Odontogenic cysts II
• Classification
• Historical aspects
• Odontogenic keratocyst
• Gingival cyst of infants & mid palatal cysts
• Gingival cyst of adults
• Lateral periodontal cyst
• Botroyoid odontogenic cyst
• Galandular odontogenic cyst
• Dentigerous cyst
• Eruption cyst
• COC
• Radicular cyst
• Paradental cyst
• Mandibular infected buccal cyst
• Cystic fluid and its role in diagnosis
Gingival cyst and midpalatal cyst of infants
Clinical features

• Frequently seen in new born infants

• Rare after 3 months of age
  • Undergo involution and disappear
  • Rupture through the surface epithelium and exfoliate

• Along the mid palatine raphe \(\rightarrow\) Epstein’s pearls

• Buccal or lingual aspect of dental ridges \(\rightarrow\) Bohn’s nodules
• 2-3 mm in diameter

• White or cream coloured

• Single or multiple (usually 5 or 6)
Pathogenesis

Gingival cyst of infants

• Arise from epithelial remnants of dental lamina (cell rests of Serre)

• These rests have the capacity to proliferate, keratinize and form small cysts
Midpalatal raphe cyst

• Arise from epithelial inclusions along the line of fusion of palatal folds and the nasal process
  • Usually atrophy and get resorbed after birth
  • May persist to form keratin filled cysts
Histopathology

- Round or ovoid
- Smooth or undulating outline
- Thin lining of stratified squamous epithelium with parakeratotic surface
- Cyst cavity filled with keratin (concentric laminations with flat nuclei)
- Flat basal cells
- Epithelium lined clefts between cyst and oral epithelium
- Oral epithelium may be atrophic
Gingival cyst of adults
Clinical features

- **Frequency**
  - 0.5%
  - May be higher as all cases may not be submitted to histopathological examination

- **Age**
  - 5th and 6th decade

- **Sex**
  - No predilection

- **Site**
  - Much more frequent in mandible
  - Premolar-canine region
• Clinical presentation

• Soft and fluctuant

• Well circumscribed, slowly enlarging, painless swelling

• Attached gingiva or interdental papilla

• Facial aspect

• Usually less than 1 cm

• Smooth surface

• Colour of overlying mucosa → normal

• Adjacent teeth usually vital

• Slight erosion of surface of the bone
Radiological features

- No change
- Faint round shadow
Pathogenesis

• Odontogenic epithelial cell rests

• Traumatic implantation of surface epithelium

• Cystic degeneration of deep projections of surface epithelium

• From glandular elements

• Junctional epithelium

• May be derived from reduced enamel epithelium
Histopathology

- Extremely thin epithelium resembling REE
  - 1-3 layers of flat to cuboidal cells
  - Darkly staining nuclei

Or

- Thicker stratified squamous epithelium without rete ridges
• Epithelial cells may show
  • Pyknotic nuclei
  • Perinuclear cytoplasmic vacouлизation
  • Atrophic with ghost outlines

• Localized epithelial thickenings or plaques
  • Some protrude in the cystic lumen
  • Some extend into fibrous cyst wall
  • Cells
    • Whorled configuration
    • Compact and fusiform
    • Swollen and clear (water clear cells)

• Low columnar cells on the surface of epithelium → origin from ameloblasts
Attachment of epithelium to connective tissue is tenuous

Easily peels off

Epithelial discontinuities
• Fibrous connective tissue wall
  • Usually uninflamed
  • Except close to junctional epithelium → chronic inflammatory cell infiltrate

• May contain epithelial islands
Dentigerous cyst
A dentigerous cyst is one which encloses the crown of an unerupted tooth by the expansion of its follicle, and is attached to the neck.
Clinical features

• Frequency
  • 16.6%

• Age
  • Peak between 2\textsuperscript{nd}-4\textsuperscript{th} decade
  • Most common jaw cyst in the first decade

• Sex
  • Male predilection (1.6: 1)

• Race
  • More common in whites
• Site
  • Mandibular third molar
  • Maxillary canine
  • Mandibular premolars
  • Maxillary third molars
  • Others

• Supernumerary teeth
  • Mesiodens ➔ 90%
• Clinical presentation
  • May be asymptomatic
  • Slowly enlarging swelling
  • Painful if infected
Radiographic features

• Unilocular radiolucent area associated with crown of an unerupted tooth.

• Erroneous impression of multilocularity
• Dentigerous cyst vs dilated follicle
  • Pericoronal radiolucency greater than 4mm → cyst

• Radicular cyst in deciduous teeth → may mimic dentigerous cyst
• Three variants
  • Central
  • Lateral
  • Circumferential
• Greater tendency to produce root resorption
  • Derivation from dental follicle

• Release of bone resorbing factors from the cyst wall
  • Prostaglandins E2 and E3
  • Interleukin 1
  • TNF
Pathogenesis

• Intrafollicular
  • Develop by accumulation of fluid between
    • Reduced enamel epithelium and enamel
    • Within the enamel organ itself i.e cystic degeneration of stellate reticulum

• Extrafollicular
  • Envelopmental or follicular keratocysts???
• Enamel hypoplasia

  • Cyst arising from degeneration of stellate reticulum → enamel hypoplasia

  • Cyst arising from accumulation of fluid between REE and enamel → no enamel hypoplasia
Presence of enamel hypoplasia

- Diminished the adherence of REE to the crown
- Accumulation of fluid
- Cyst formation

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Superficial cells of the cyst lining sometimes show projections resembling Tomes’ process

Derived from ameloblasts

Origin from REE
Extrafollicular hypothesis

• Crown of a permanent tooth may erupt into a radicular cyst of its deciduous predecessor

• Not very popular because
  • Radicular cyst in deciduous teeth are very uncommon
  • Erupting tooth may indent rather than penetrate the cyst
• How does the separation between the REE and enamel takes place????

Pressure exerted by erupting tooth on impacted follicle

Obstruction of venous outflow

Rapid transudation of serum across the capillary walls

Increased hydrostatic pressure

Separation of REE from the crown

(Main, 1970)
• Dentigerous cyst fluid contains
  • Glycosaminoglycans
    • Hyaluronic acid
    • Heparan and chondroitin sulphate

• Increases the osmolality of the cyst fluid and thought to play a role in the expansion of the cyst.
Histopathological features

• Thin fibrous cyst wall derived from dental follicle
  • Young fibroblasts
  • Abundant stroma and ground substance rich in mucopolysaccharides
• Epithelial lining derived from REE

• 2-4 layers of flat cuboidal cells

• Characteristically non keratinized

• May have discontinuities

• Sometimes superficial layers may be low columnar → retains morphology of ameloblast layer
• Variations

  • Mucous cells in epithelial lining
    • More common in maxilla

  • Ciliated cells in epithelial lining

  • Sebaceous glands in cyst wall
• Rushton bodies
  • Found within
    • The epithelium or its surface
    • Connective tissue wall

• Appear as
  • Irregular, eosinophilic, glassy structures
  • Often showing a granular center
• Localized proliferation of epithelial lining in response to inflammation

• Bud-like thickenings of the epithelium in absence of inflammation

• Budding of the basal cells into the fibrous capsule

• Epithelial proliferations resembling SOT
• Nests, islands and strands of odontogenic epithelium in the connective tissue capsule
Eruption cyst
• Dentigerous cyst occurring in the soft tissues

• Occurs when tooth is impeded in eruption within the soft tissues
Clinical features

• Frequency
  • 0.8%

• Age
  • Children of different ages
  • Occasionally adults → delayed eruption
Clinical presentation

- Most frequently anterior to the 1st permanent molar
- Smooth swelling over erupted tooth
- Normal colour or bluish
- Soft and fluctuant
- Usually painless unless infected
• Sometimes more than one cyst may be present

• Brief history of about 3-4 weeks

• Usually 1-1.5 cms
Radiographic features

- May have a soft tissue shadow
- No bone involvement
Pathogenesis

• Similar to dentigerous cyst

• Dense fibrous soft tissue may be responsible for impedance in eruption
Histopathological features

- Superficial aspect covered by gingival epithelium
- Cyst is lined by REE
- Intensely inflamed $\rightarrow$ may form arcades
- Connective tissue capsule merges with gingival connective tissue
  - Gingival connective tissue $\rightarrow$ pink
  - Cyst connective tissue $\rightarrow$ blue
Lateral periodontal cyst
Cysts which occur in the lateral periodontal position and in which an inflammatory etiology and a diagnosis of collateral keratocyst have been excluded on clinical and histopathological grounds
Clinical features

• Frequency
  • 0.7%

• Age
  • Prominent peak in the 6th decade

• Sex
  • No sex predilection
  • Some studies show slight male preponderance

• Site
  • Mandibular premolar area
  • Anterior maxilla
• Clinical presentation
  • Asymptomatic
  • Gingival swelling on facial aspect
  • Pain, tenderness on palpation
  • Consistency
    • Springy with egg shell crackling
    • Gelatinous feel
  • Associated teeth usually vital
Radiographic features

• Round or oval, well circumscribed radiolucency

• Sclerotic margin

• Between the apex and cervical margin of tooth

• Usually less than 1 cm in diameter

• Mean growth → 0.7mm per year
Pathogenesis

• Developmental odontogenic origin

• Three possibilities
  • Reduced enamel epithelium
  • Remnants of dental lamina
  • Cell rests of Malassez
• Reduced enamel epithelium

• Arises initially as a dentigerous cyst developing by expansion of the follicle along the lateral surface of crown
• Support of this hypothesis

• LPC occur in areas where dentigerous cysts are likely to be associated with vertically impacted teeth

• Epithelial plaques similar to those seen in LPC may also be seen sometimes in dentigerous cysts
• Cell rests of dental lamina
  • Cystic change in a single rest → **unicystic forms**
  • Concomitant changes in several adjacent rests → **polycystic**

• Support for this hypothesis
  • Limited growth potential of LPC → derivation from post functional cells of dental lamina
• Cell nests of Malassez

• Occur in the periodontium
• Well positioned for a lateral periodontal cyst
• Has not received much support
Histopathology

- Thin, non-keratinized squamous or cuboidal epithelial lining
- 1-5 cell layers
- Resembles reduced enamel epithelium
- Sometimes stratified squamous
- Usually free of inflammation

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• Localized plaques or thickenings of the epithelial lining

• Extend into the surrounding cyst wall

• Mural bulges
Glycogen rich clear cells in the epithelial lining
Botryoid odontogenic cyst
First reported by *Weathers and Waldron, 1973*, who also proposed the name → resemblance to cluster of grapes

- Variant of LPC

- Microscopically similar to LPC with some differences
• Multilocular with thin fibrous connective tissue septa

• Smaller cyst cavities are oriented towards the larger ones

• Usually lined by thin non-keratinized epithelium, 1-2 layer thick

• In some areas thicker stratified squamous epithelium
• Foci of plaque like thickenings

• Flat fusiform cells

• Clear cells are unusual
Glandular odontogenic cyst
• Sialo-odontogenic cyst

• Glandular odontogenic cyst

• Mucoepidermoid odontogenic cyst
• Wide age range

• Can occur in either jaws

• Propensity to grow to a large size and to recur

• Radiologically
  • Unilocular or multilocular
  • Smooth or scalloped margin
Histologically

- Non-keratinized stratified squamous epithelium
- Chronic inflammatory infiltration of connective tissue wall
- Superficial layer of epithelial lining
  - Columnar or cuboidal cells, occasionally with cilia
  - Glandular or pseudoglandular structure
  - Intraepithelial crypts or microcysts

may open onto the surface of epithelium

Papillary or corrugated surface
• Numerous goblet cells may be present

• Occasionally epithelium resembles REE

• Epithelial thickenings or plaques may be present
  • Protrude into the cyst cavity
  • Extend into the connective tissue wall

• Islands of odontogenic epithelium
• Microcysts
• Irregular calcifications
Calcifying odontogenic cyst
First described by Gorlin, 1962

Cyst or Neoplasm ?????
Clinical features

• Frequency
  • 1% of all jaw cysts

• Age
  • Peak in 2\textsuperscript{nd} decade
  • Bimodal age distribution (6\textsuperscript{th}-7\textsuperscript{th} decade)
  • Extraosseous lesions $\Rightarrow$ over 50 years

• Sex
  • Equal sex distribution
• Race
  • No racial predilection

• Site
  • Equal frequency in maxilla and mandible
  • Anterior jaw
  • Peripheral lesions $\rightarrow$ gingiva and alveolar mucosa anterior to molars
• Clinical presentation
  • Asymptomatic
  • Pain is rare
  • Bony hard swelling
  • May be fairly extensive
  • Occasionally may perforate cortical plate
  • Displacement of teeth
Radiological features

• Regular or irregular radiolucency

• Usually unilocular

• Irregular calcified bodies of varying sizes may be seen

• If associated with odontome → dense radiopacity

• Displacement of teeth

• Resorption of root
Histopathological features

- The epithelial lining shows
  - 6-8 cell layers
  - Prominent basal layer
  - Palisaded columnar or cuboidal cells
  - Hyperchromatic nuclei polarized away from basement membrane
  - Budding from basal layers
  - Epithelial proliferations
• Ghost cells
  • Essential characteristic for the diagnosis of COC

• May also be found in
  • Cutaneous epithelioma of Malherbe
  • Odontoma
  • Ameloblastoma
  • Ameloblastic fibro-odontoma
  • Ameloblastic fibroma
• Found singly or in groups

• Enlarged, ballooned, ovoid or elongated elliptoid

• Eosionophilic

• Cell outline usually well preserved

• Very faint nuclear outline (may contain nuclear remnants)
• Have an affinity for calcification

• May also be seen in the connective tissue

• Evokes a foreign body response in connective tissue with formation of giant cells

• May herniate into the cystic lumen
• Nature of ghost cells??????????

• Abnormal keratinization

• Squamous metaplasia with subsequent calcification caused by ischemia

• Metaplastic transformation of odontogenic epithelium

• Product of abortive enamel matrix

• Product of coagulative necrosis of odontogenic epithelium
• Other histological features
  • Satellite cysts
  • Atubular dentinoid close to the epithelial lining
  • Complex odontomes in the walls
  • Melanin deposits in the epithelial lining
Classification of COC

• Praetorius et al, 1981
  • Type 1 → cystic
    • Type 1A → simple unicystic type
    • Type 1B → odontome producing type
    • Type 1C → ameloblastomatous type

• Type 2 → solid neoplasm
  • Ameloblastomatous epithelium with secondary cyst development
• Buchner, 1991

A. Peripheral (extraosseous) COC
   1. Cystic variant
   2. Neoplastic (solid) variant

B. Central (intraosseous) COC
   1. Cystic variants
      a. Simple (unicystic or multicystic)
      b. Associated with odontoma
      c. Associated with odontogenic tumors (other than odontoma)
      d. Other variants (clear cell variant, pigmented variant)
   2. Neoplastic (solid) variant
   3. Malignant COC
RADICULAR CYST
A radicular cyst is one which arises from the epithelial residues in the peridontal ligament as a result of inflammation.
CLINICAL FEATURES

• Frequency
  • Most common cystic lesions in the jaws (52 - 68%)

• Age
  • Third decade

• Sex
  • Male preponderance

• Site
  • 60% Maxilla > 40% mandible
• Clinical presentation
  
  • Many are symptomless
  
  • Slowly enlarging swelling
  
  • Springiness & fluctuation
  
  • Tooth with a non vital pulp.
  
  • Sinus tract occasionally
RADIOLOGICAL FEATURES

• Round or ovoid radiolucencies bounded by a radio-opaque margin which extends from lamina dura of involved tooth.

• Root resorption is rare, but may occur.

• Infection causes diffuse radiographic margin
• Residual cyst
  • Those which are retained after removal of the offending non-vital tooth

  • Approximately 10% of all odontogenic cysts

  • Usually asymptomatic

  • Decrease in size with increase in age
PATHOGENESIS

• Epithelial cell rests of Malassez

• Three phases:
  • Phase of Initiation,
  • Phase of Cyst formation
  • Phase of Enlargement
• Phase of initiation:

Some product of a dead pulp evokes an inflammation reaction

Proliferation of odontogenic epithelium
• Local changes in the supporting C.T.
  • Decreased Oxygen
  • Increased Carbon dioxide Tension
  • Local Reduction In PH

• Role of immune factors
  • IgG
  • Compliment C3
Bacterial antigens from the infected pulp

Bind with antibodies

Form antigen-antibody complexes

Co-activate complement

Increased vascular permeability and leukotactic response
• Role of anaphylactic hypersensitivity reaction
  • Presence of IgE containing cells and mast cells

• Humoral & cell - mediated reactions
  • T cells are more
  • Low B cell activity
  • In areas of intense inflammation, greater number of S-100 and HLA-Dr positive cells
Activated T cells in periapical granulomas

Produce lymphokines

Act on rests of Malassez

Proliferation and altered differentiation

Cyst formation
• **Phase of cyst formation:**

- Breakdown of connective tissue by proteolytic enzyme activity

- Central degeneration in the proliferating epithelium
  - Proliferating epithelial masses show considerable intercellular edema.

- High levels of acid phosphate activity in the central cells of PG

- Sheets of epithelial cells with distinct clefts are seen
• Phase of enlargement:

• Osmosis could play role in enlargement

• Cyst walls have properties of semipermeable membranes
  • In vivo dialysis experiments showed crystalloid diffusion was rapid and colloid retained

• Mean osmolality is greater than serum
  • Plasma proteins
  • Hyaluronic acid
  • Products of cell breakdown

• Osmotic imbalance is due to absence of lymphatics

• Internal cystic pressure is higher than capillary blood pressure
• As the cyst expands there is resorption of the surrounding bone

• Intraosseous expansion is facilitated by
  • Local enzymes
  • Hormone-induced bone resorption
    • Lipoperoxides
    • Prostaglandins
  • Collagenolytic activity
    • MMPs

• Rate of growth \(\rightarrow\) 5mm per year
Histopathological features

• Gross
  • Sherical / ovoid intact masses
  • Walls are thick
  • Yellow mural nodules of cholesterol
• St. sq. epithelium, range from 1 to 50 cell layer
• Arcading pattern
• Spongiosis
• Mucous cells
• Increased incidence with age
• Ciliated cells
• Mostly in maxilla
• Hyaline or Rushton’s bodies
• Origin of Rushton bodies
  • Secondary enamel cuticle
  • Keratin
  • Hemotagenous origin
  • Non keratinous secretory product of the odontogenic epithelium

• Type I $\rightarrow$ homogenous with no central granular component
• Type II $\rightarrow$ encloses coarse grained foreign material
• Some characteristic shapes
  • Linear, straight or curved
  • Broken up pieces of plate
  • Circular or polycyclic
  • Elongated type lining cleft like spaces
• Cholesterol crystals and clefts
• Sources of cholesterol
  • Disintegrating RBCs
  • Lymphocytes
  • Plasma cells
  • Macrophages

• Behaves as foreign body and elicits a giant cell reaction
  • Derived from pericytes
• Pigmented cells in the epithelial lining
  • Macrophages containing lipid pigment ceroid
Small periapical lesions

Cavity lined by epithelium opening into the root canal

Bay cyst
• Lateral radicular cyst
• Fibrous capsule is composed of
  • Condensed collagen peripherally
  • Loose connective tissue adjacent to the epithelial lining

• Divided into 3 layers
  • Inner granulomatous layer
  • Moderately fibrous intermediate layer
  • Densely fibrous outer layer
• Varying degrees of acute and chronic inflammatory cells
  
  • Areas of epithelial proliferation $\rightarrow$ acute
  
  • Fibrous capsule $\rightarrow$ chronic

• Mast cells $\rightarrow$ subepithelial zone
• Remnants of odontogenic epithelium

• Satellite microcysts

• Hemorrhage and hemosiderin deposits

• Calcifications
• Microbial flora

• Mostly gram positive anaerobic cocci

• Gram negative anaerobic rods

• Gram positive aerobic cocci
Carcinomatous change

• Few cases of squamous cell carcinoma arising from radicular cyst has been reported

• Keratin metaplasia in long standing cyst may precede carcinomaous transformation

• Very rare → can not be considered as precancerous lesion
PARADENTAL CYST
Cyst which occurs on the lateral aspect of roots of partially erupted mandibular 3rd molar when there is a history of associated pericoronitis

- **Main** → Inflammatory collateral cyst
- **Craig** → Paradental cyst
Clinical features

• 3% of cysts

• 3rd decade.

• Males

• Mandibular 3rd Molars with history of pericoronitis
Radiologically

• Well demarcated radiolucency distal to partially erupted 3\textsuperscript{rd} molar

• Often buccal superimposition

• Intact periodontal ligament space
Histologic features

- Indistinguishable from radicular cyst
Pathogenesis

- Reduced enamel epithelium
- Rests of Malassez
Mandibular infected buccal cyst
• Permanent mandibular 1\textsuperscript{st} and 2\textsuperscript{nd} molars rather than wisdom teeth

• Younger age

• Similar to paradental cyst

• More extensive & severe clinical features
Cystic fluid and its role in diagnosis
<table>
<thead>
<tr>
<th>Investigation</th>
<th>OKC</th>
<th>Dentigerous cyst</th>
<th>Radicular cyst</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
<td>Clear - transudative</td>
<td>Clear - transudative</td>
<td>Straw colored - exudative</td>
</tr>
<tr>
<td><strong>Consistency</strong></td>
<td>Viscous - not free flowing.</td>
<td>Viscous - Not free flowing</td>
<td>Watery - Free flowing</td>
</tr>
<tr>
<td><strong>Quantity</strong></td>
<td>&lt; radicular &amp; dentigerous C</td>
<td>&lt; radicular C</td>
<td>&gt; All Dev. Odont. cysts</td>
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<tr>
<td><strong>osmolality</strong></td>
<td>296 milliosmoles</td>
<td>286m.os</td>
<td>290m.os</td>
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<td><strong>Intracystic pressure</strong></td>
<td>Increased. &gt; dentigerous &amp; Rad.</td>
<td>Same as radicular.</td>
<td>Same as DC</td>
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<tr>
<td>Investigation</td>
<td>OKC</td>
<td>Dentigerous cyst</td>
<td>Radicular cyst</td>
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<tr>
<td>------------------------</td>
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</tr>
<tr>
<td><strong>Soluble protein</strong></td>
<td>2.09g/100ml</td>
<td>5.40gm/100ml</td>
<td>4.86g/100ml</td>
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<tr>
<td><strong>Albumin</strong></td>
<td>78.03</td>
<td>61.35</td>
<td>51.19</td>
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<td><strong>β globulins</strong></td>
<td>7.52</td>
<td>13.98</td>
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<td>7.91</td>
<td>12.70</td>
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<td><strong>Immunoglobulins</strong></td>
<td>Decreased</td>
<td>Increased</td>
<td>Increased</td>
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<td></td>
<td>IgG cell ↓</td>
<td>IgG cell ↑</td>
<td>IgG cell ↑</td>
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<td></td>
<td>IgA cell ↑</td>
<td>IgA cell ↓</td>
<td>IgA cell ↓</td>
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<tr>
<td><strong>Cholesterol crystals</strong></td>
<td>absent</td>
<td>present</td>
<td>present</td>
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<tr>
<td><strong>Keratin</strong></td>
<td>present</td>
<td>Usually absent</td>
<td>May be present</td>
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<tr>
<td>Investigation</td>
<td>OKC</td>
<td>Dentigerous cyst</td>
<td>Radicular cyst</td>
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<td>Collagenolytic inhibitor</td>
<td>Decreased</td>
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<td>Prostaglandin</td>
<td>Decreased</td>
<td>Increased PGE2 &amp; PGE3</td>
<td>Increased PGE2 &amp; PGI2</td>
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<td>Lactoferrins</td>
<td>Higher</td>
<td>Lesser</td>
<td>Lesser</td>
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<td>Mucopolysaccharides</td>
<td>++ (heparin sulphate increased)</td>
<td>++ (hyaluronic acid increased)</td>
<td>+</td>
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<td>Crystalline deposits</td>
<td>Present Increased phosphate</td>
<td>Absent</td>
<td>Present</td>
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<tr>
<td>Interleukin –1 like material</td>
<td>+</td>
<td>++</td>
<td>+</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>Lesion</th>
<th>Aspirate</th>
<th>Other findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentigerous</td>
<td>Clear pale, straw coloured fluid</td>
<td>Cholesterol crystals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total protein &gt; 4g/100ml (resembling serum)</td>
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<tr>
<td>OKC</td>
<td>Dirty, creamy white viscoid suspension</td>
<td>Parakeratinised squames.</td>
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<td>Total protein &lt; 5g/100ml most of which is albumin</td>
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<tr>
<td>Radicular cyst</td>
<td>Clear pale yellow straw coloured fluid</td>
<td>Varying amounts of cholesterol crystals.</td>
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<tr>
<td></td>
<td></td>
<td>Total protein b/n 5-11g/100ml</td>
</tr>
<tr>
<td>Infected cysts</td>
<td>Pus or brownish fluid, seropurulent/sanguinopurulant fluid, at times paste like or caseous consistency.</td>
<td>PMNL, Foam cells cholesterol clefts</td>
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<td>Solitary bone c</td>
<td>Serous or sanguinous fluid, blood or empty cavity</td>
<td>Necrotic blood clot</td>
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<tr>
<td>Gingival cysts</td>
<td>Clear fluid</td>
<td></td>
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<td>------------------------</td>
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<tr>
<td>Fissural cysts</td>
<td>Mucoid fluid</td>
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<td>Mucocele, ranula</td>
<td>Mucus</td>
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<tr>
<td>Dermoid cysts</td>
<td>Thick sebaceous material</td>
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<td>Stafne’s bone cavity</td>
<td>Empty cavity will yield air</td>
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<tr>
<td>Vascular cysts</td>
<td>Fresh blood</td>
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<td>walls</td>
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<tr>
<td>Intramedullary</td>
<td>Syringe full of venous blood</td>
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</tr>
<tr>
<td>cavernous hemangioma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arterial or</td>
<td>Bright red blood, pulsatile, pushes plunger</td>
<td></td>
</tr>
<tr>
<td>arteriovenous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>malformation</td>
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</tbody>
</table>

Prof. Shaleen Chandra
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• Lucas
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• Regezi
thank you