Origin of Odontogenic Cysts & Tumors

Odontogenic Apparatus

- Remnants of dental lamina
- Reduced enamel epithelium
- Odontogenic rests
- Basal cell layer of oral mucosa
- Dental papilla (ectomesenchyme)
- Lining of odontogenic cysts

What is a cyst?

An abnormal space within tissue lined by epithelium
Odontogenic Cysts

- Inflammatory
  - Periapical (radicular) cyst
  - Residual periapical (radicular) cyst
  - Buccal bifurcation cyst (usually first molars)
    - Paradental cysts (partially erupted third molars)

- Developmental

Periapical Cyst vs. Periapical Granuloma (chronic localized osteitis)

- CANNOT TELL THE DIFFERENCE BY X-RAY
- CAN ONLY TELL BY HISTOLOGY

Periapical Granuloma (chronic localized osteitis)

- Granulation Tissue - No epithelial lining

Periapical Cyst

- True cyst with central lumen and epithelial lining

Periapical Cyst vs. Periapical Granuloma (chronic localized osteitis)

- Differential diagnosis must include both
- DO NOT INCLUDE PERIAPICAL ABSCESS
  (Rohrer disagrees with the text)
Why does a periapical cyst form instead of just a granuloma?

Simply the chance of Rests of Malassez being in the area of inflammation

1. Cells in the rest proliferate due to the inflammation

2. The ball of cells gets so big the center gets too far from the blood supply, the cells in the center die

3. The center of the ball of cells then has a higher protein concentration than the surrounding tissue
4. Fluid flows into the center by osmotic pressure, cyst expands, more cells grow around the periphery, more cells in the center die, concentration increases again.

5. Osmotic pressure can keep expanding the cyst independent of the inflammation.

Result = Periapical Cyst

A radiolucency in the jaws must be investigated
If the teeth in the area are vital, you must biopsy the radiolucent area.
If non-vital, obviously RCT.
Vitality Test!
Vitality Test!
Vitality Test!
Vitality Test!
Vitality Test!

Odontogenic Cysts

- Developmental
  - Dentigerous cyst
  - Odontogenic keratocyst
  - Orthokeratinized odontogenic cyst
  - Gingival (alveolar) cyst of the newborn
  - Gingival cyst of the adult
  - Lateral periodontal cyst
  - Calcifying odontogenic (Gorlin) cyst
  - Glandular odontogenic cyst
  - Eruption cyst
• Dentigerous - “tooth containing” cyst
• Origin - reduced enamel epithelium (dental follicle)

If a radiolucency is ASSOCIATED with an unerupted tooth
Dentigerous cyst should be your FIRST differential diagnosis

Differential Diagnosis
• Dentigerous Cyst
• Odontogenic Keratocyst
• Ameloblastoma
Odontogenic Keratocyst
Because of its behavior, many oral pathologists now consider the OKC an odontogenic tumor that has a cystic form

2005 Classification by the W.H.O.

Keratocystic Odontogenic Tumor

Three important things associated with this diagnosis:
1. High recurrence rate (up to 60%)
2. Highly aggressive (now considered by W.H.O. to be an odontogenic tumor)
3. Relation to Gorlin syndrome

Keratocystic Odontogenic Tumor (Odontogenic Keratocyst)

• Can be in the location of any odontogenic cyst
• Can be isolated in the jaws

Keratocystic Odontogenic Tumor (Odontogenic Keratocyst)

Diagnosis entirely depends on the histology of the cyst lining
1. Uniform (5-8 cells) thickness
2. Hyperchromatic, cuboidal or columnar basal cell layer
3. Corrugated parakeratin layer
4. Virtually no inflammation in cyst wall

“Daughter” Cyst

Keratocystic Odontogenic Tumor
W.H.O. Definition

- a benign uni-or multicystic, intraosseous tumor of odontogenic origin
- lining is parakeratinized stratified squamous epithelium
- potential aggressive, infiltrative behavior
- solitary or multiple (multiple usually related to Gorlin syndrome)
<table>
<thead>
<tr>
<th>Synonyms</th>
<th>Histogenesis</th>
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<tbody>
<tr>
<td>Odontogenic Keratocyst</td>
<td>Dental lamina or its remnants</td>
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<tr>
<td>(OKC)</td>
<td>Extensions of basal cells from the overlying oral epithelium</td>
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<td>Primordial Cyst</td>
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<tr>
<th>Cause</th>
<th>Genetics</th>
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<tbody>
<tr>
<td>Recent studies have</td>
<td>PTCH gene has been mapped to chromosome 9q22.3 - site of Gorlin Syndrome</td>
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<tr>
<td>demonstrated the role of the</td>
<td>For Gorlin Syndrome</td>
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<tr>
<td>PTCH gene</td>
<td>• Two-hit mechanism</td>
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<tr>
<td></td>
<td>• Leads to over expression of bcl-1 and TP53</td>
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<tr>
<td></td>
<td>• Evidence that PTCH gene is a significant factor in the development of KCOT not associated with the Gorlin Syndrome</td>
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<tr>
<th>Genetics (2)</th>
<th>Nevoid Basal Cell Carcinoma (Gorlin) Syndrome</th>
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<tbody>
<tr>
<td>PTCH - Sonic Hedgehog Pathway</td>
<td>• Multiple basal cell carcinomas</td>
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<td>• Multiple jaw cysts (odontogenic keratocysts)</td>
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<td></td>
<td>• Numerous bone abnormalities including bifid ribs, intracranial calcification, vertebral anomalies</td>
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<td>• Mild ocular hypertelorism</td>
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<td>• Epidermal cysts of the skin</td>
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<td>• Etc.</td>
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Gorlin (Nevoid Basal Cell Carcinoma) Syndrome

Basal cell carcinomas in non-sun exposed areas

Multiple OKCs
Keratinizing odontogenic cyst
No relation to Keratocystic Odontogenic Tumor - No problems beyond odontogenic cyst

2 Week female brought to pediatric dentistry clinic - parents were very upset

Gingival cysts of the newborn
No treatment needed - they’ll regress in a short time

Gingival Cyst of the Adult

Lining derived from remnants of the dental lamina