

Cysts of the Jaws

Classification of Jaw Cysts

I-Epithelial cysts :

1- Odontogenic cysts:

A- Developmental:

- Dentigerous cyst
- Eruption cyst.
- Odontogenic Keratocyst
- Gingival cyst of Adults
- Gingival cyst (alveolar) of newborn
- Calcifying odontogenic cyst Lateral periodontal cyst
- Glandular odontogenic cyst

B- Inflammatory:

- Periapical radicular cyst
- Residual periapical radicular cyst
- Paradental cyst

2-Non-Odontogenic cysts

- Nasopalatine duct cyst
- Nasolabial cyst
- Globulomaxillary cyst
- Median cysts

II- Non-Epithelial Primary bone cysts

Cysts are common lesions & are clinically important because they are often destructive. They produce significant signs & symptoms, especially when they become large and infected. Most cysts are true cysts since they possess an epithelial lining, such as solitary bone cyst, Aneurysmal bone cyst & Stafne's bone cyst.

True cysts of the oral region can be divided into:

-Odontogenic cysts: cysts that are lined by epithelium that is derived from odontogenic epithelium, only seen the jaws. They are subclassified into, **developmental** cysts, are of unknown origin or **inflammatory** cysts, and are the result of inflammation.

-Non-odontogenic cysts (Developmental cysts)

Odontogenic Cysts:

Cysts in which the lining of the lumen is derived from epithelium produced during tooth development.

Odontogenic cysts are derived from the epithelial structures:

- 1- Rest of Malassez: Remnants of Hertwigs epithelial root sheath, they persist in periodontal ligament after complete root formation.
- 2- Reduced Enamel Epithelium: Residual epithelium that surrounds the crown after complete enamel formation.
- 3- Remnants of dental lamina: Islands & strands of epithelium that originate from oral epithelium in tissue after inducing tooth development.

Histogenic Classification of Odontogenic Cysts:

1. Cysts derived from Rest of Malassez:
 - Periapical cysts.
 - Residual cysts.
2. Cysts derived from reduced enamel epithelium:
 - Dentigrous cyst.
 - Eruption cyst.
3. Cysts derived from dental lamina:
 - Odontogenic Keratocyst.
 - Lateral periodontal cyst.
 - Gingival cyst of the adult.
 - Dental lamina cyst of newborn.
 - Glandular odontogenic cyst.
4. Unclassified:
 - Paradental cyst.

Dentigerous Cyst (Follicular cyst):

The Dentigerous cyst is defined as a cyst that originates by the separation of follicle from around the crown of an unerupted tooth. It is the most common type of developmental odontogenic cysts making about 20% of all epithelium-lined cysts of the jaws. The dentigerous cyst encloses the crown of an unerupted tooth and is attached to the tooth at the cemento-enamel junction.

The pathogenesis of this cyst is uncertain, but apparently it develops by the accumulation of fluid between the reduced enamel epithelium and the tooth crown.



Clinical Features:

- Most often dentigerous cyst involve the mandibular third molar. Other frequent sites include maxillary canines, maxillary third molars and mandibular second premolars.
- Dentigerous cysts are discovered most frequently in patients between 10-30 years of age.
- Slight male predilection.
- Small dentigerous cysts are completely asymptomatic & are discovered only on a routine radiographic examination or to determine the reason for the failure of a tooth to erupt.
- Large cysts may be associated with a painless expansion of the bone.

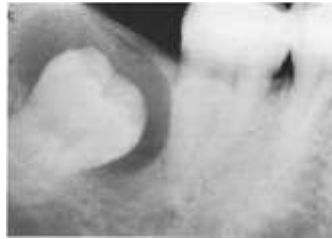
When dentigerous cysts become infected they may be associated with pain and swelling.

Radiographically:

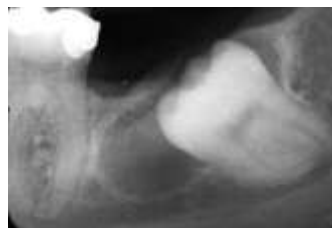
Dentigerous cysts show a unilocular radiolucent area that is associated with the crown of an unerupted tooth. The radiolucency has a well-defined & sclerotic border. Dentigerous cysts may displace the involved tooth to a considerable distance. Root resorption of adjacent erupted teeth can occur.

The cyst- crown relationship shows several radiographic relations:

The **Central** relation, which is the most common, the cyst surrounds the crown of the tooth and the crown projects into the cyst.



The **Lateral** relation is usually associated with mesioangular impacted mandibular third molar that are partially erupted. The cyst grows laterally along the root surface and partially surrounds the crown.



The **circumferential** relation, the cyst surrounds the crown & extends for some distance along the root so that a significant portion of the root appears to lie within the cyst .



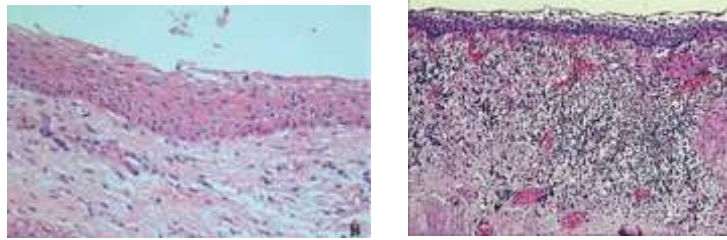
Histopathological Features:

The histopathological features of dentigerous cyst vary depending on whether the cyst is inflamed or not.

In the **non-inflamed dentigerous cyst**, the cyst is lined by epithelium of 2-4 layers thickness of flattened nonkeratinized cells. The fibrous connective tissue wall is loosely arranged. Small islands or cords of inactive- appearing odontogenic epithelial rests may be present in the fibrous wall.

In the **inflamed dentigerous cyst**, the fibrous wall is more collagenized with a variable infiltration of chronic inflammatory cells. The epithelial lining shows variable amount of hyperplasia, rete ridges formation and more definite squamous

features. Focal areas of mucous cells may be found in epithelial lining of dentigerous cysts.



Treatment:

The usual treatment for dentigerous cyst is careful enucleation together with removal of the unerupted tooth. If eruption of the involved tooth is considered feasible, the tooth may be left in place after partial removal of the cyst wall. Patient may need orthodontic treatment to assist eruption.

Prognosis: for most dentigerous cysts is excellent and recurrence is seldom after complete removal .

A possibility that the lining of the dentigerous cyst may undergo neoplastic transformation in to:

- Ameloblastoma
- Squamous cell carcinoma rarely arise in the lining of dentigerous cyst.
- Intraosseous mucoepidermoid carcinoma likely develop from the mucous cells in the lining of the dentigerous cyst.

Eruption Cyst (Eruption Hematoma)

The eruption cyst is the soft tissue analogue of the dentigerous cyst. The cyst develops as a result of separation of the dental follicle from around the crown of an erupting tooth that is within the soft tissue overlying the alveolar bone.

Clinical features:

- The eruption cyst appears as a soft, often translucent swelling in the gingival mucosa overlying the crown of an erupting tooth deciduous or permanent tooth.
- Mostly affecting children younger than age 10 years.
- Most commonly associated with the first permanent molars and the maxillary incisors.
- Surface trauma may result in a considerable amount of blood in the cystic fluid, which render the cyst a blue to purplish-brown color. Such lesions sometimes are referred to as Eruption Hematomas

Histopathological features:

Intact eruption cysts seldom are submitted to histopathological examination, and most specimens consist of the excised roof of the cyst, which has been removed to facilitate tooth eruption.

These show surface oral epithelium on the superior aspect. The underlying lamina propria shows inflammatory cells infiltration. The deep portion of the specimen which represents the roof of the cyst shows a thin layer of nonkeratinizing squamous epithelium.

Treatment and Prognosis:

Treatment may not be required because the cyst usually ruptures spontaneously, permitting the tooth to erupt. If this does not occur, simple excision of the roof of the cyst generally permits speedy eruption of the tooth.

Odontogenic Keratocyst:(OKC)

The odontogenic keratocyst (OKC), is a distinctive form of developmental cysts that deserves special consideration because of its specific histopathological features and clinical behavior. Odontogenic keratocyst believed to arise from cell nests of the dental lamina.

Pathogenesis & Expansion of OKC:

Although hydrostatic forces are probably involved in expansion, other hypotheses have been involved to account for the growth pattern of the lesion.

Possible factors involved in OKC expansion:

- 1- Hydrostatic forces: same mechanism suggested for radicular cyst. OKC contents are hypertonic when compared with serum & the lining acts as an efficient semipermeable membrane. However, hydrostatic pressure alone would result in a unicentric ballooning pattern of expansion.
- 2- Active epithelial growth: Epithelial lining of OKC exhibits greater mitotic activity than other odontogenic cysts. Proliferation of local groups of epithelial cells could account for folding in the cyst lining & projection of the cyst along cancellous spaces resulting in a multicentric pattern of growth.
- 3- Production of bone resorbing factors: Including prostaglandins & IL-1 & IL-6.
- 4- Accumulation of mural squames: Which might result in localized areas of increased pressure that lead to resorption of bone.

Clinical Features:

- Most commonly affect people between 10-40 years age.

- Slight male predilection
- Mandible is involved more than the maxilla, with marked tendency to occur in the posterior body of mandible and ascending ramus.
- Small OKCs are usually asymptomatic & discovered only during radiographic examination. Larger OKCs may be associated with pain, swelling, or drainage.
- OKCs tend to grow in antero-posterior direction within the medullary cavity of the bone without causing obvious bone expansion. This feature may be useful in differential clinical & radiographic diagnosis because dentigerous cyst and radicular cyst of comparable size are usually associated with bony expansion.

. Multiple OKCs may be present, and such patients should be evaluated for other manifestations of Nevoid Basal Cell Carcinoma (Gorlin Syndrome). In this syndrome the patient complains from multiple clinical features, most common are (multiple basal cell carcinomas, OKCs, Epidermal cysts of the skin), in addition to many other manifestations.

Radiographic features:

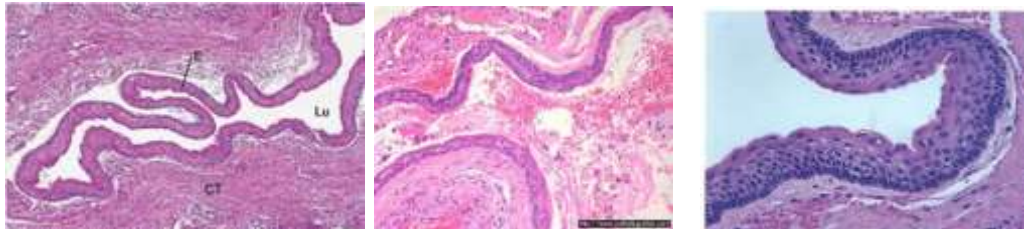
OKC demonstrates a well-defined radiolucent area with smooth and often corticated margins. Large lesions, particularly at the posterior body & ascending ramus of the mandible, may appear multilocular. An unerupted tooth is involved in some OKCs, in such instances, the radiographic features suggest the diagnosis as dentigerous cyst. Resorption of roots of erupted teeth adjacent to OKC is less common than that noted in dentigerous and radicular cysts.

The diagnosis of OKCs is based on the histopathological features, because although the radiographic findings often highly suggestive, but not diagnostic. The radiographic features of OKC could be similar to radiographic findings of a dentigerous cyst, a radicular cyst, a lateral periodontal cyst, a residual cyst or a globulomaxillary cyst.

Histopathological features:

- The OKC typically shows a thin, friable wall, which is often difficult to enucleate from the bone in one piece.
- The cystic lumen may contain a clear fluid similar to serum, or it may be filled with a cheesy material that is on microscopical examination consists of keratin material.
- Microscopically, the thin fibrous wall is essentially devoid of any inflammatory infiltrate.

- The epithelial lining is composed of a uniform layer of stratified squamous epithelium, usually 6-8 cells in thickness.
- The epithelium and connective tissue interface is flat. Detachment of portions of the cyst-lining epithelium from the fibrous wall is commonly observed.
- The luminal surface shows flattened parakeratotic epithelial cells, which exhibit a wavy or corrugated appearance.
- The basal epithelial layer is composed of a palisaded layer of cuboidal or columnar epithelial cells which are often hyperchromatic.
- Small satellite cysts, cords or islands of odontogenic epithelium may be seen within the fibrous wall.
- In the presence of inflammatory changes, the typical features of OKC may be altered.



Treatment & Prognosis:

Most OKCs are treated by enucleation and curettage. Complete removal of the cyst in one piece is often difficult, because of the thin, friable nature of the cyst wall.

Recurrence rate is high & clinical follow-up of the sit of surgery is advisable.

Recurrence after treatment may be due to either:

- Fragments of the original cyst that are not removed at the time of operation.
- Presence of daughter cysts in the cyst wall.
- Focal separation of epithelial lining from underlying C.T make surgical removal very difficult.

Gingival Cysts of Adults:

Clinical Features:

- Derived from dental lamina rests
- Middle-aged adults (5th-6th decades)
- Mandibular canine/premolar region most common
- Bluish-translucent swelling, often centered in attached gingival

Radiographic features: None, sometimes saucerization of the underlying bone

Histopathological features:

- Thin, non-keratinized cuboidal to stratified squamous epithelium
- Occasional clear cells
- Nodular thickenings of epithelial lining may be seen.

Treatment: Enucleation.

Gingival Cyst of NewBorn:

- Uncommon soft tissue raised nodules on edentulous alveolar ridges of the infant which is resolved without treatment.
- It is derived from rests of dental lamina & composed of keratin-producing epithelium .

Calcifying Odontogenic Cyst (COC): (Ghost Cell Cyst)

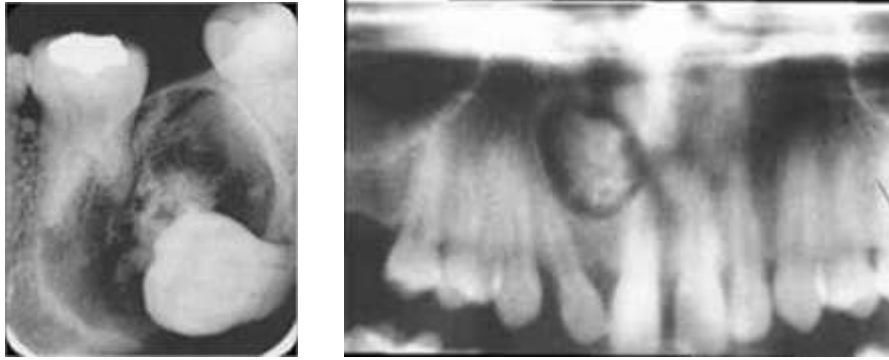
It is an uncommon lesion, although it is widely considered as a cyst, many investigators prefer to classify it as a neoplasm. The solid variant is known as (Odontogenic Ghost Cell Tumor). It is believed to develop from odontogenic epithelial remnants within gingiva, mandible or maxilla.

Clinical Features:

- It affect young patients in the second decade of life, predilection for females .
- Most of the cases are seen in the maxilla.
- The central (intraosseous) lesions cause painless expansion of the buccal& lingual cortices.
- Rarely, peripheral (extraosseous) masses involving the gingiva of older than 50 years patients found anterior to the first molar region.

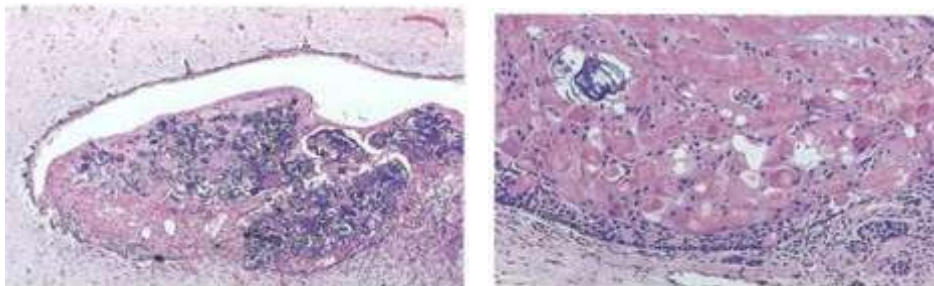
Radiographical Features:

COC presented as unilocular or multilocular radiolucency with well demarcated Margins. Within the radiolucency there may be scattered of irregular sized calcifications. In many cases the radiolucent lesion is associated with crown of unerupted tooth.



Histopathological Features:

- Many COCs presented as well-defined cystic cavity with a fibrous tissue wall & a lining of odontogenic epithelium, other lesions intraluminal epithelial proliferation obscure the cyst lumen and produce a solid tumor.
- The epithelial lining similar to that of ameloblastoma Composed of outer layer of palisaded columnar basal Cells & inner layer of stellate reticulum.
- Enlarged eosinophilic epithelial cells without visible Nuclei known as Ghost Cells are present within the Stellate reticulum-like area.
- Multiple spherical& diffuse calcifications within the Epithelia & C. T is present also.

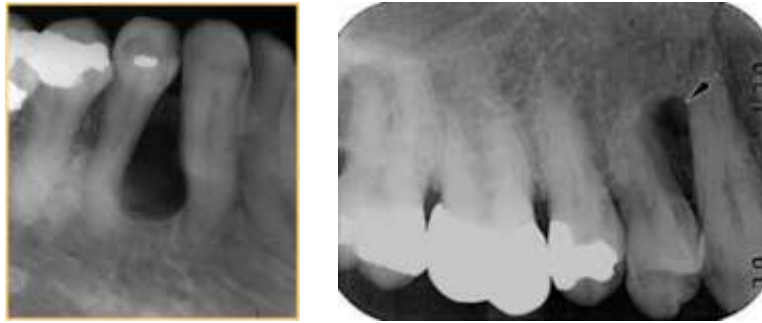


Treatment: Cystic lesion is treated by enucleation as a non-neoplastic cyst, whereas Solid lesions may be treated more aggressively.

Lateral Periodontal Cyst (Botryoid Odontogenic Cyst)

- Derived from dental lamina rests
- Affect middle aged adults, males/ female ratio is 2:1
- Share gingival cyst in clinical & histopathological features
- Asymptomatic, causes boney expansion usually in the mandibular canine/premolar, less than 1 cm.

Radiographic features: Well-defined, round or teardrop- shaped radiolucency with opaque margin along the lateral surface of a vital tooth. The term **botryoid** Odontogenic cyst is sometimes used when the lesion is multilocular.



Histopathological features:

- Identical to gingival cyst of the adult
- Cyst lining is a Non-keratinized epithelium, focal nodular thickenings, clear cell.

Treatment: Enucleation with uncommon recurrence.

Glandular Odontogenic Cyst:

Clinically:

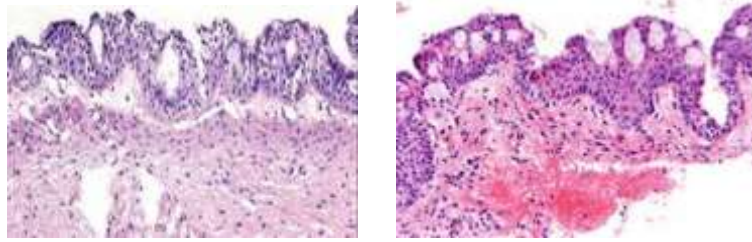
- More recently described
- Mandible commonly involved, usually anterior region
- Very slow progressive growth

Radiographic findings

Unilocular or multilocular radiolucency

Histopathologic features:

- Uniform thickness of squamous epithelia with focal thickening.
- Variable number of small glandular structures within epithelial lining
- A single layer of columnar or cuboidal cells lining the glandular structure replacing the surface layer of stratified squamous epithelium of cyst lining.
- Occasionally, goblet-like mucous secreting cells are present.
- Recurrence is possible.



Paradental Cyst

- Cyst of uncertain origin on the distal aspect of vital mandibular third molar involving pericoronitis
- It could arise from rest of malassez , reduced enamel epithelium or dental lamina .
- Radiographically, show well circumscribed radiolucency on the distal aspect of lower third molar.
- Histologically similar to periapical cyst with significant inflammation.

Non-Epithelial Primary Bone Cysts (Pseudocysts)

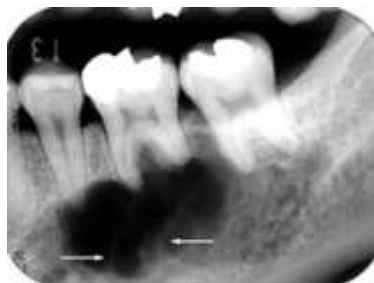
Solitary Bone Cyst (Simple or Traumatic or Hemorrhagic Bone Cyst)

Etiology: unknown although sometimes suggested, hematoma is formed intramedullary portion of bone. The blood clot breaks down for unknown reason rather than organization, leaving an empty cavity by subsequent hemolysis.

Clinical Features:

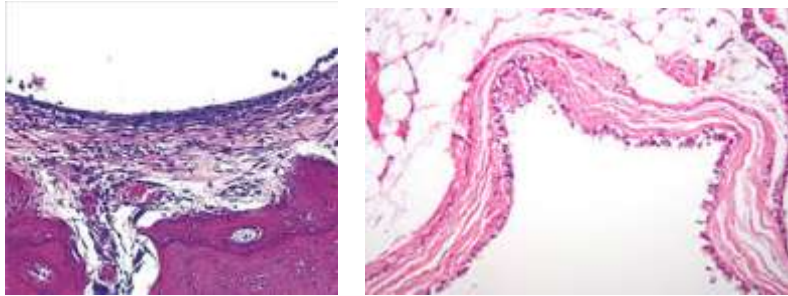
- Teenagers most commonly affected, a symptomatic lesion
- Mandible most common site of occurrence anteriorly or posteriorly.

Radiographically: delineated area of radiolucency with an irregular edge is discovered on routine examination. Scalloping is a prominent feature especially around & between roots of teeth



Histologically:

- Lack of epithelial lining therefore it is not a true cyst.
- Fibrous connective tissue with occasional chronic inflammatory cells lining the bone cavity.
- Empty or fluid filled cavity.



Surgical exploration: rough bony-walled cavity devoid of any detectable soft tissue lining, the cavity is empty or with little clear or blood stained fluid. Rapid healing follow surgical exploration & cyst resolve spontaneously with time.