# Odontogenic cysts

Odontogenic cysts are so called because their epithelial lining is derived from epithelium produced during tooth development (either from rest of Malassez, reduced enamel epithelium, or from remnants of dental lamina).

**Odontogenic Cysts**

- *Periapical (Radicular) Cyst*
- *Lateral Periodontal Cyst*
- *Gingival Cyst of the Newborn*
- *Dentigerous Cyst*
- *Eruption Cyst*
- *Glandular Odontogenic Cyst*
- *Odontogenic Keratocyst/Keratocystic Odontogenic Tumor*
- *Calcifying Odontogenic Cyst (Calcifying Cystic Odontogenic Tumor)*

| Type | Source | Origin of Rests | Cyst Examples |
|---|---|---|---|
| Odontogenic rests | Rests of Malassez | Epithelial root sheath | Periapical (radicular) cyst |
| | Reduced enamel epithelium | Enamel organ | Dentigerous cyst |
| | Rests of dental lamina (rests of Serres) | Epithelial connection between mucosa and enamel organ | Odontogenic keratocyst (KCOT)<br>Lateral periodontal cyst<br>Gingival cyst of adult<br>Gingival cyst of newborn<br>Glandular odontogenic cyst |
| Nonodontogenic rests | Remnants of nasopalatine duct | Paired nasopalatine ducts (vestigial) | Nasopalatine duct cyst |

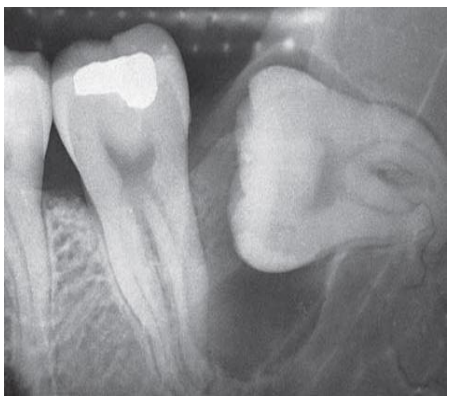
**Dentigerous cyst (follicular cyst):** Dentigerous cysts are the second most common type of odontogenic cyst (most common type is periapical cyst) and the most common developmental cyst of the jaws. In children from 2 to 14 years of age, dentigerous cysts account for 49% of intraosseous cystic lesions, with eruption cysts, odontogenic keratocysts, and radicular cysts accounting for more than 10% each. By definition, a dentigerous cyst is attached to the tooth cervix at the cementoenamel junction, and it encloses the crown of the unerupted tooth. A dentigerous cyst develops from proliferation of the enamel organ remnant or reduced enamel epithelium.

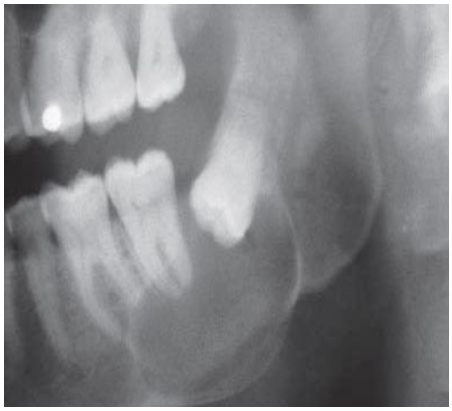
## Clinical Features

Dentigerous cysts are most commonly seen in association with third molars and maxillary canines, which are the most commonly impacted teeth. The highest incidence of dentigerous cysts occurs during the second and third decades. Symptoms generally are absent, and delayed eruption is the most common indication of dentigerous cyst formation. This cyst is capable of achieving significant size, occasionally with associated cortical bone expansion, but rarely does it reach a size that predisposes the patient to a pathologic fracture.

## Radiographically

A dentigerous cyst presents as a well-defined, unilocular radiolucency with corticated margins in association with the crown of an unerupted tooth. The unerupted tooth is often displaced. These cysts range in size from several millimeters to several centimeters, where they may compromise jawbone integrity and produce facial asymmetry. In the mandible, associated radiolucency may extend superiorly from the third molar site into the ramus or anteriorly and inferiorly along the body of the mandible. In maxillary dentigerous cysts involving the canine region, extension into the maxillary sinus or to the orbital floor may be noted. Resorption of roots of adjacent erupted teeth may occasionally be seen.

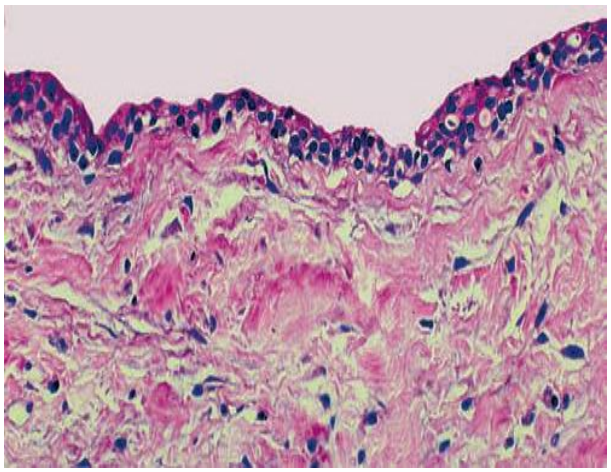




Dentigerous cyst surrounding the crown of an impacted molar

## Histopathology

Dentigerous cyst is formed by a fibrous connective tissue wall and is lined by stratified squamous epithelium. In an uninflamed dentigerous cyst, the epithelial lining is nonkeratinized and tends to be approximately four to six cell layers thick. On occasion, numerous mucous cells, ciliated cells, and, rarely, sebaceous cells may be found in the lining of the epithelium. The epithelium–connective tissue junction is generally flat, although in cases of secondary inflammation, epithelial hyperplasia may be noted.



Dentigerous cyst lined by thin, nonkeratinized epithelium.

## Treatment

Removal of the associated tooth and enucleation of the pericoronal soft tissue component. In cases in which cysts affect significant portions of the mandible the treatment approach involves exteriorization or marsupialization of the cyst to allow for decompression and marsupialization of the cyst to allow for decompression and subsequent shrinkage of the lesion, thereby reducing the extent of surgery to be done at a later date. Potential complications of untreated dentigerous cysts include transformation of the epithelial lining into an ameloblastoma and rarely, carcinomatous transformation of the epithelial lining. It has been suggested that the presence of mucous cells may indicate the potential for development of the rare intraosseous mucoepidermoid carcinoma.

## Odontogenic Keratocyst (Keratocystic Odontogenic Tumor)

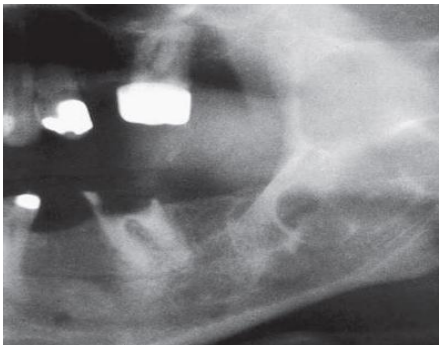
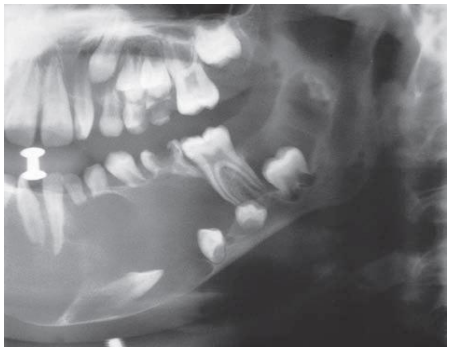
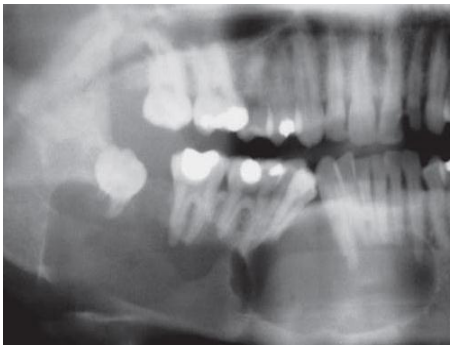
Odontogenic keratocyst (OKC) fulfills the definition of a cyst, that is, a pathologic space filled with fluid or semisolid material lined by epithelium. Also, that it can be reduced in size or even ablated in some cases by marsupialization would seem to support a cyst classification. However, other factors such as recurrence rate, overexpression of cell cycle proteins, and an association with a proliferation-related genetic mutation indicate that the OKC may be a cystic neoplasm. A new name has been proposed for this lesion, keratocystic odontogenic tumor (KCOT). Odontogenic keratocysts (OKC/KCOT) may exhibit aggressive clinical behavior, a relatively high recurrence rate, and an association with nevoid basal cell carcinoma syndrome (NBCCS). They are found anywhere in the jaws and can radiographically mimic other types of cysts and some odontogenic tumors. Microscopically, however, they have a consistent and unique appearance.

**Etiology and Pathogenesis:** It is generally agreed that OKCs/KCOTs develop from dental lamina remnants in the mandible and maxilla. However, origin of this cyst from extension of basal cells of the overlying oral epithelium has also been suggested.

## Clinical Features

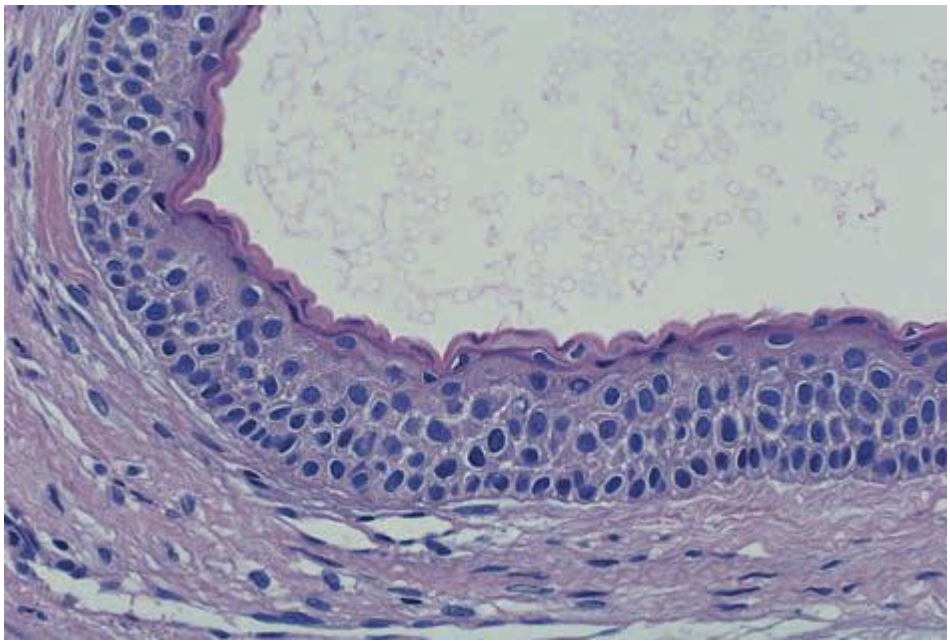
Odontogenic keratocysts are relatively common jaw cysts. They occur at any age and have a peak incidence within the second and third decades. Lesions found in children are often reflective of multiple cysts as a component of NBCCS. OKCs/ KCOTs represent 5% to 15% of all odontogenic cysts. Approximately 5% of patients with OKCs/KCOTs have multiple cysts and another 5% have NBCCS. OKCs/KCOTs are found in the mandible in an approximate 2:1 ratio. In the mandible, the posterior portion of the body and the ramus region are most commonly affected, and in the maxilla, the third molar area is most commonly affected.

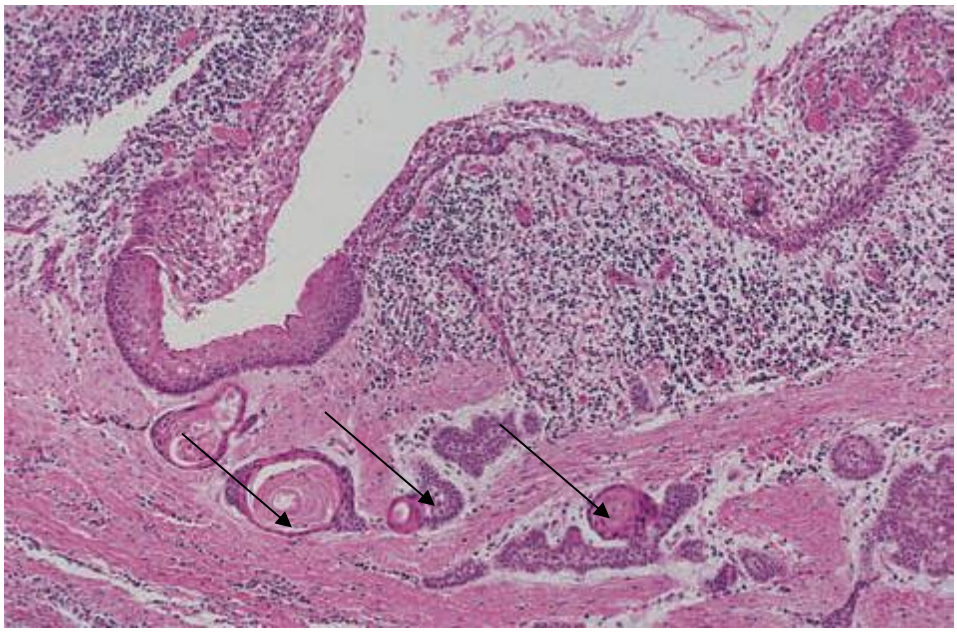
Radiographically, an OKC/KCOT characteristically presents as a well-circumscribed radiolucency with smooth radiopaque margins. Multilocularity is often present and tends to be seen more commonly in larger lesions. Most lesions, however, are unilocular, with as many as 40% noted adjacent to the crown of an unerupted tooth (dentigerous cyst presentation). Approximately 30% of maxillary and 50% of mandibular lesions produce buccal expansion. Mandibular lingual enlargement is occasionally seen.

**Histopathology**

The epithelial lining of the cyst is uniformly thin, ranging from 6 to 10 cell layers thick. The basal layer exhibits a characteristic palisaded pattern with polarized and intensely stained nuclei of uniform diameter. The luminal epithelial cells are parakeratinized and produce an uneven or corrugated profile. Focal zones of orthokeratinization can be seen. Additional histologic features that may occasionally be encountered include budding of the basal cells into the connective tissue wall and microcyst formation. The fibrous connective tissue component of the cyst wall is often free of an inflammatory cell infiltrate and is relatively thin. The epithelium–connective tissue interface is characteristically flat with no epithelial ridge formation.





Odontogenic keratocyst showing loss of characteristic

features in areas of inflammation, as well as mural daughter cysts/rests (arrows).

## Treatment and Prognosis

Surgical excision with peripheral osseous curettage or ostectomy is the preferred method of management. This more aggressive approach for a cystic lesion is justified by the high recurrence rate associated with OKCs/KCOTs. Some have advocated surgical decompression and marsupialization to permit cyst shrinkage, followed by enucleation as an alternative. The recurrence rate varies from 10% to 30% depending on how the lesion is managed and is also related to several physical factors. The friable, thin connective tissue wall of the cyst may lead to incomplete removal. Small dental lamina remnants or satellite cysts in the bone adjacent to the primary lesion may contribute to recurrence. Also, cystic proliferation of the overlying oral epithelial basal cell layer, if not eliminated during cyst removal, is considered significant by some. Actual biological qualities of the cyst epithelium, such as an increased mitotic index and production of bone resorption factors, may be associated with recurrence. Follow-up examinations are important for patients with this lesion. Patients should be evaluated for completeness of excision, new keratocysts, and NBCCS. Most recurrences become clinically evident within 5 years of treatment. Aside from the recurrence potential, ameloblastic transformation is a rare complication. Patients with multiple keratocysts have a significantly higher rate of recurrence than those with single keratocysts (30% and 10%, respectively).