Introduction

- Variety of cysts and tumors
- Uniquely derived from tissues of developing teeth
- May present to otolaryngologist
Odontogenesis

- Projections of dental lamina into ectomesenchyme
- Layered cap (inner/outer enamel epithelium, stratum intermedium, stellate reticulum)
- Odontoblasts secrete dentin → ameloblasts (from IEE) → enamel
- Cementoblasts → cementum
- Fibroblasts → periodontal membrane
Odontogenesis
Diagnosis

- Complete history
  - Pain, loose teeth, occlusion, swellings, dysthesias, delayed tooth eruption

- Thorough physical examination
  - Inspection, palpation, percussion, auscultation

- Plain radiographs
  - Panorex, dental radiographs

- CT for larger, aggressive lesions
Diagnosis

- Differential diagnosis
- Obtain tissue
  - FNA – r/o vascular lesions, inflammatory
  - Excisional biopsy – smaller cysts, unilocular tumors
  - Incisional biopsy – larger lesions prior to definitive therapy
Odontogenic Cysts

- Inflammatory
  - Radicular
  - Paradental

- Developmental
  - Dentigerous
  - Developmental lateral periodontal
  - Odontogenic keratocyst
  - Glandular odontogenic
Radicular (Periapical) Cyst

- Most common (65%)
- Epithelial cell rests of Malassez
- Response to inflammation
- Radiographic findings
  - Pulpless, nonvital tooth
  - Small well-defined periapical radiolucency
- Histology
- Treatment – extraction, root canal
Radicular Cyst
Radicular Cyst
Residual Cyst
Paradental Cyst

- Associated with partially impacted 3rd molars
- Result of inflammation of the gingiva over an erupting molar
- 0.5 to 4% of cysts
- Radiology – radiolucency in apical portion of the root
- Treatment – enucleation
Paradental Cyst
Dentigerous (follicular) Cyst

- Most common developmental cyst (24%)
- Fluid between reduced enamel epithelium and tooth crown
- Radiographic findings
  - Unilocular radiolucency with well-defined sclerotic margins
- Histology
  - Nonkeratinizing squamous epithelium
- Treatment – enucleation, decompression
Dentigerous Cyst
Dentigerous Cyst
Developmental Lateral Periodontal Cyst

- From epithelial rests in periodontal ligament vs. primordial cyst – tooth bud
- Mandibular premolar region
- Middle-aged men
- Radiographic findings
  - Interradicular radiolucency, well-defined margins
- Histology
  - Nonkeratinizing stratified squamous or cuboidal epithelium
- Treatment – enucleation, curettage with preservation of adjacent teeth
Developmental Lateral Periodontal Cyst
Odontogenic Keratocyst

- 11% of jaw cysts
- May mimic any of the other cysts
- Most often in mandibular ramus and angle
- Radiographically
  - Well-marginated, radiolucency
  - Pericoronal, inter-radicular, or pericoronal
  - Multilocular
Odontogenic Keratocyst

Fig. 1A - Large OKC involving an impacted third molar tooth, unilocular with scalloped borders, representing the typical radiographic appearance of OKC.
Odontogenic Keratocyst

Fig. 1B - Small and well corticated margins between mandibular first and second premolars simulating lateral periodontal cyst.
Odontogenic Keratocyst

- **Histology**
  - Thin epithelial lining with underlying connective tissue (collagen and epithelial nests)
  - Secondary inflammation may mask features
- **High frequency of recurrence (up to 62%)**
- **Complete removal difficult and satellite cysts can be left behind**
Odontogenic Keratocyst
Treatment of OKC

- Depends on extent of lesion
- Small – simple enucleation, complete removal of cyst wall
- Larger – enucleation with/without peripheral ostectomy
- Bataineh, et al, promote complete resection with 1 cm bony margins (if extension through cortex, overlying soft tissues excised)
- Long term follow-up required (5-10 years)
Glandular Odontogenic Cyst

- More recently described (45 cases)
- Gardner, 1988
- Mandible (87%), usually anterior
- Very slow progressive growth (CC: swelling, pain [40%])
- Radiographic findings
  - Unilocular or multilocular radiolucency
Glandular Odontogenic Cyst
Glandular Odontogenic Cyst

- Histology
  - Stratified epithelium
  - Cuboidal, ciliated surface lining cells
  - Polycystic with secretory and epithelial elements
Treatment of GOC

- Considerable recurrence potential
- 25% after enucleation or curettage
- Marginal resection suggested for larger lesions or involvement of posterior maxilla
- Warrants close follow-up
Nonodontogenic Cysts

- Incisive Canal Cyst
- Stafne Bone Cyst
- Traumatic Bone Cyst
- Surgical Ciliated Cyst (of Maxilla)
Incisive Canal Cyst

- Derived from epithelial remnants of the nasopalatine duct (incisive canal)
- 4th to 6th decades
- Palatal swelling common, asymptomatic
- Radiographic findings
  - Well-delineated oval radiolucency between maxillary incisors, root resorption occasional
- Histology
  - Cyst lined by stratified squamous or respiratory epithelium or both
Incisive Canal Cyst
Incisive Canal Cyst

- Treatment consists of surgical enucleation or periodic radiographs
- Progressive enlargement requires surgical intervention
Stafne Bone Cyst

- Submandibular salivary gland depression
- Incidental finding, not a true cyst
- Radiographs – small, circular, corticated radiolucency below mandibular canal
- Histology – normal salivary tissue
- Treatment – routine follow up
Stafne Bone Cyst
Traumatic Bone Cyst

- Empty or fluid filled cavity associated with jaw trauma (50%)
- Radiographic findings
  - Radiolucency, most commonly in body or anterior portion of mandible
- Histology – thin membrane of fibrous granulation
- Treatment – exploratory surgery may expedite healing
Traumatic Bone Cyst
Surgical Ciliated Cyst

- May occur following Caldwell-Luc
- Trapped fragments of sinus epithelium that undergo benign proliferation
- Radiographic findings
  - Unilocular radiolucency in maxilla
- Histology
  - Lining of pseudostratified columnar ciliated
- Treatment - enucleation
Surgical Ciliated Cyst
Odontogenic Tumors

- Ameloblastoma
- Calcifying Epithelial Odontogenic Tumor
- Adenomatoid Odontogenic Tumor
- Squamous Odontogenic Tumor
- Calcifying Odontogenic Cyst
Ameloblastoma

- Most common odontogenic tumor
- Benign, but locally invasive
- Clinically and histologically similar to BCCa
- 4th and 5th decades
- Occasionally arise from dentigerous cysts
- Subtypes – multicystic (86%), unicystic (13%), and peripheral (extraosseous – 1%)
Ameloblastoma

- Radiographic findings
  - Classic – multilocular radiolucency of posterior mandible
  - Well-circumscribed, soap-bubble
  - Unilocular – often confused with odontogenic cysts
  - Root resorption – associated with malignancy
Ameloblastoma
Ameloblastoma

**Histology**

- Two patterns – plexiform and follicular (no bearing on prognosis)
- Classic – sheets and islands of tumor cells, outer rim of ameloblasts is polarized away from basement membrane
- Center looks like stellate reticulum
- Squamous differentiation (1%) – Diagnosed as ameloblastic carcinoma
Ameloblastoma
Treatment of Ameloblastoma

- According to growth characteristics and type
  - Unicystic
    - Complete removal
    - Peripheral ostectomies if extension through cyst wall
  - Classic infiltrative (aggressive)
    - Mandibular – adequate normal bone around margins of resection
    - Maxillary – more aggressive surgery, 1.5 cm margins
- Ameloblastic carcinoma
  - Radical surgical resection (like SCCa)
  - Neck dissection for LAN
Calcifying Epithelial Odontogenic Tumor

- a.k.a. Pindborg tumor
- Aggressive tumor of epithelial derivation
- Impacted tooth, mandible body/ramus
- Chief sign – cortical expansion
- Pain not normally a complaint
Calcifying Epithelial Odontogenic Tumor

- Radiographic findings
  - Expanded cortices in all dimensions
  - Radiolucent; poorly defined, noncorticated borders
  - Unilocular, multilocular, or “moth-eaten”
  - “Driven-snow” appearance from multiple radiopaque foci
  - Root divergence/resorption; impacted tooth
Calcifying Epithelial Odontogenic Tumor
Calcifying Epithelial Odontogenic Tumor

- **Histology**
  - Islands of eosinophilic epithelial cells
  - Cells infiltrate bony trabeculae
  - Nuclear hyperchromatism and pleomorphism
  - Psammoma-like calcifications (Liesegang rings)
Calcifying Epithelial Odontogenic Tumor
Treatment of CEOT

- Behaves like ameloblastoma
- Smaller recurrence rates
- En bloc resection, hemimandibulectomy
  partial maxillectomy suggested
Adenomatoid Odontogenic Tumor

- Associated with the crown of an impacted anterior tooth
- Painless expansion
- Radiographic findings
  - Well-defined expansile radiolucency
  - Root divergence, calcified flecks ("target")
- Histology
  - Thick fibrous capsule, clusters of spindle cells, columnar cells (rosettes, ductal) throughout
- Treatment – enucleation, recurrence is rare
Adenomatoid Odontogenic Tumor
Squamous Odontogenic Tumor

- Hamartomatous proliferation
- Maxillary incisor-canine and mandibular molar
- Tooth mobility common complaint
- Radiology – triangular, localized radiolucency between contiguous teeth
- Histology – oval nest of squamous epithelium in mature collagen stroma
- Treatment – extraction of involved tooth and thorough curettage; maxillary – more extensive resection; recurrences – treat with aggressive resection
Squamous Odontogenic Tumor
Calcifying Odontogenic Cyst

- Tumor-like cyst of mandibular premolar region
- ¼ are peripheral – gingival swelling
- Osseous lesions – expansion, vital teeth
- Radiographic findings
  - Radiolucency with progressive calcification
  - Target lesion (lucent halo); root divergence
- Histology
  - Stratified squamous epithelial lining
  - Polarized basal layer, lumen contains ghost cells
- Treatment – enucleation with curettage; rarely recur
Mesenchymal Odontogenic Tumors

- Odontogenic Myxoma
- Cementoblastoma
Odontogenic Myxoma

- Originates from dental papilla or follicular mesenchyme
- Slow growing, aggressively invasive
- Multilocular, expansile; impacted teeth?
- Radiology – radiolucency with septae
- Histology – spindle/stellate fibroblasts with basophilic ground substance
- Treatment – en bloc resection, curettage may be attempted if fibrotic
Cementoblastoma

- True neoplasm of cementoblasts
- First mandibular molars
- Cortex expanded without pain
- Involved tooth ankylosed, percussion
- Radiology – apical mass; lucent or solid, radiolucent halo with dense lesions
- Histology – radially oriented trabeculae from cementum, rim of osteoblasts
- Treatment – complete excision and tooth sacrifice
Cementoblastoma
Mixed Odontogenic Tumors

- Ameloblastic fibroma, ameloblastic fibrodentinoma, ameloblastic fibro-odontoma, odontoma
- Both epithelial and mesenchymal cells
- Mimic differentiation of developing tooth
- Treatment – enucleation, thorough curettage with extraction of impacted tooth
- Ameloblastic fibrosarcomas – malignant, treat with aggressive en bloc resection
Related Jaw Lesions

- **Giant Cell Lesions**
  - Central giant cell granuloma
  - Brown tumor
  - Aneurysmal bone cyst

- **Fibroosseous lesions**
  - Fibrous dysplasia
  - Ossifying fibroma

- **Condensing Osteitis**
Central Giant Cell Granuloma

- Neoplastic-like reactive proliferation
- Common in children and young adults
- Females > males (hormonal?)
- Mandible > maxilla
- Expansile lesions – root resorption
- Slow-growing – asymptomatic swelling
- Rapid-growing – pain, loose dentition (high rate of recurrence)
Central Giant Cell Granuloma

- Radiographic findings
  - Unilocular, multilocular radiolucencies
  - Well-defined or irregular borders

- Histology
  - Multinucleated giant cells, dispersed throughout a fibrovascular stroma
Central Giant Cell Granuloma
Central Giant Cell Granuloma
Central Giant Cell Granuloma

- **Treatment**
  - Curettage, segmental resection
  - Radiation – out of favor (risk of sarcoma)
  - Intralesional steroids – younger patients, very large lesions
  - Individualized treatment depending on characteristics and location of tumor
Brown Tumor

- Local manifestation of hyperparathyroid
- Histologically identical to CGCG
- Serum calcium and phosphorus
- More likely in older patients
Aneurysmal Bone Cyst

- Large vascular sinusoids (no bruit)
- Not a true cyst; aggressive, reactive
- Great potential for growth, deformity
- Multilocular radiolucency with cortical expansion
- Mandible body
- Simple enucleation, rare recurrence
Fibrous Dysplasia

- **Monostotic vs. polystotic**
  - **Monostotic**
    - More common in jaws and cranium
  - **Polystotic**
    - McCune-Albright’s syndrome
    - Cutaneous pigmentation, hyper-functioning endocrine glands, precocious puberty
Fibrous Dysplasia

- Painless expansile dysplastic process of osteoprogenitor connective tissue
- Maxilla most common
- Does not typically cross midline (one bone)
- Antrum obliterated, orbital floor involvement (globe displacement)
- Radiology – ground-glass appearance
Fibrous Dysplasia
Fibrous Dysplasia
Fibrous Dysplasia

- **Histology** – irregular osseous trabeculae in hypercellular fibrous stroma

- **Treatment**
  - Deferred, if possible until skeletal maturity
  - Quarterly clinical and radiographic f/u
  - If quiescent – contour excision (cosmesis or function)
  - Accelerated growth or disabling functional impairment - surgical intervention (en bloc resection, reconstruction)
Ossifying Fibroma

- True neoplasm of medullary jaws
- Elements of periodontal ligament
- Younger patients, premolar – mandible
- Frequently grow to expand jaw bone
- Radiology
  - Radiolucent lesion early, well-demarcated
  - Progressive calcification (radiopaque – 6 yrs)
Ossifying Fibromatosa
Ossifying Fibroma

- Histologically similar to fibrous dysplasia
- **Treatment**
  - Surgical excision – shells out
  - Recurrence is uncommon
Condensing Osteitis

- 4% to 8% of population
- Focal areas of radiodense sclerotic bone
- Mandible, apices of first molar
- Reactive bony sclerosis to pulp inflammation
- Irregular, radiopaque
- Stable, no treatment required
Condensing Osteitis
Conclusion
Case Presentation

- 20 year-old hispanic female with several month history of lesion in right maxilla, treated initially by oral surgeon with multiple curettage.
- Has experienced recent onset of rapid expansion, after pregnancy, with complaints of loose dentition and pain.
Physical Examination
Physical Examination
Radiographs

- Plain films – facial series
- Computerized Tomography of facial series
Pathology
Treatment
Treatment