

# *Cysts*

## **THE CLINICAL PRESENTATION OF CYSTS**

A cyst is a uni- or multilocular, epithelium-lined cavity of various aetiologies that contain liquid or gaseous materials. Most cysts in the oral region are intra-bony. Unless a cyst has grown to a large size, thereby causing palpable and visible expansion, or has become secondarily infected, acutely inflamed and, thus painful, it does not advertise its presence. Many cysts are therefore found incidentally during radiographic examination carried out for other purposes. The "OPG" type of radiograph is particularly valuable in disclosing cysts and cystic lesions, which would otherwise have remained undiscovered. The majority of intraosseous cysts lead to a clearly defined radiolucency in the bone although in some instances there is more than one radiolucent area. A cyst appearing as a single radiolucency is referred to as unilocular, while one which appears as several, often confluent, cavities, is described as multilocular. Most cysts are unilocular. A "cystic" appearance on a radiograph cannot, however, be considered as definitely diagnostic because other pathological conditions can give rise to similar radiographic changes (e.g. periapical granuloma, ameloblastoma). Cysts can cause resorption of bone and tooth roots and can displace teeth.

## **THE FORMATION OF CYSTS**

It was thought that some cysts (fissural or inclusion) arose because of a failure of normal suppression of the growth of epithelial rests included in the lines of fusion of embryonic processes. The theory has been discredited because it has been shown that during development the fissures between embryonic processes are obliterated and there is no entrapment of epithelium.

Epithelium which is involved in a chronic inflammatory process is stimulated to grow and may lead ultimately to cyst formation. This mechanism may well operate in the formation of radicular and paradental cysts. Degeneration of the central epithelium, because of lack of nutrients, within a growing epithelial mass results in a situation where, because of a higher internal osmotic pressure from broken down cells, fluid flows in from outside the cyst, the hydrostatic pressure within the cyst increases and stimulates its further growth. In the developmental odontogenic cysts the stimulus that causes epithelial growth is uncertain. In the odontogenic keratocyst the proliferation of the epithelium has features in common with proliferation in benign neoplasms. The odontogenic keratocyst is now regarded as a benign odontogenic neoplasm. Epithelial-mesenchymal interactions are important in the growth of odontogenic cysts. It has been shown that expansion involves degradation of bone matrix and cell attachment to the extracellular matrix components.

## THE HISTOLOGICAL STRUCTURE OF CYSTS

Lesions which have the radiographic appearance of cysts and which are found to be cystic when being removed are subjected to histological examination to determine whether or not they are cysts and whether the cyst lining possesses any prognostically significant features.

All cysts are made up of three components:-

- a) Fibrous connective tissue cyst wall 'capsule'
- b) Epithelial lining
- c) Contents of lumen

In some situations the definite diagnosis is formed from the clinical information and the histological features (e.g. radicular cysts, dentigerous cyst). On other occasions the histological features alone are diagnostic (e.g. odontogenic keratocyst).

A variety of epithelia are found in cyst linings, e.g. the diagnostically characteristic epithelia of odontogenic keratocyst and of calcifying odontogenic cyst, and epithelia such as respiratory, mucus-secreting, and non-keratinising stratified epithelium. In addition, superimposed on any or all of these, changes wrought by inflammation may be seen. This may involve hyperplasia and degeneration of epithelium which often contains numerous neutrophils. As a result of inflammation in the cyst wall the characteristic appearance may be lost e.g. odontogenic keratocyst epithelium becomes a simple stratified epithelium.

The presence of areas of acutely inflamed tissue, numerous inflammatory cells and sometimes a proliferation of granulation tissue to give "inflammatory nodules" on the cyst wall are frequent histological findings especially in cysts of inflammatory origin. Occasionally, small calcified nodules are also found in cyst epithelium. The pathologist who is going to examine a cyst histologically will look at the lining carefully and take sections through any mural thickenings because this is where changes in the lining may be found.

## THE CLASSIFICATION OF CYSTS

WHO histological typing of odontogenic tumours

I.R.H. Kramer, J. J. Pindborg and M. Shear 1997

### A. Developmental

#### a. Odontogenic

- i. Gingival cysts of infants (Epstein's pearls)
- ii. \*Odontogenic keratocyst (primordial cyst) (Keratocystic Odontogenic Tumour)
- iii. Dentigerous (follicular cyst)
- iv. Eruption cyst
- v. Lateral periodontal cyst
- vi. Gingival cyst in adults
- vii. Glandular odontogenic cyst; sialo-odontogenic cyst
- viii. \*Keratinising and Calcifying Odontogenic Cyst (KCOC)

#### b. Non-odontogenic

- i. Nasopalatine duct (incisive canal) cyst
- ii. Nasolabial (nasolabial) cyst

### B. Inflammatory

#### a. Radicular cyst

- i. Apical and lateral
- ii. Residual

#### b. Paradental (inflammatory collateral, mandibular infected buccal) cyst

## Gingival cysts of infants/ Epstein's Pearls

Epstein's pearls or gingival cysts of infants are small extraosseous cysts found in most newborns. Their prevalence has not been accurately ascertained to its ability to resolve on its own within weeks to months. Gingival cysts of infants are believed to form via one of two processes. Some believe that they occur as a remnant of dental lamina but it is also suggested that it is due to the epithelium becoming trapped as palatal shelves fuse in the midline during the 6-8<sup>th</sup> week of pregnancy. Originally described as a separate entity as Bohn's nodules which occurred on the palates of newborns, the terms are now used interchangeably.

### Clinical features

- Small in size (1-3mm)
- Multiple white/ yellow, raised nodules
- Occur on the alveolar ridges and mid-palatal mucosa
- Painless
- Rarely seen after 3 months



**Fig. 15-32** Gingival cyst of the newborn. Multiple whitish papules on the alveolar ridge of a newborn infant.

### Histopathology

- Lined by a thin keratinised squamous epithelium
- Contain keratin in their lumen

### Treatment

- No treatment is required, as they resolve on their own within a few weeks or months with friction from feeding

## Odontogenic Keratocyst/ primordial cyst

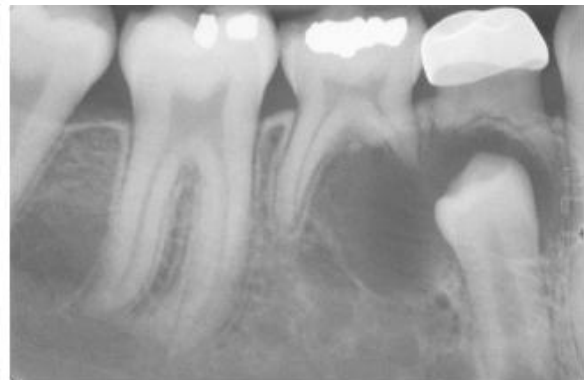
Odontogenic Keratocysts are of special importance in dentistry due to its greater tendency to recur. Although they are not of greater likelihood of malignant change than other odontogenic cysts, it is imperative to continue monitoring these lesions. Odontogenic keratocysts are also important due to its characteristic histopathological features and clinical behaviour. Similar to many other cysts, it is thought to arise from cell rests of the dental lamina. Its growth has been likened to that of benign cystic neoplasms, prompting the WHO classification change in 2005. Unknown factors inherent in the epithelium itself or enzymatic activity in fibrous wall have been implicated in its development. 60% of cases occur between 10-40 years of age, and 60-80% of these cysts are found in the mandible.

### Clinical and radiographic features

- Small odontogenic keratocysts are usually asymptomatic and incidental findings with radiographs. Larger cysts may be associated with pain, swelling, drainage but are not always symptomatic
- Tend to grow in antero-posterior direction, without causing obvious bone expansion
- If multiple odontogenic keratocysts present, the patient should be evaluated for nevoid basal cell carcinoma (Gorlin) syndrome
- Cannot be radiographically be distinguished from many other cysts. If it involves and unerupted tooth it may appear like dentigerous cyst and needs to be distinguished histologically
- Well defined radiolucent area with smooth and corticated margins
- Larger lesions may appear multilocular due to superimposed trabecular bone pattern



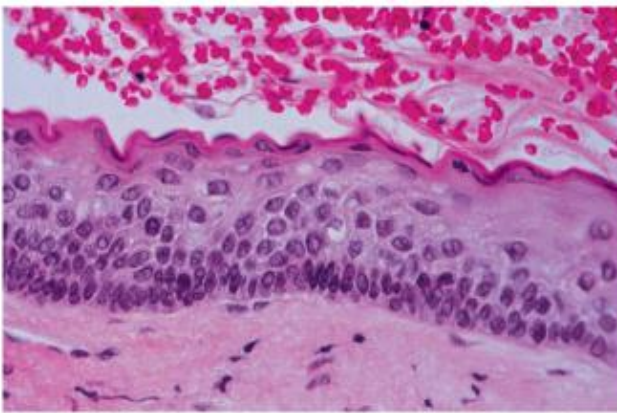
**Fig. 15-13** Odontogenic keratocyst. Large, multilocular cyst involving most of the ascending ramus. (Courtesy of Dr. S.C. Roddy.)



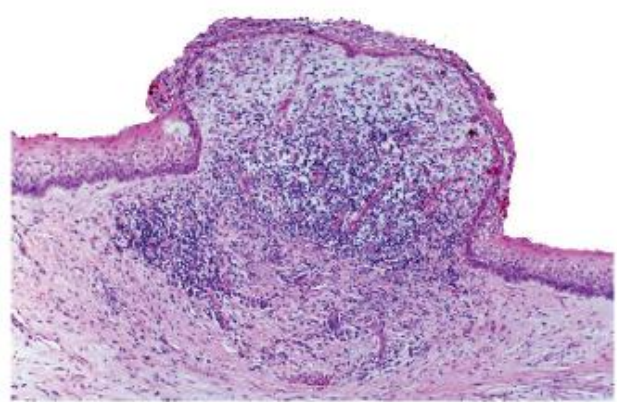
**Fig. 15-14** Odontogenic keratocyst. This cyst involves the crown of an unerupted premolar. Radiographically, this lesion cannot be differentiated from a dentigerous cyst.

### Histopathological features

- Thin friable wall, often difficult to enucleate from bone in one piece
- Walls devoid of inflammatory infiltrate
- Cystic lumen may contain clear liquid, keratinaceous debris
- Epithelial lining composed of a uniform layer of stratified squamous epithelium, usually 6-8 cells in thickness
- Epithelium and CT interface usually flat, rete ridge formation inconspicuous
- Detachment of cyst-lining epithelium from fibrous walls
- Luminal surface shows flattened parakeratotic epithelial cells
  - Corrugated appearance
- Basal epithelial layer- cuboid/ columnar cells, often hyperchromatic
- These typical features may be altered in the presence of inflammatory changes



**Fig. 15-17** Odontogenic keratocyst. The epithelial lining is 6 to 8 cells thick, with a hyperchromatic and palisaded basal cell layer. Note the corrugated parakeratotic surface.



**Fig. 15-18** Odontogenic keratocyst. The characteristic microscopic features have been lost in the central area of this portion of the cystic lining because of the heavy chronic inflammatory cell infiltrate.

### Diagnosis

- Is via histopathological features, as many radiographic features are shared with other lesions

### Treatment

- Enucleation and curettage, similarly to other odontogenic cysts
- Difficult to excise in one piece, which is why they tend to recur (if not removed fully after treatment or new cyst formation)
- Peripheral ostectomy of bone cavity has been suggested to reduce frequency of recurrence
- Overall prognosis good with no greater tendency to undergo malignant change than other odontogenic cysts

## Addendum (A Polonowita)

### [Keratocystic Odontogenic Tumour (KCOT)]

Associated with mutations of the PTCH gene (Hedgehog signalling pathway) are thought to arise from the dental lamina. Previously termed Odontogenic Keratocyst (OKC)

They are benign and locally aggressive developmental neoplasm with a cystic component.

Management is with wide excision and monitoring for possible recurrence. Multiple KCOT can be associated with Basal Cell Nevus Syndrome (Gorlin Goltz syndrome), Autosomal dominant and can present with:

- pitting in the palms of the hands or on the feet
- KCOT, Bifid Ribs, calcified falx cerebri
- large head size
- cleft palate
- eyes that are spaced far apart
- a protruding jaw
- spinal problems, including scoliosis or kyphosis

And may be associated with the development of Medulloblastoma, Breast Cancer, Non-Hodgkin's Lymphoma and ovarian cancer. ]

## Dentigerous/ follicular cyst

A dentigerous cyst is one that is associated with the crown of an unerupted tooth and is attached to the tooth at the cemento-enamel junction. It originated by separation of the follicle from around the crown of the unerupted tooth, where fluid is able to accumulate and cause in the follicular space.

Clinical and radiographic features

- Can affect any unerupted tooth but often involves the mandibular third molars
- Small dentigerous cysts can be asymptomatic, larger cysts can involve expansion into bone (not necessarily painful)
  - Extensive lesions may result in asymmetry but is rare
- Can become infected and painful
- Radiographically
  - Unilocular radiolucent area associated with crown of unerupted tooth

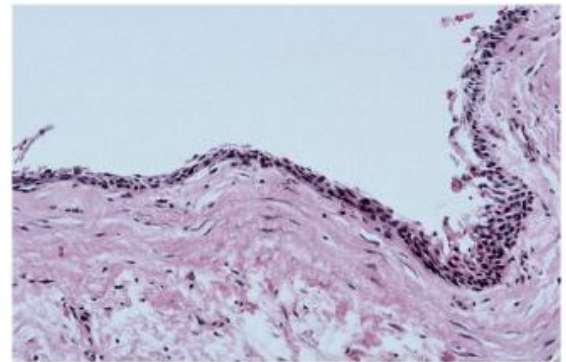
- Usually has well-defined corticated border (if infected, border may be ill-defined)

#### Diagnosis

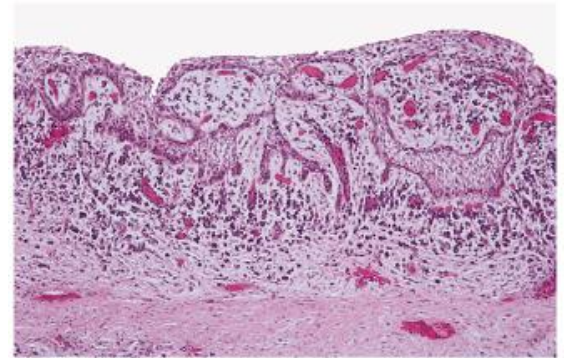
- When it is smaller in size, it must be distinguished from normal anatomy, where it appears like an enlarged follicle, as well as odontokeratocysts and ameloblastomas if larger in size.
- Dentigerous cysts needs to be at least 3-4 mm in diameter to differentiate from an enlarged follicle
- Larger lesions need to be distinguished histologically

#### Histological features

- Fibrous connective tissue in the cyst wall of variable thickness (tends to be thicker if inflamed)
- Lined by thin non-keratinised stratified squamous epithelium (1-4 cells thick)
- Diffuse inflammatory exudate may be present if inflamed



**Fig. 15-6 Dentigerous cyst.** This noninflamed dentigerous cyst shows a thin, nonkeratinized epithelial lining.



**Fig. 15-7 Dentigerous cyst.** This inflamed dentigerous cyst shows a thicker epithelial lining with hyperplastic rete ridges. The fibrous cyst capsule shows a diffuse chronic inflammatory infiltrate.

#### Treatment

- Ensure lesion does not represent a more significant pathologic process, and is not resorbing roots of adjacent teeth
- Carefully enucleation of cyst with removal of unerupted tooth unless eruption seems feasible (partial removal of cyst)
- Prognosis excellent, seldom recurrence

### Eruption cyst/ eruption haematoma

Eruption cysts similarly develop as a result of separation of the dental follicle from around the crown an erupting tooth but instead occurs within the soft tissues overlying the alveolar bone. They are most commonly associated with mandibular central incisors, first permanent molars and deciduous maxillary incisors. Eruption haematoma's occur when the superficial, fluid filled cyst becomes infiltrated with blood as a result of surface trauma giving it its distinct blueish, purple colour.

### Clinical features

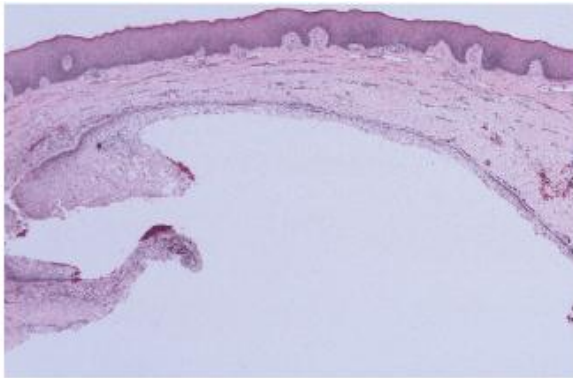
- Soft, often translucent swelling in the gingival mucosa overlying the crown of erupting deciduous or permanent tooth
- Eruption haematomas have a distinct blue- purple-brown colour

### Histological features

- Surface oral epithelium on superior aspect
- Underlying lamina propria shows variable inflammatory cell infiltrate
- Roof of cysts shows thin layer of non-keratinising squamous epithelium



**Fig. 15-9** Eruption cyst. This soft gingival swelling contains considerable blood and can also be designated as an eruption hematoma.



**Fig. 15-10** Eruption cyst. A cystic epithelial cavity can be seen below the mucosal surface.

### Treatment

- Cysts usually ruptures spontaneously and treatment may not be required
- Excision of the cyst roof may promote eruption

## Lateral periodontal cyst/ Botryoid odontogenic cysts

Lateral periodontal cysts are an uncommon type of odontogenic cysts that occurs along lateral root surface of a tooth in the periodontal ligament space. Again, this cyst arises from rests of dental lamina. It represents intrabony counterpart of gingival cyst of adult, discussed in the next section. They are referred to as Botryoid odontogenic cysts when they have a polycystic or 'grape-like' appearance. These lesions tend to occur in the fifth to seventh decade of life and rarely before 30 years of age.



**Fig. 15-38** Lateral periodontal cyst. A larger lesion causing root divergence.

### Clinical and radiographic features

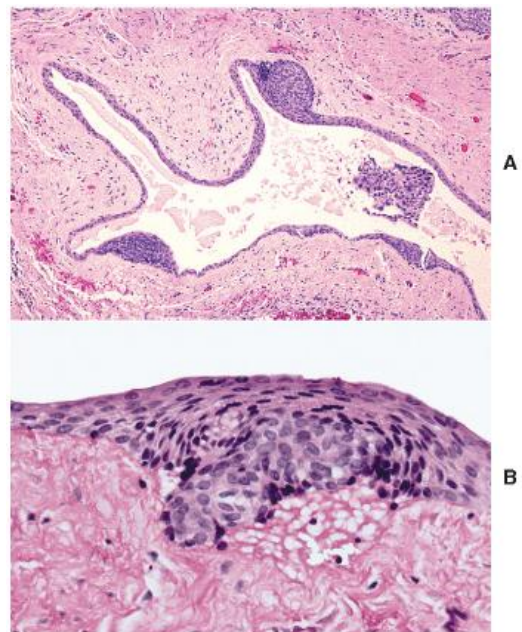
- Most often asymptomatic, detected only during radiographic examination, but is not enough to diagnose from radiographs alone
- Well circumscribed radiolucent area located laterally to root or roots of vital teeth
- Most are less than 1.0cm in diameter
- May have polycystic appearance (Botryoid odontogenic cysts)
  - Grapelike cluster of small individual cysts

### Histological features

- Thin, generally non inflamed, fibrous wall with epithelial lining only 1-3 cells thick in most areas
- Epithelium- flattened squamous cells, sometimes cuboidal
- Some show focal nodular thickenings of lining epithelium, composed chiefly of clear cells
- Clear cell epithelial rests sometimes seen within fibrous wall

### Treatment

- Conservative enucleation
  - Usually can be done without damage to adjacent teeth
- Recurrence is unusual, but if it does occur, the Botryoid variant is usually implicated



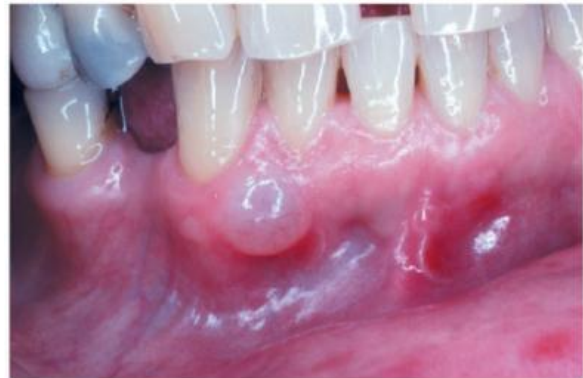
**Fig. 15-40** Lateral periodontal cyst. A, This photomicrograph shows a thin epithelial lining with focal nodular thickenings. B, These thickenings often show a swirling appearance of the cells.

## Gingival cyst in adults

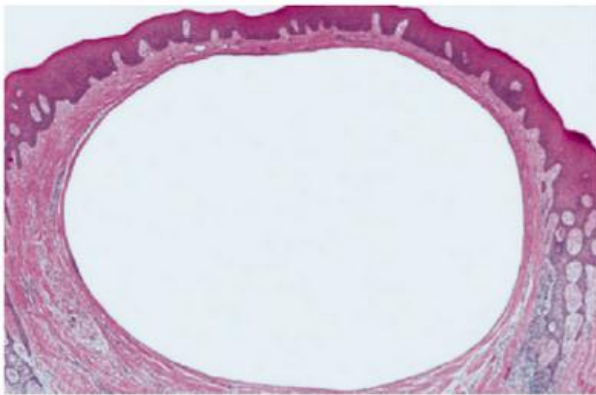
Gingival cysts in adults are uncommon. The diagnosis of gingival cysts in adults are restricted to lesions with the same histopathologic features as those of the lateral periodontal cyst. These cysts tend to occur in the mandibular canine and premolar area (60-75% of cases). They are most commonly found in patients in the fifth and sixth decades of life. They are almost invariably located on the facial gingiva or alveolar mucosa. Maxillary gingival cysts are usually found in the incisor, canine, and premolar areas.

### Clinical features

- Painless, dome-like swellings
- Usually less than 0.5cm in diameter
- Often bluish or blue-gray
- May cause superficial “cupping out” of alveolar bone, usually not detected on a radiograph but is apparent when cyst is excised



**Fig. 15-33** Gingival cyst of the adult. Tense, fluid-filled swelling on the facial gingiva.



**Fig. 15-34** Gingival cyst of the adult. Low-power photomicrograph showing a thin-walled cyst in the gingival soft tissue.

### Histopathologic features

- Thin, flattened epithelial lining with or without focal plaques that contain clear cells
- Small nests of glycogen-rich clear cells

### Treatment

- Surgical excision

## Glandular odontogenic cyst; sialo-odontogenic cyst

The glandular odontogenic cyst is a rare type of developmental cyst that can show aggressive behaviour. Although it is generally accepted as being odontogenic in origin, it also shows glandular or salivary features that presumably are an indication of the pluripotentiality of odontogenic epithelium. Occurring most commonly in middle-aged adults, the cyst tends to occur in the anterior region of the jaws and many mandibular lesions will cross the midline.

### Clinical features

- Size varies from less than 1cm in diameter to lesions that may involve most of the jaw
- Small cysts may be asymptomatic
- Large cysts often produce clinical expansion which sometimes can be associated with pain or paraesthesia



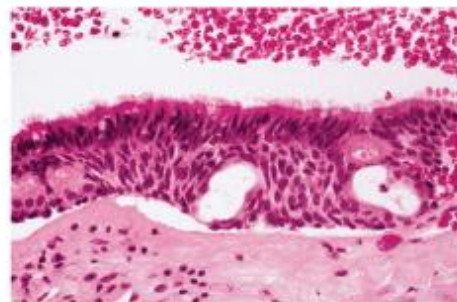
**Fig. 15-47 Glandular odontogenic cyst.** **A**, Expansile lesion of the anterior mandible. **B**, The panoramic radiograph shows a large multilocular radiolucency. (Courtesy of Dr. Cheng-Chung Lin.)

### Radiographic features

- Unilocular or multilocular radiolucency
- Margins of radiolucency well defined with a sclerotic rim

### Histopathologic features

- Lined with squamous epithelium of varying thickness
- Interface between epithelium and fibrous connective tissue wall generally flat
- Fibrous cyst wall usually devoid of any inflammatory cell infiltrate
- Superficial epithelial cells line cyst cavity (cuboidal to columnar)



**Fig. 15-48 Glandular odontogenic cyst.** The cyst is lined by stratified squamous epithelium that exhibits surface columnar cells with cilia. Small microcysts and clusters of mucous cells are present.

### Treatment

- Enucleation or curettage
- Some have suggested *en bloc* resection due to its aggressive nature and tendency for recurrence

## Addendum ( A Polonowita)

### [Keratinizing and Calcifying Odontogenic Cyst ( KCOC)

The keratinizing and calcifying odontogenic cyst (KCOC), or Gorlin cyst, is not actually a cyst but rather a neoplasm with cystic tendencies. Some KCOC lesions are actually solid. This is a very rare lesion with no age, sex, or location predilections. KCOC may be found anywhere in the jaws, and one fourth of lesions are found in peripheral soft tissue (eg, gingiva). If KCOC is not discovered as an incidental finding on radiographic examination, the earliest clinical presentation usually is a localized swelling.

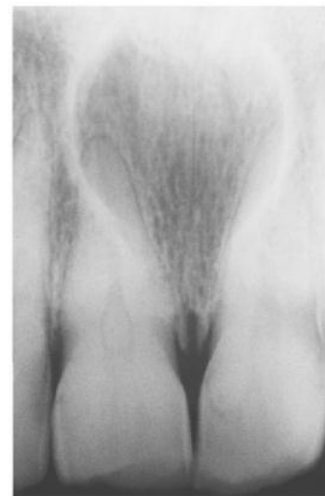
]

### Nasopalatine duct (incisive canal) cyst

The nasopalatine duct cyst is the most common non-odontogenic cyst of the oral cavity, however only occurs in 1% of the population. The cyst is believed to arise from remnants of the nasopalatine duct, an embryologic structure connecting the oral and nasal cavities in the area of the incisive canal. In spite of being a “developmental cyst”, the lesion is rarely seen during the first decade but is most common in the fourth to sixth decades of life. The pathogenesis of this lesion remains to be uncertain, but most likely represents a spontaneous cystic degeneration of remnants of the nasopalatine duct.



**Fig. 1-53** Nasopalatine duct cyst. Fluctuant swelling of the anterior hard palate.



**Fig. 1-54** Nasopalatine duct cyst. Well-circumscribed radiolucency between and apical to the roots of the maxillary central incisors.

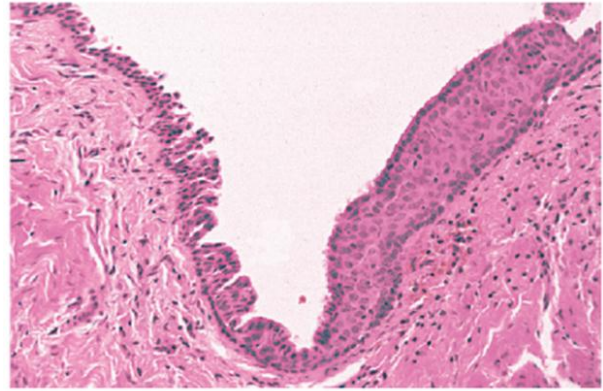
#### Clinical features

- Swelling of the anterior palate
- Drainage
- Pain
- Can be asymptomatic

#### Radiographic features

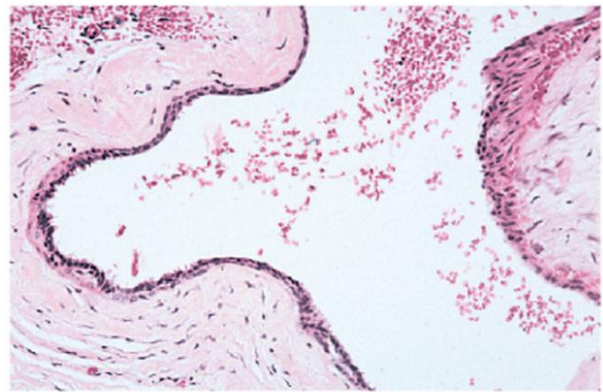
- Well-circumscribed radiolucency in or near the midline of the anterior maxilla, between and apical to the central incisor teeth
- Root resorption rarely noted
- Round or oval with sclerotic border
- May have inverted pear shape

- May have heart shape
- Radiographic diameter can range from 6mm to 6cm
- Most are in the range of 1-2.5cm
- May be difficult to distinguish small nasopalatine duct cyst from a large incisive foramen therefore generally accepted that a radiolucency 6mm or smaller in the area is usually considered a normal foramen unless other clinical signs or symptoms present



**Fig. 1-57** Nasopalatine duct cyst. Cystic lining showing transition from pseudostratified columnar to stratified squamous epithelium.

In rare instances, a nasopalatine duct cyst may develop in the soft tissues of the incisive papilla area without any bony involvement. Such lesions are called cysts of the incisive papilla. These cysts usually present with a bluish discolouration as a result of fluid contents in the cyst lumen.



**Fig. 1-58** Nasopalatine duct cyst. Flattened cuboidal epithelial lining.

#### Histopathologic features

- Epithelial lining may be composed of
  - Stratified squamous epithelium (>75%)
  - Pseudostratified columnar epithelium (33-75%)
  - Simple columnar epithelium
  - Simple cuboidal epithelium
- Cilia and goblet cells when associated with columnar epithelium

#### Treatment

- Biopsy is recommended as the lesion is not diagnostic radiographically
  - Other benign and malignant lesions have been known to mimic the nasopalatine duct cyst
- Treated by surgical enucleation
  - Lesion approached with a palatal flap after incision along the lingual gingival margin of the anterior maxillary teeth



**Fig. 1-51** Nasolabial cyst. A, Enlargement of the left upper lip with elevation of the ala of the nose. B, Intraoral swelling fills the maxillary labial fold. (Courtesy of Dr. Jim Weir.)

## Nasolabial cyst (nasolabial cyst)

The nasolabial cyst is a rare developmental cyst that occurs in the upper lip lateral to the midline. The pathogenesis is uncertain, although there are two major theories. One theory considers the nasolabial cyst to be a “fissural” cyst arising from epithelial remnants entrapped along the line of fusion of the maxillary, medial nasal, and lateral nasal processes. A second theory suggests that these cysts develop from misplaced epithelium of the nasolacrimal duct because of their similar location and histologic appearance. Most commonly seen in adults, these cysts tend to occur in the fourth and fifth decades of life.

### Clinical features

- Swelling of the upper lip lateral to the midline, resulting in elevation of the ala of the nose
- Enlargement often elevates the mucosa of the nasal vestibule and obliterates the maxillary mucolabial fold
- This expansion may result in nasal obstruction or may interfere with wearing of a denture
- Pain uncommon unless lesion is secondarily infected
- Cyst may rupture spontaneously and may drain into the oral cavity or nose

### Radiographic features

- No radiographic changes are seen
- Occasionally, pressure resorption of the underlying bone may occur

### Histopathologic features

- Lined by pseudostratified columnar epithelium
- Often goblet cells and cilia present
- Areas of cuboidal epithelium and squamous metaplasia are not unusual

### Treatment

- Complete surgical excision via intraoral approach

## Radicular cyst (apical, lateral, residual)

Epithelium at the apex of a non-vital tooth can be stimulated by inflammation to form a true epithelial-lined cyst or radicular cyst. The inflammatory response appears to increase the production of keratinocyte growth factor by periodontal stroma cells, leading to increased proliferation of normally quiescent epithelium in the area. The source of the epithelium is usually a rest of Malassez but also may be traced to crevicular epithelium, sinus lining, or epithelial lining of fistulous tracts.

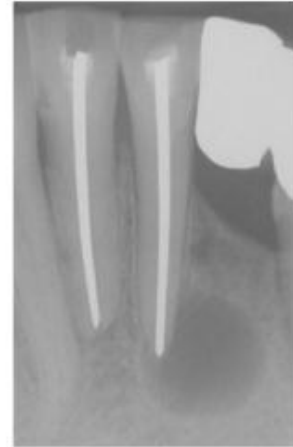
### Apical cyst

#### Clinical features

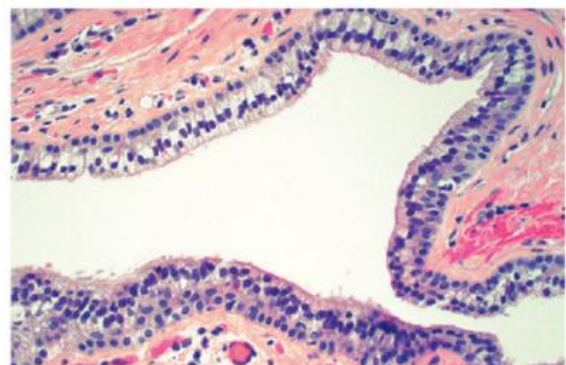
- No symptoms unless there is an acute inflammatory exacerbation
- Swelling and mild sensitivity associated with large cysts
- Movement and mobility of adjacent teeth are possible as cyst enlarges
- Tooth from which the cyst originated does not respond to thermal and electric pulp testing

#### Radiographic features

- Identical to that of periapical granuloma
- Loss of lamina dura along the adjacent root



**Fig. 3-21 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.



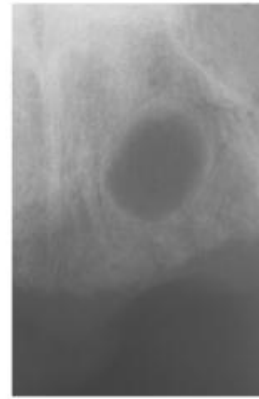
**Fig. 1-52 Nasolabial cyst.** Pseudostratified columnar epithelial lining.

- Round radiolucency encircles affected tooth apex
- Root resorption is common
- With enlargement, radiolucency often flattens out as it approaches adjacent teeth

### *Lateral cyst*

#### Radiographic features

- Discrete radiolucencies along lateral aspect of the root
- Loss of lamina dura
- Obvious source of inflammation may not be detected



**Fig. 3-27 Residual periapical cyst.** Persistent radiolucency of the mandibular body at the site of previous tooth extraction.

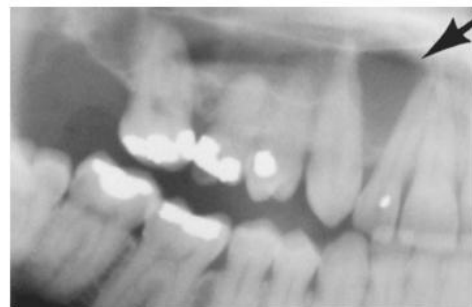
### *Residual cyst*

#### Radiographic features

- Round to oval radiolucency of variable size within the alveolar ridge at the site of a previous tooth extraction
- As cyst ages, degeneration of the cellular contents within the lumen occasionally leads to dystrophic calcification and central luminal radiopacity

#### Histopathologic features

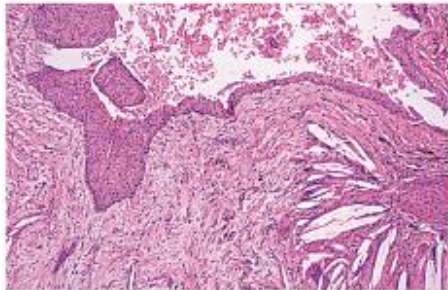
- Lined by stratified squamous epithelium which may demonstrate exocytosis, spongiosis, or hyperplasia
- Scattered mucous cells or areas of ciliated pseudostratified columnar epithelium



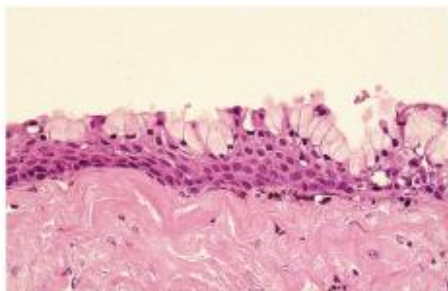
**Fig. 3-26 Lateral radicular cyst.** Inverted pear-shaped radiolucency between the maxillary lateral incisor and cuspid (arrow). The lateral incisor ultimately proved to be nonvital.

#### Treatment

- Extraction
- Conservative nonsurgical endodontic therapy



**Fig. 3-30 Periapical cyst.** Cyst lined by stratified squamous epithelium. Note connective tissue wall, which contains a chronic inflammatory infiltrate and numerous cholesterol clefts.



**Fig. 3-31 Periapical cyst.** Stratified squamous epithelial lining containing numerous mucous cells.

## Paradental cyst (buccal bifurcation cyst)

The paradental cyst is an uncommon inflammatory odontogenic cyst that characteristically develops on the buccal aspect of the mandibular first permanent molar. The pathogenesis of this cyst is uncertain. The cyst typically occurs in children from 5 to 13 years of age.

### Clinical features

- Slight to moderate tenderness on the buccal aspect of the mandibular first molar, which may be in the process of erupting
- Swelling
- Foul-tasting discharge
- Pocket formation

### Radiographic features

- Well-circumscribed unilocular radiolucency involving the buccal bifurcation and root area of the involved tooth
- On average 1.2cm in diameter
- Root apices of the molar are characteristically tipped toward the lingual mandibular cortex

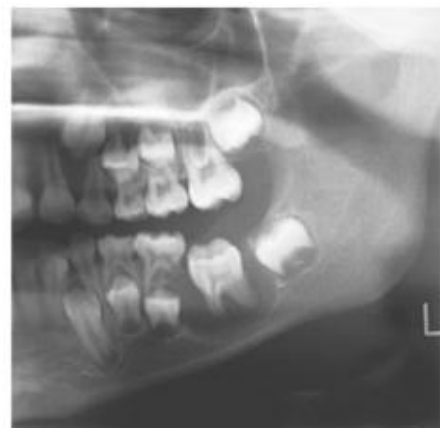
#### Histopathologic features

- Lined with non-keratinised stratified squamous epithelium with areas of hyperplasia
- Prominent chronic inflammatory cell infiltrate is present in surrounding connective tissue wall

#### Treatment

- Enucleation
- Extraction

## Case Study



**Fig. 15-49 Buccal bifurcation cyst.** Well-circumscribed unilocular radiolucency superimposed on the roots of the mandibular first permanent molar. (Courtesy of Dr. Michael Pharoah.)

**This a 30 year old male had an asymptomatic radiolucency around an unerupted 38, as seen in the OPG below.**



**Describe this radiolucency and provide a differential diagnosis.**

Unilocular ovoid radiolucent area with well-defined corticated inferior border. It is associated with the crown of the unerupted 38 and extends to the distal root of 37, although there does not appear to be any resorption of it.

**Differential diagnosis, what could it be?**

Its proximity to an unerupted tooth 38, would highlight the possibility of a dentigerous cyst, where it is attached to the crown at the CEJ. Fluid accumulates in this follicular space and so it presents as a radiolucency. It is most likely the case here.

However, its appearance can mimic that of odontokeratocysts, radicular cysts and ameloblastomas, especially if it is larger in size. These need to be distinguished via histology.

Odontokeratocysts need to be diagnosed histologically. While radicular cysts are a possibility here, the lesion appears to be more associated with the crown of 38 rather than the root of 37. Ameloblastomas too can be associated with unerupted teeth. However, their growth tends to be much more extensive, and can impinge on other structures, which does not appear to occur here.

**In this case, surgery was performed, and cyst-like sac was found covering the crown of a tooth. How do these lesions behave?**

Dentigerous cysts can affect any unerupted tooth but often involve the mandibular third molars. Small dentigerous cysts can be asymptomatic, as is in this case, but larger cysts can involve expansion into bone which may not necessarily be painful. They can become infected and painful. They are treated with careful enucleation with removal of the unerupted tooth.



For further information about cysts:

Neville, B. W., Damm, D. D., Allen, C. M., & Bouquot, J. E. (2009). *Oral and maxillofacial pathology*. St Louis, Missouri: Saunders Elsevier.

## Multiple Choice questions

**1. Which type of cyst is presented in this photograph?**

- a. Nasolabial cyst
- b. Lateral radicular cyst
- c. Nasopalatine duct cyst
- d. Paradental cyst



**2. Which is not a component of a cyst?**

- a. Contents of the lumen
- b. Blood
- c. Epithelial lining
- d. Fibrous connective tissue cyst wall 'capsule'

**3. What is true of gingival cysts of infants?**

- a. They are painful lesions causing difficulty feeding
- b. They are extraosseous cysts
- c. They are rare, occurring in only 1% of cases
- d. They occur as single, ulcer-like lesions

**4. Which of these cysts are diagnosed using histopathology alone?**

- a. Odontogenic kerotacyst
- b. Dentigerous cyst
- c. Nasolabial cyst
- d. Gingival cyst

**5. Which of the following are radiographic features of a apical radicular cyst?**

- a. Loss of lamina dura along the adjacent root
- b. Round radiolucency encircle affected tooth apex
- c. Root resorption is common
- d. All of the above

**6. Which of these are true of glandular cyst?**

- a. Regardless of size, cysts are asymptomatic
- b. Unilocular radiolucency
- c. Margins of radiolucency poorly defined
- d. Superficial epithelial cells line cyst cavity (cuboidal to columnar)

**7. Which of the following is FALSE?**

- a. Odontogenic kerotocysts have high recurrence rate
- b. Large odontogenic keratocysts can appear multilocular due to its super imposition of trabecular bone pattern
- c. Odontogenic keratocysts appear more often in the mandible than maxilla
- d. Odontogenic keratocysts can be diagnosed radiographically

**8. A dentigerous cyst**

- a. Affects surrounfing soft tissue of an erupted tooth
- b. Can become infected and painful
- c. Are always sympotomatic
- d. Have multilocular, corticated borders

**9. What is not a feature of an eruption cyst?**

- a. Cysts only affects the superfical soft tissue
- b. Requires extraction of the unerupted tooth
- c. Can appear blue/purple in colour
- d. Are a soft translucent swelling

**10. Which is true of lateral periodontal cysts?**

- a. Are diagnosed by radiography
- b. Are treated with enucleation
- c. Cause diffuse swelling and pain
- d. Most are greater than 1.0cm in diameter

**Question: why is KOT now suggested as KCOT ?**

**Answers**

**1. C 2. B 3. B 4. A 5. D 6. D 7. D 8. B 9. B 10. B**