Rushton bodies.
- Wall:
 - Parallel bundles collagen
 - Inflammatory cell infiltrate
 - May have cholesterol clefts with giant cells
 - May have foam cells with hemosiderophages.
- Lumen:
 - Fluid, Cholesterol (clefts), Blood (serum).

Treatment:

- Root canal therapy, apicoectomy
- Extraction, curettage

1A) RESIDUAL (RADICULAR) CYST

In edentulous area at site of previous periapical radiolucency.

- Probably a radicular cyst which was not removed when the tooth was extracted.

Pathogenesis, clinical features, radiological features and histologic features similar to Radicular Cyst except that tooth has been removed.

Treatment: Curettage.

2) PARADENTAL CYST

Distal of 3rd molar, *or Mandibular infected buccal cyst, which develops on the buccal aspect of a first molar tooth, which has an enamel extension into the furcation zone.*
(= Buccal Bifurcation Cyst or Inflammatory Collateral cyst).

Pathogenesis:

- Pericoronitis (inflammation) stimulates:
 - Cell rests of Malassez or
 - Reduced enamel epithelium.

Clinical features:

- 2nd and 3rd decades
- Male = Female
- Distal 3rd molar/beside a molar tooth.

Radiological features:

- Well-circumscribed radiolucent
- Sclerotic margin

Histology:

- Like Radicular Cyst.

Treatment:

- Extraction 3rd molar
- Curettage of Cyst

B: DEVELOPMENTAL ODONTOGENIC CYSTS

1) DENTIGEROUS CYST

A cyst that forms **around the crown of an unerupted tooth**.

Pathogenesis

Develops between enamel epithelium and tooth after odontogenesis is completed (Distinguish from normal dental follicle: Cyst wall is larger than 2.5mm in maximum thickness radiographically)

Clinical features:

- Contains crown of unerupted or impacted tooth
- Cyst epithelium attached to tooth in cervical area
- 16% of oral cysts – very common
- 1st 3 decades, M > F = 2:1
- Mandible 3rd molar most often
- Also maxillary 3rd molar and maxillary canine, other teeth and primary teeth much less often.
- Usually asymptomatic unless its get very large
- Bone expansion when large
- Displaces teeth (especially the affected tooth – eg: mandibular third molar)
- Root resorption of adjacent teeth sometimes

Radiological features:

- Radiolucent
- Well circumscribed
- Uni-ocular, sometimes scalloped.
- Sclerotic margin
- Around the crown of unerupted or impacted tooth (not necessarily symmetrical)

Histology:

- Epithelium:
 - Non-keratinizing stratified squamous epithelium – variable thickness when inflamed.
 - Sometimes mucous cells are present.
 - No rete ridges unless inflamed
- Connective tissue wall:
 - Bundles of collagen fibers.
 - Sometimes islands of odontogenic epithelium.
- Lumen: thin fluid.

Treatment

- Enucleation with removal of unerupted tooth.
 - If eruption is feasible, tooth may be left in place.
- Marsupialization for large cysts – excised later.
- Prognosis good; recurrence seldom occurs.
- Neoplastic potential:
 - Ameloblastoma
 - Squamous cell carcinoma
 - Mucoepidermoid carcinoma

1A) ERUPTION CYST (ERUPTION HEMATOMA)

Soft tissue variant of Dentigerous Cyst

Clinical features:

- Usually children <10 years, commonly 1st primary mandibular molar.
- Soft fluctuant blue swelling on gingiva.
- Haemorrhage into the cyst is common.

Histology:

- Thin non-keratinising squamous epithelium (like Dentigerous Cyst).

Treatment:

- Ruptures spontaneously, or
- Excision of the cyst roof, which allows eruption of the tooth.

2) LATERAL PERIODONTAL CYST

- Occurs in bone lateral to the roots of one or two teeth, commonly between the roots of mandibular premolars and in the globulomaxillary area in the maxilla.

Pathogenesis:

- Dental lamina – cell rests of Serres

Clinical features:

- Lateral to a vital tooth.
- 0.7% of oral cysts.
- adult, more common in males.
- Mandible: premolar, canine.
- Asymptomatic.

Radiological features:

- Radiolucent, well-circumscribed, often with a sclerotic margin.
- Lateral to an erupted vital tooth. Usually remain rather small.
- Multilocular, large appearance: is a 2A) **Botryoid Odontogenic Cyst**.

Histology:

- Epithelium:
 - thin, 1 to 3 layers, non-keratinized.
 - Plaque-like thickenings.
 - Some cells with clear cytoplasm - glycogen-rich cells – especially in the plaques..
- Connective tissue:
 - Sometimes inflammatory cells. (secondary inflammation)
 - Cell rests of Serres sometimes seen.

Treatment:

- Conservative curettage
- Recurrence rare if ever.

2B) GINGIVAL CYST OF THE ADULT

- Soft tissue (gingival) variant of the lateral periodontal cyst

Pathogenesis:

- Develops from Dental lamina – cell rests of Serres

Clinical features:

- 0.5% of oral cysts; mean age of about 50 years.
- Attached gingiva, or interdental papilla.
- Mandible: premolar, incisor, canine area.
- Maxilla: seldom, sometimes incisor canine area.
- Small, firm swelling, pink or bluish, painless (unless inflammation).

Histology:

- The cyst histology is exactly the same as the lateral periodontal cyst (see above), except that it's in the gingiva and not in bone.

Treatment:

- Simple surgical excision.
- Rarely, if ever, recurs

2C?) GLANDULAR ODONTOGENIC CYST

Not all expert agree that this is a variant of the lateral periodontal cyst, especially because of its significantly more aggressive biological behaviour.

Clinical features:

- Middle aged and older people; Male = Female.
- Predilection for the mandible: anterior; sometimes maxilla anterior.
- Bone expansion, may become very large and destructive.

Radiological features:

- Multilocular, radiolucent.
- ±Well-circumscribed
- usually larger than 1 cm.

Histology:

- Epithelium:
 - Non-keratinizing of varying thickness.
 - Focal thickenings.
 - Cuboidal cells with cilia superficially
 - Mucous cells and clear cells.
- Connective tissue: collagen and fibroblasts.

Forms characteristic intraepithelial duct-like or gland-like structures.

Treatment:

- Enucleation and curettage.
- Recurrence: 30%.
- Some recommend en bloc resection.
- Transformation into central mucoepidermoid carcinoma has been reported.

3) ORTHOKERATINIZED ODONTOGENIC CYST

Originally believed to be a variant of the keratocystic odontogenic tumor, but with a much less aggressive biological behaviour.

Clinical features

- Young adults; M:F = 2:1;
- Site: Mandible:Maxilla = 2:1; Posterior jaws.

Radiographic features

- Unilocular radiolucency (sometimes multilocular).
- May resemble dentigerous cyst (radiographically), involving unerupted mandibular 3rd molar.
- 1cm to 7cm and larger.

Histology:

- Epithelium:
 - Stratified squamous with **Orthokeratin**.
 - Keratohyaline granules in superficial epithelium.
 - Palisaded basal layer **not** present.
- Thin connective tissue wall.

Treatment

- Enucleation with curettage; recurrence rare.
- Prognosis excellent.

4) GINGIVAL CYST (DENTAL LAMINA CYST) OF THE NEWBORN

Soft tissue cyst on the gingiva of infants.

Pathogenesis:

- Dental lamina rests.

Clinical features:

- Single or multiple small white nodules on the edentulous alveolar ridges
- Asymptomatic.

Histology:

- Epithelium: thin squamous.
- Connective tissue wall: Inflammation, calcifications.

Treatment:

- Spontaneously marsupializes so no treatment required.

C: NEOPLASTIC

1) **ODONTOGENIC KERATOCYST (OKC) = KERATOCYSTIC ODONTOGENIC TUMOUR (KOT)**

IN THE NEWEST WHO CLASSIFICATION, THE ODONTOGENIC KERATOCYST HAS BEEN RE-CLASSIFIED AS A TUMOR – THE KERATOCYSTIC ODONTOGENIC TUMOR. ITS DEVELOPMENT HAS BEEN ASSOCIATED WITH A TUMOR SUPPRESSOR GENE, THE PTCH (Patched) GENE.

Pathogenesis:

- Dental lamina

Clinical features:

- Common (10% of oral cysts)
- 10 – 30 years, M > F 2:1
- Mandible 3rd molar; and Maxilla 3rd molar, canine regions.
- Asymptomatic, sometimes pain, swelling
- May be associated with:
 - Absent tooth
 - Primary tooth without permanent successor
 - Supernumerary tooth

Radiological features:

- Well-circumscribed, Radiolucent, Uni- or Multi-locular, ±Sclerotic margin.
- May appear pericoronal.
- Tooth absent (sometimes).
- Sometimes root resorption (usually spares roots).
- Displacement of teeth.

Histology:

- Epithelium:
 - Stratified squamous, **parakeratinized** with corrugated appearance of surface.
 - Palisaded basal cell layer.
 - No rete ridges.
- Connective tissue: ±Daughter cysts; budding.
- Lumen: keratin filled.

Treatment:

- Block resection is best.
- Enucleation and curettage result in recurrence.
 - Cyst is friable and often fragments
- Adjuncts to surgery:
 - Peripheral ostectomy of bony cavity
 - Cauterization of bony cavity with Carnoy's solution
 - Decompression of cyst when large (marsupialization)
- Recurrence
 - Is high (5 - 62%; average 25%) – possibly due to:
 - Remnants (incomplete removal at surgery), Daughter cysts enlarging.

Gorlin –Goltz Syndrome (Basal cell nevus-bifid rib-jaw cyst syndrome):

Autosomal dominantly inherited.
Mutation of PTCH gene

Features:

Multiple keratocystic odontogenic tumors*

Multiple basal cell nevi in childhood that often become basal cell carcinomas in adults*

Bifid ribs*

Kyphoscoliosis

Short fourth metatarsal

Calcified falx cerebri

Increased incidence in medulloblastoma

Epidermoid cysts of skin

Palmer and plantar pitting

Others less commonly expressed features

Comment: A rare solid (no grossly visible cystic spaces) has been reported. (Solid neoplasm)

2) CALCIFYING CYSTIC ODONTOGENIC TUMOR (WHO reclassified the Calcifying Odontogenic Cyst (also called Gorlin Cyst) as a cystic neoplasm.

The GHOST CELL tumor

Clinical features:

2 age peaks – teen to 20s –often associated with an odontoma, and 40s (simple cystic type)

F>M, Maxilla=Mandible incisor/canine region

Usually central in bone but also peripheral lesions seen on gingiva

Asymptomatic

Radiographic features:

Well circumscribed uni or multilocular

Contains internal calcified flecks or globules

May be root resorption

Microscopic features:

Central cystic spaced line by odontogenic epithelium with basal ameloblast-like layer surfaced by stellate reticulum-like cells and containing scattered polygonal cells or sheets of polygonal cells with eosinophilic cytoplasm and empty spaces where the nuclei used to be (GHOST CELLS!). These cells commonly calcify (dystrophic calcification). The surrounding connective tissue sometimes contains calcified structures believed to be dentin-like calcification (without dentinal tubules).

Treatment: Curettage for bony lesions, surgical excision for peripheral lesions.

Prognosis: Recurrence is uncommon.

Comment: A non-cystic (solid) variant is well known – the **odontogenic (dentinogenic) ghost cell tumor** and a rare malignant variant has been reported – **odontogenic ghost cell carcinoma**.