ODONTOGENIC CYSTS
Epithelial Sources

- Rests of Serres
- Rests of Malassez
- Reduced Enamel Epithelium
- Surface Mucosa
Epithelial Sources

- Surface Epithelium
- Rests of Serres
- Reduced Enamel Epithelium
- Rests of Malassez

[Odontogenic Epithelium]
Etiology

• The stimulus that induces epithelial proliferation is not known for most odontogenic cysts; they are said to be “developmental”

• Exceptions:
  – The Apical Periodontal or Radicular Cyst evolves in response to spread of infection from pulpitis
  – The Odontogenic Keratocysts arises from a mutation in a tumor suppressor gene known as “Patched”, a component of the Sonic Hedgehog morphogenic pathway.
Classification

- Apical Periodontal (Radicular) Cyst
- Dentigerous Cyst
- Paradental (Infected Buccal) Cyst
- Lateral Periodontal Cyst
- Botryoid Odontogenic Cyst
- Sialo-Odontogenic Cyst
- Odontogenic Keratocyst
- Orthokeratotic Odontogenic Cyst
- Calcifying and Keratinizing Odontogenic Cyst
Apical Periodontal Cyst

- Located at the level of the root tip “periapex”
- Overlying tooth is nonvital
- Products of infection/inflammation stimulate apical rests of Malassez to proliferate
- Cyst wall is inflamed
- Lining is nonkeratinized stratified squamous epithelium that may be hyperplastic
- Tx: Endodontic therapy, apicoectomy
Apical Periodontal (Radicular) Cyst
Radicular Cysts
Apical Periodontal Cyst
Residual Radicular Cyst

- Usually, once the odontogenic source of infection is removed (i.e.: extraction or root canal therapy) apical cysts resolve. Rarely the cyst fails to resorb.
- Radiographically, there is a well defined, usually unilocular radiolucency within the edentulous alveolus.
- Residual cysts are usually asymptomatic and nonexpansile.
Carcinoma ex Odontogenic Cyst

• Very rarely, the stratified squamous lining of an apical or residual cyst undergoes dysplastic change and may then evolve into a squamous cell carcinoma

• Microscopically, one sees a cyst lining with dysplastic change and invasive islands of carcinoma are evident in the fibrous tissue of the cyst wall

• These malignancies behave similar to surface mucosa SCCA with local invasion and metastases, usually local but less frequently there may be distant (hematogenous) spread
Dysplastic Changes in Odontogenic Cysts
Carcinoma ex Radicular Cyst
Dentigerous Cyst

• Cyst that forms around the crown (pericoronal) of an impacted tooth
• Third Molars and Cuspids most often affected
• Derived from remnants of the ameloblastic epithelium referred to as reduced enamel epithelium
• In teens, the lining is cuboidal; in adults it is nonkeratinizing stratified squamous
• Tx: extraction with enucleation/curettage
• A variety of neoplasms, both benign and malignant can arise from the epithelial lining
Dentigerous Cyst
Dentigerous Cyst
Dentigerous Cysts
Dentigerous Cyst: Epithelial Lining

Cuboidal Reduced Enamel Epithelium

Nonkeratinizing stratified squamous

Epithelial rests in cyst wall
Neoplasms Arising in Dentigerous Cysts

- Odontogenic keratocyst, a quasi neoplasm
- Ameloblastoma
- Rarely, other odontogenic tumors
- Squamous cell carcinoma
- Mucoepidermoid carcinoma
Neoplasms Arising in Dentigerous Cysts

Odontogenic Keratocyst

Unicystic Ameloblastoma
Lateral Periodontal Cyst

- A developmental cyst that arises from rests of Malassez
- Typically located inter-radicular, midroot level
- Must rule out a radicular cyst associated with infection in a lateral accessory canal: Test vitality of contiguous teeth
- Microscopic: characteristic thin cuboidal and low stratified squamous epithelium with focal acanthotic nodules
- Tx: Enucleation/Curettage
Lateral Periodontal Cyst
Lateral Periodontal Cyst
Lateral Periodontal Cysts

1997 2000
Lateral Periodontal Cyst
Gingival Cysts

• Gingival cyst of the adult
  – Arise from rests of Serres
  – Histology may be similar to lateral periodontal cyst, low or attenuated stratified squamous epithelium, rarely show features of OKC

• Newborn developmental cysts
  – Nodule on alveolar ridge, often multiple
  – Termed cyst of the dental lamina
Gingival Cyst
Botryoid Odontogenic Cyst

- A multilocular variant of the lateral periodontal cyst
- Radiographic loculations
- At surgery, the multiple loculations yield a grape-like appearance (Racemose)
- Microscopic: same as lateral periodontal cyst with tortuosity of cystic lining
- Recurrence after enucleation is low
Botryoid Odontogenic Cyst
Botryoid Odontogenic Cyst

  Botryoid odontogenic cyst: analysis of 33 cases.

average age of 57 years and the most common site for occurrence in the lower premolar area. Follow-up information on 12 patients determined that 2 had recurrences.
Botryoid Odontogenic Cyst


Ten cases

Eight of ten lesions were located in the mandible; the anterior mandible being the dominant site.

Five were unilocular, the largest measuring 4.5 X 1.2 cm.

Two multilocular.

Three lesions represented recurrences 8, 10, and 10 years after previous surgical intervention.
Odontogenic Keratocyst

- Adults, no sex predilection
- Associated with a mutation in the PATCH 1 or SMOOTHENED genes of the Sonic Hedgehog Pathway (tumor suppressor gene)
- Associated with the Gorlin Syndrome when multiple
- Radiographic: Expansile unilocular or multilocular often with root divergence or resorption
- Microscopic: Thin spinous layer, corrugated parakeratin layer, polarized basal layer, caseous keratinacious contents
- Tx: Curettage, Cryotherapy, Carnoy’s fixation, marsupialization
- Recurrence: less than 10% when under 1.0 cm, up to 60% for cysts over 3.0 cm after curettage
Odontogenic Keratocyst
OKC
Gorlin Syndrome

• Bifid rib/Basal cell nevus syndrome

Multiple cysts
In single patient
Odontogenic Keratocyst
The use of enucleation and liquid nitrogen cryotherapy in the management of odontogenic keratocysts.

Schmidt BL, Pogrel MA.

Department of Oral and Maxillofacial Surgery, University of California, San Francisco, San Francisco, CA 94143-0440, USA.

26 patients. All of the patients received a combination of enucleation and cryosurgery.

- Before enucleation and cryotherapy, 22 of the 26 patients had received previous treatment consisting of enucleation alone.
- The average time from initial treatment to recurrence was 6.2 years.

- Three of the 26 patients (11.5%) developed a recurrence after treatment.
- 23 patients (88.5%) had no evidence of clinical or radiographic recurrence. The average time of follow-up was 3.5 years (range, 2.0 to 10.0 years).
OKC cryotherapy


Jensen J, Sindet-Pedersen S, Simonsen EK.

Dept. of Oral and Maxillofacial Surgery, Aarhus University Hospital, Denmark.

In the present study, the recurrence rates found after treatment of keratocysts by enucleation or enucleation combined with cryotherapy are compared. Despite the relatively short follow-up period, this study indicates that there is no difference in recurrence rate between the two treatment methods.
OKC Marsupialization


Nakamura N, Mitsuyasu T, Mitsuyasu Y, Taketomi T, Higuchi Y, Ohishi M.

Twenty-eight primary OKCs, treated by marsupialization before enucleation and curettage, were examined in this study.

- 3 years followup RESULTS: The effect of marsupialization was evaluated as extremely effective (64.3%), moderately effective (32.1%), and poorly effective (3.6%).

- Recurrence was observed in 6 lesions (21.4%), and there was no significant difference in recurrence rates between the lesions treated with or without marsupialization.

- There appeared to be a predilection for recurrence in the lesions in the mandibular ramus region and also for radiographically multilocular lesions.

- Microscopic examination showed substantial changes from a parakeratinized or orthokeratinized epithelium into a hyperplastic, stratified, nonkeratinizing squamous epithelium.

- Marsupialization was found to be effective as a preliminary treatment for large OKCs.
OKC marsupialization

  - Marsupialization as a definitive treatment for the odontogenic keratocyst.

  Pogrel MA, Jordan RC.

  Ten patients
  - measuring between 2 and 8 cm
  - treated by marsupialization consisting of excision of the overlying mucosa and the opening of a 1-cm window into the cystic cavity and, where possible, suturing of the cyst lining to the oral mucosa.
  - CONCLUSIONS: All 10 OKCs resolved completely after marsupialization. Teeth within the cyst were found to be upright and erupt. Marsupialization requires a cooperative patient who will irrigate the cavity and keep it open. It appears that the cyst lining is replaced by normal epithelium during this treatment.
Orthokeratinized Odontogenic Cyst

• Adults
• No sex predilection
• Unilocular or Multilocular
• Lining is orthokeratinized with a granular layer, rather than parakeratinized like OKC
• Low incidence of recurrence following curettage
Orthokeratinized Odontogenic Cyst
Infected Buccal Cyst

• Also termed “Paradental Cyst”
• Cyst lies buccal to erupted tooth or teeth and is not in continuity with gingival sulcus
• Buccal expansion
• May be a laterally displaced dentigerous cyst
• Microscopic: nonkeratinized stratified squamous epithelium with inflammatory cell infiltration in fibrous wall
• Tx: simple curettage
Infected Buccal Cyst
Buccal “Paradental” Cysts
Calcifying Epithelial Odontogenic Cyst

• Also known as Gorlin cyst
• Skin counterpart is pilomatixoma
• Adults, no sex predilection
• Most common in premolar area as an interradicular radiolucency; some show intracystic radioopacity; can occur as a peripheral gingival lesion
• CEOC features are often present in Odontomas
• Microscopic: cyst lined by ameloblastic epithelium with stellate reticulum containing keratinized Ghost cells; some of which may calcify. Dentinoid matrix is commonly seen in the cyst wall
• The solid counterpart is classified as the odontogenic ghost cell tumor
Calcifying Epithelial Odontogenic Cyst (Gorlin Cyst)
Calcifying Epithelial Odontogenic Cyst (Gorlin Cyst)

Peripheral CEOC

Ghost cells
Glandular Odontogenic Cyst

• Also known as the sialo-odontogenic cyst
• Stratified squamous lining with acinar like clusters of mucous secreting cells and ductal structures
• Low grade central mucoepidermoid carcinoma must be considered in the differential diagnosis
• Uni or Multilocular
• Tendency for recurrence following curettage
• Tx: Curettage with close periodic followup
Sialo-odontogenic Cyst
Glandular Odontogenic Cyst


56 cases, 49 from the literature and 7 new cases.

- 34 male and 22 female patients aged 14 to 74 years (mean, 48 years).
- The mandible was involved in 41 cases (73.2%) and the maxilla in 15 (26.8%), predominantly in the anterior region;
- 53.6% of the lesions were unilocular and 46.4% multilocular. Large lesions were found in 78.5% of cases.
- Cortical integrity was compromised in 53.6% (cortical perforation in 39.3% and thinning or erosion of the cortical plate in 14.3%).
- Recurrence occurred at a rate of 29.2%, within 0.5 to 7 years (mean, 2.9 years).
- Recurrence was associated with minor surgery such as enucleation or curettage; none of the patients treated by peripheral ostectomy, marginal resection, or partial jaw resection had a recurrence.
- Recurrence group had a higher frequency of multilocularity than the nonrecurrent group (64.3% vs 41.2%) and of compromised cortical integrity (71.4% vs 47.1%).
Hybrid Odontogenic Cysts

- Cysts that exhibit features of more than one entity
- They are rare
- Unilocular radiolucencies
- May show features of OKC, Odontogenic Adenomatoid tumor, CEOC, etc.
Hybrid Odontogenic Cyst

AOT and CEOC features