PERIAPICAL RADIOLUCENCIES

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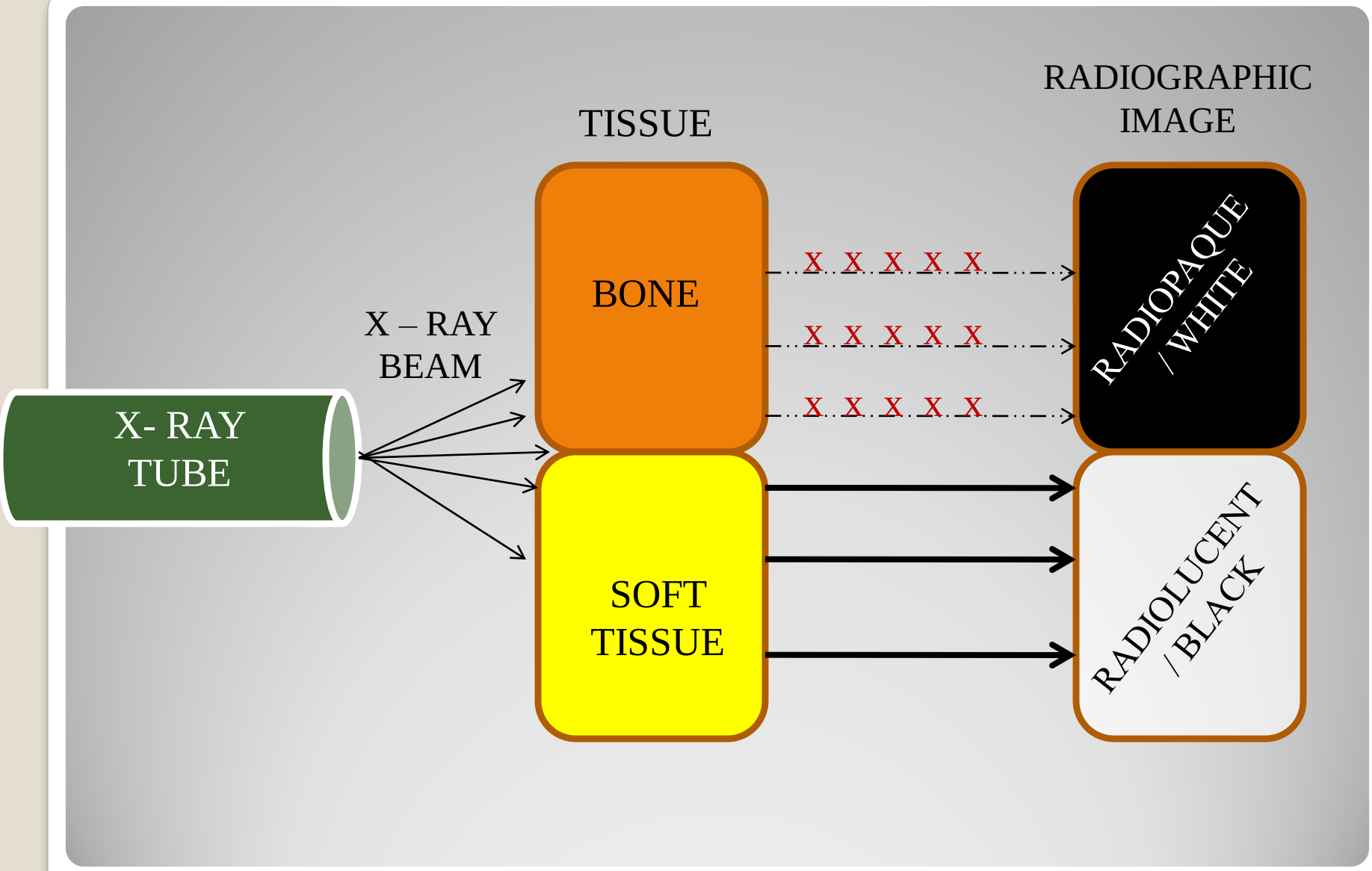
III BDS lecture



Why is a tissue is radiopaque or radiolucent?

Introduction

- Periapical radiolucency is the descriptive term for radiographic changes which are most often due to apical periodontitis and radicular cysts, that is, inflammatory bone lesions around the apex of the tooth which develop if bacteria are spread from the oral cavity through a caries-affected tooth with necrotic dental pulp.

Wood and Goaz Classification

Radiolucencies

- Periapical
- Pericoronal
- Interradicular
- Solitary cyst-like lesions
- Multilocular
- Ill defined
- Multiple separate
- Generalized rarefaction

Mixed (RL-RO)

- Periapical
- Pericoronal
- Not necessarily contacting the teeth

Radiopacities

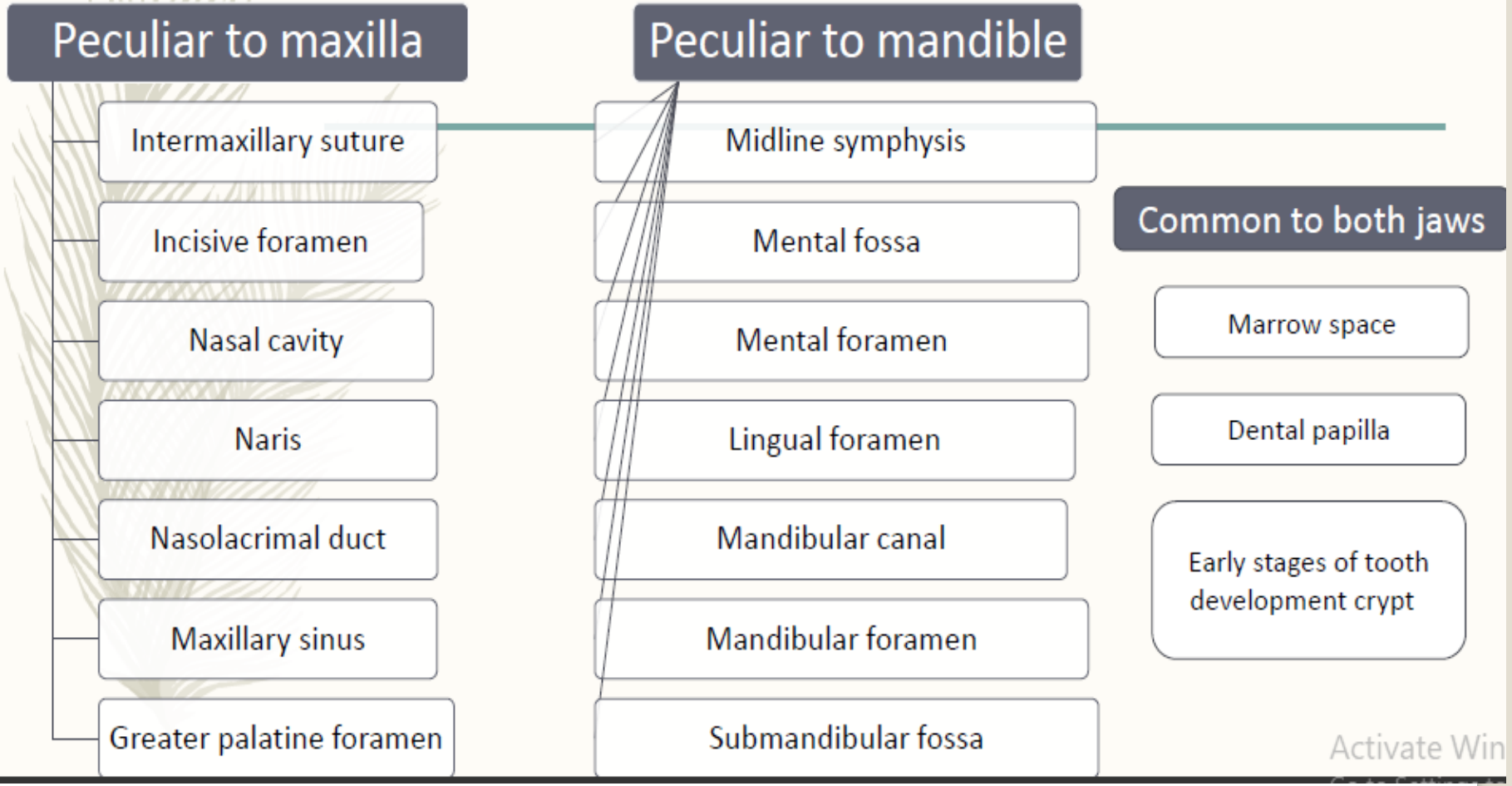
- Periapical
- Not necessarily contacting the teeth
- Multiple
- Generalized

1. ANATOMIC PSEUDO PERIAPICAL RADIOLUCENCY

2. TRUE PERIAPICAL RADIOLUCENT LESIONS

I. CLASSIFICATION

ANATOMIC



TRUE RADIOLUCENCIES

- APICAL PERIODONTITIS
- PERIAPICAL ABSCESS
- PERIAPICAL GRANULOMA
- PERIAPICAL CYST
- PERIAPICAL CEMENTAL DYSPLASIA

II. Classification

1. *Normal Anatomic radiolucencies*
   - Mental foramen
   - Incisive foramen
   - Lingual foramen
   - Submandibular fossa
   - Mental fossa
   - Nasal fossa
   - Maxillary sinus
   - Dental papilla

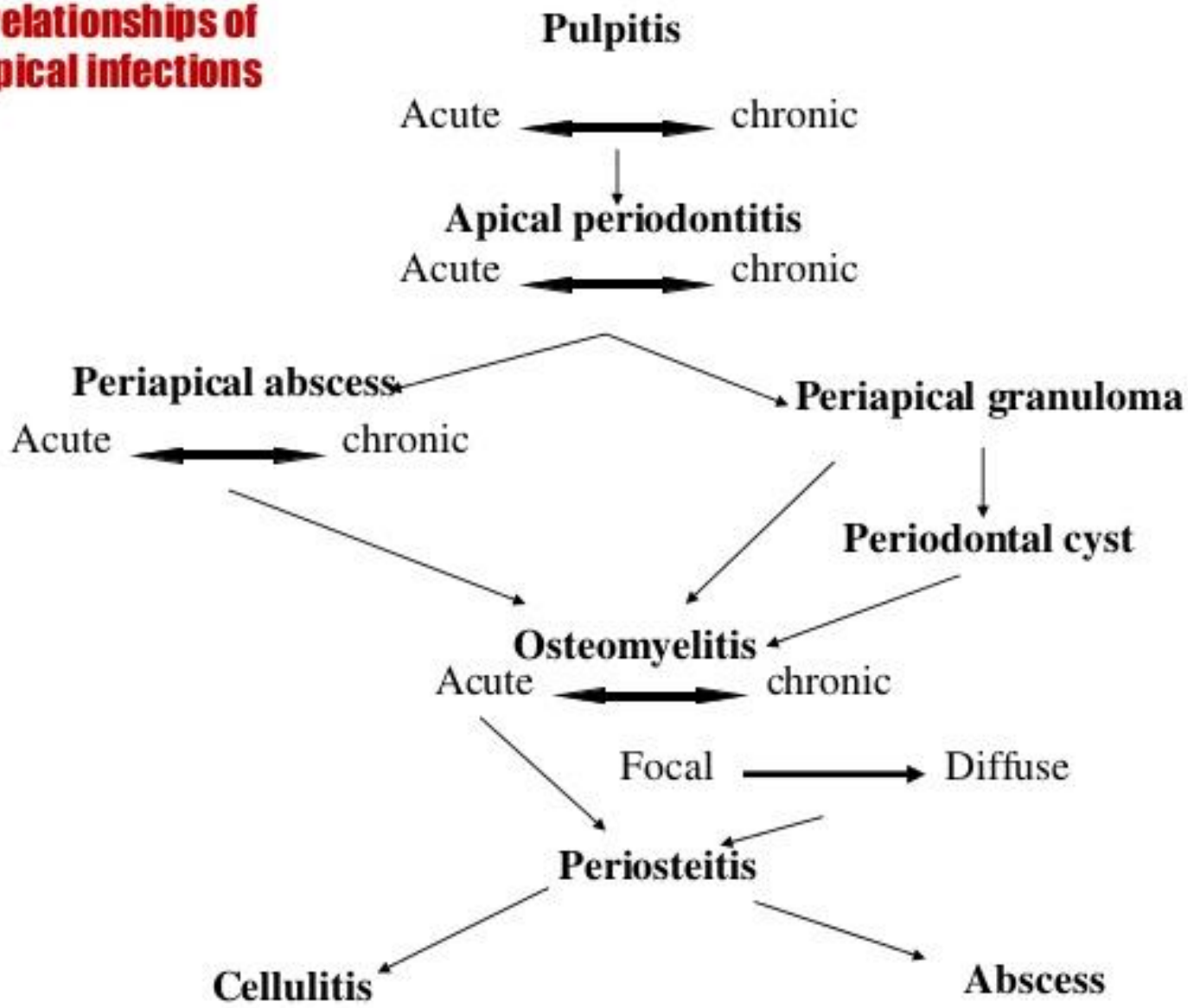
2.Pulpoperiapical radiolucencies

- Periapical granuloma
- Radicular cyst
- Periapical scar
- Alveolar abscess
- Osteomyelitis
- Hyperplasia of sinus mucosa

3.Radiolucencies associated with Periapical region

- Surgical defects
- Dentigerous cysts
- Non radicular cysts
- Periapical cementoosseous dysplasia
- Periodontal diseases
- Traumatic bone cyst
- Malignant tumors
- Other rare conditions

Interrelationships of periapical infections



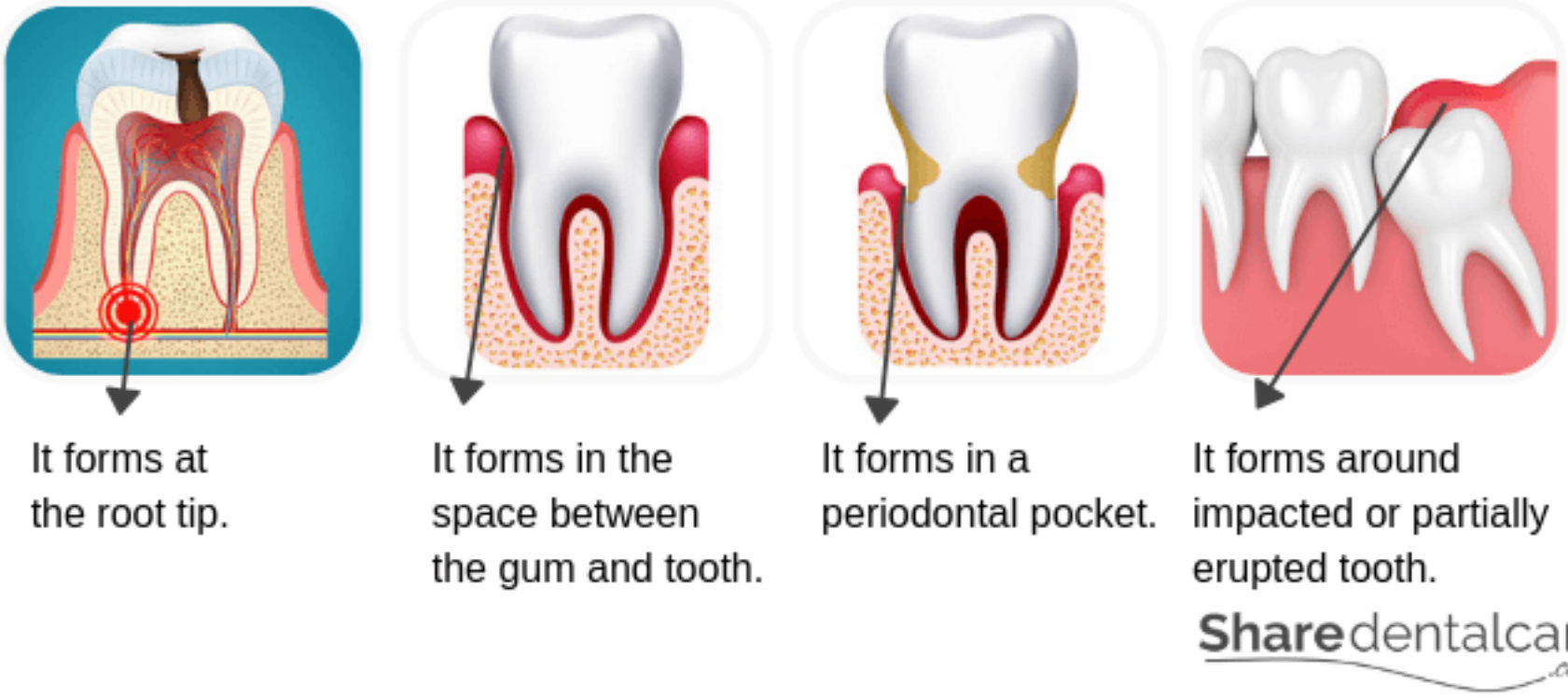
CLINICAL FEATURES:

- Thermal changes does not induce pain.
- Slight extrusion of tooth from socket.
- Cause tenderness on mastication due to inflammatory edema collected in PDL.
- Due to external pressure, forcing of edema fluid against already sensitized nerve endings results in severe pain.

APICAL PERIODONTITIS

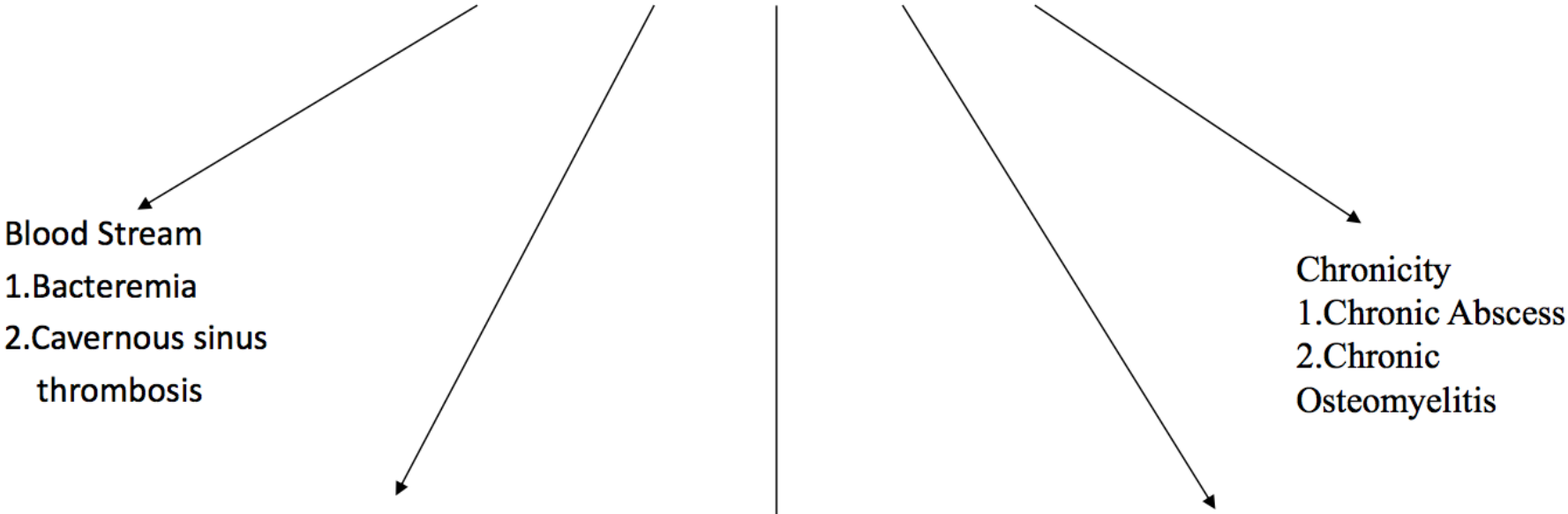
R/F

Types of Tooth Abscess



TOOTH ABSCESS

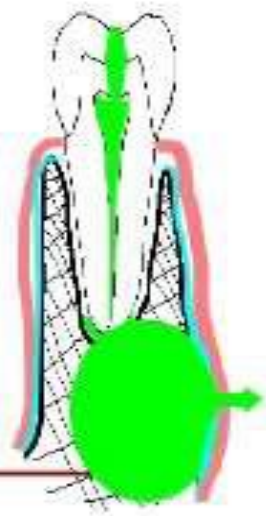
Periapical Abscess



Modified from: JA & Sciubba JJ. Oral Pathology. 3rd ed. WB Saunders, 1999.

CLINICAL FEATURES:

- Common findings of inflammation- heat, redness, swelling and pain.
- Tenderness of tooth, which relives after pressure application.
- Extreme painful tooth extrude from socket.
- Systemic manifestations like lymphadenitis & fever may present when confined to periapical region.
- Rapid extension to adjacent bone marrow spaces produces acute osteomyelitis or dentoalveolar abscess.



PERIAPICAL ABSCESS

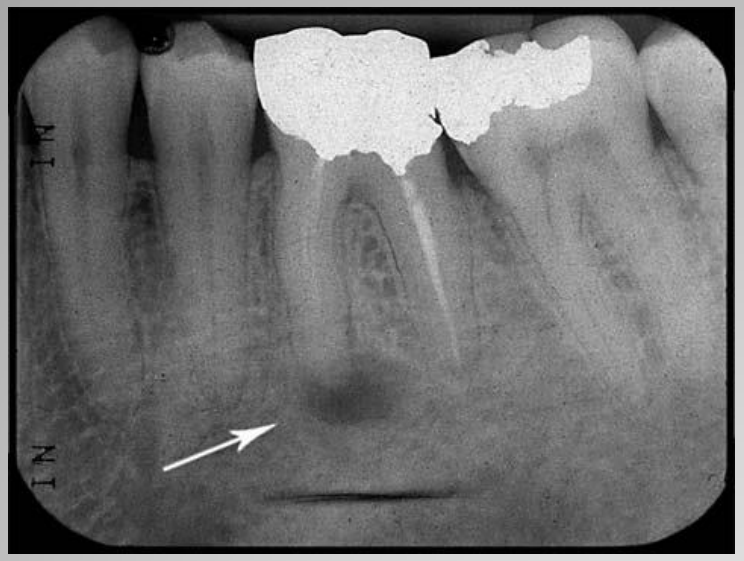
Intraoral labial sinus opening in relation to the carious maxillary lateral incisor

Intraoral palatal sinus opening in relation to the carious maxillary central incisor

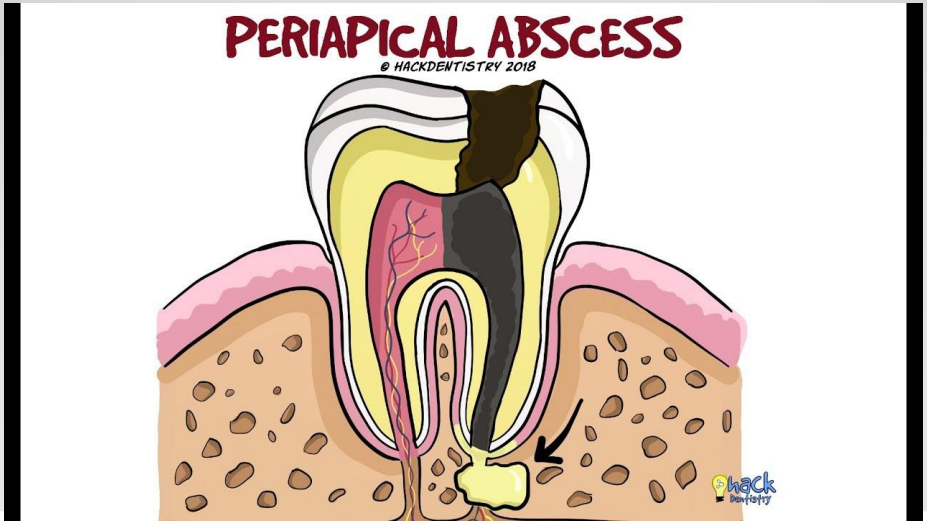
Extraoral sinus opening

Radiographic features of symptomatic apical abscess

A. Localized abscess resulting from an incomplete root canal treatment on a maxillary lateral incisor.
B. Cellulitis caused by a maxillary first molar with necrotic pulp.




abscess


PERIAPICAL ABSCESS
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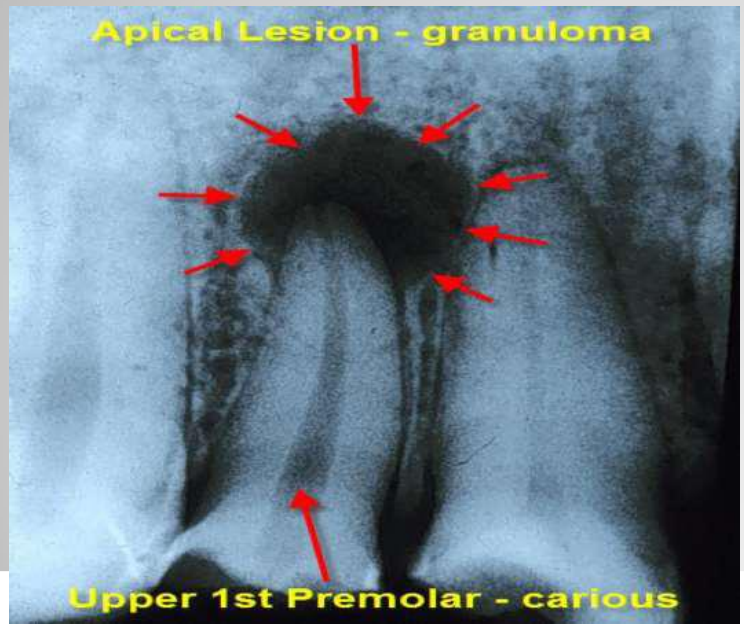
Periapical granuloma

- Most common periapical pathology
- Seen in 70-90% of cases,associated with non-vital tooth,Asymptomatic
- Well circumscribed radiolucency,surrounding apex of tooth,thin radiopaque border
- Radiographic size-upto 1-1.5cm in diameter
- Most commonly involves teeth with deep restorations and extensive caries


Apical Lesion - granuloma
Upper 1st Premolar - carious

Differential diagnosis

1. *Radicular cysts*-Larger in size,swelling or expansion of cortical plates seen
2. *Chronic Alveolar abscess*-Associated with pain,ill defined borders may be seen,hazy radiolucency

Radicular cyst

- 2nd most commonly seen pulpoperiapical lesion
- Most common among all odontogenic cysts reported,Seen in 15-25% of cases
- 60% of cases involves Max.lateral incisor apex
- Associated with non vital tooth
- Swelling may be seen,on palpation-bony hard & demonstrates crackling sound in areas where cortical plates are thinned

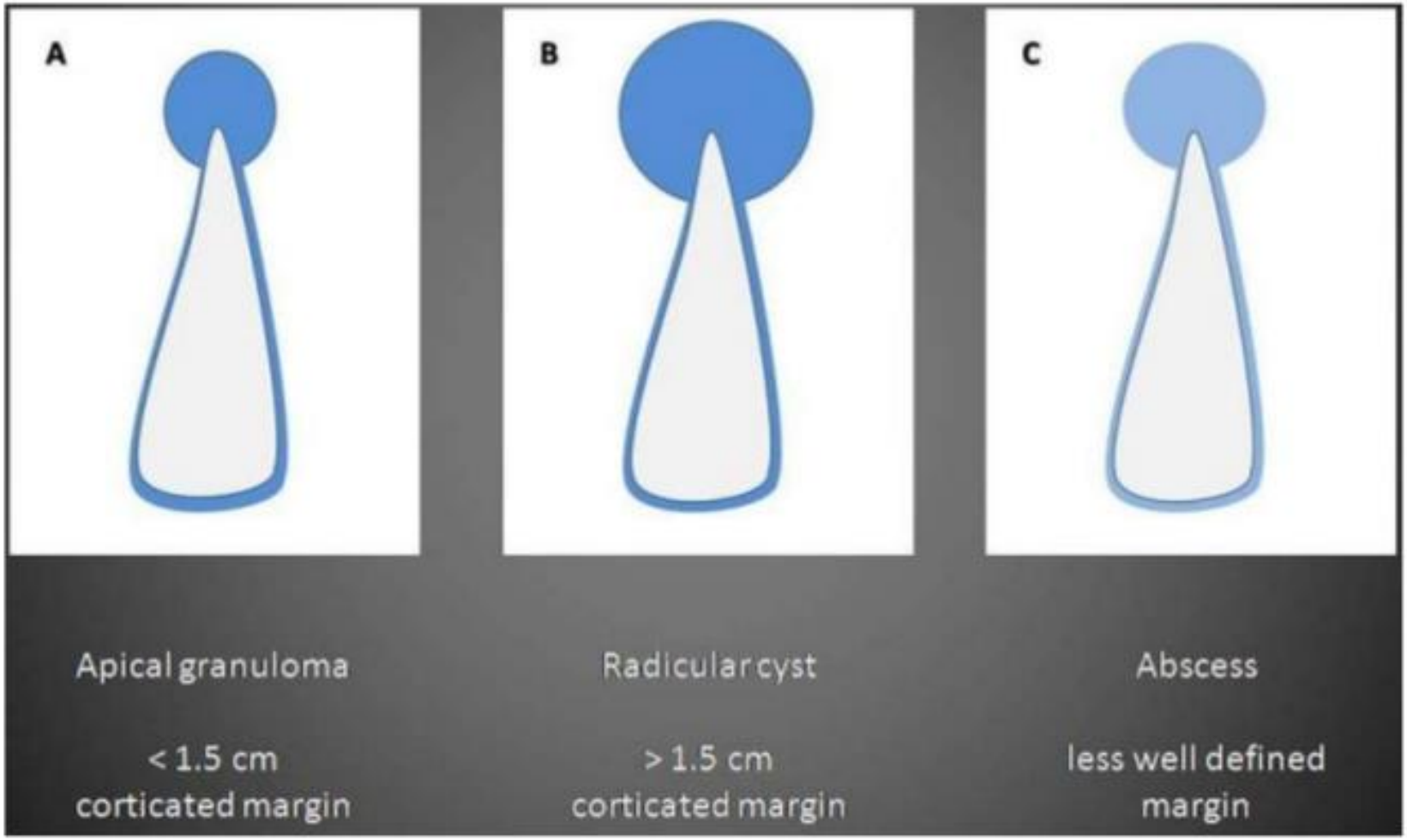
- If cyst becomes infected,swelling & painful symptoms of abscess is seen
- Aspiration of non infected cyst produces light straw colored fluid-containing abundance of shiny cholesterol crystals
- Radiographically-well defined radiolucency > 1-2 cm in diameter,apex of the affected tooth
- 20% of cases-root resorption,Expansion of cortical plates-chronic cases


A

- *Differential diagnosis*
  - *Periapical granuloma*-cyst has a larger R.L
  - *Periapical abscess*-ill defined hazy R.L
  - *Periapical scar*-seen in teeth that have received successful non surgical endodontic treatment
  - *Surgical defect*-Asymptomatic R.L.,seen after root resection
  - *Periapical cementoosseous Dysplasia*-associated with vital tooth,involves mand.anteriors

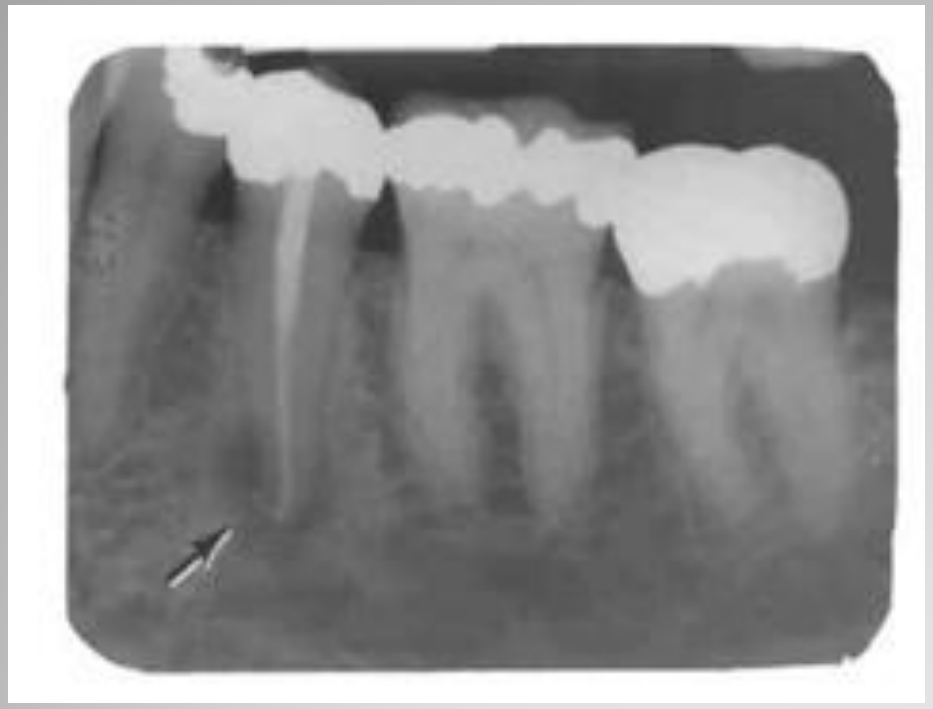
- *Traumatic bone cyst*-associated with vital tooth,90% of cases seen in mand premolar-molar area,intact lamina dura
- *Periodontal diseases*-Moderate to severe crestal bone loss
- *Systemic disorders*-hyperparathyroidism,Multiple myeloma,Malignant tumors

Periapical lucency



Periapical scar

- Composed - dense fibrous tissue, Apex of non vital tooth, in teeth - undergone successful R.C.T.
- Previous Periapical granuloma or cyst or abscess where healing has terminated leading to formation - scar tissue
- 2-5% of Periapical Radiolucencies
- Radiographically-Well circumscribed R.L, Round, resembling Periapical cyst / granuloma, but smaller in size
- Associated R.L remains constant in size or shrinks slightly
- Occurs most commonly in Ant.region of maxilla

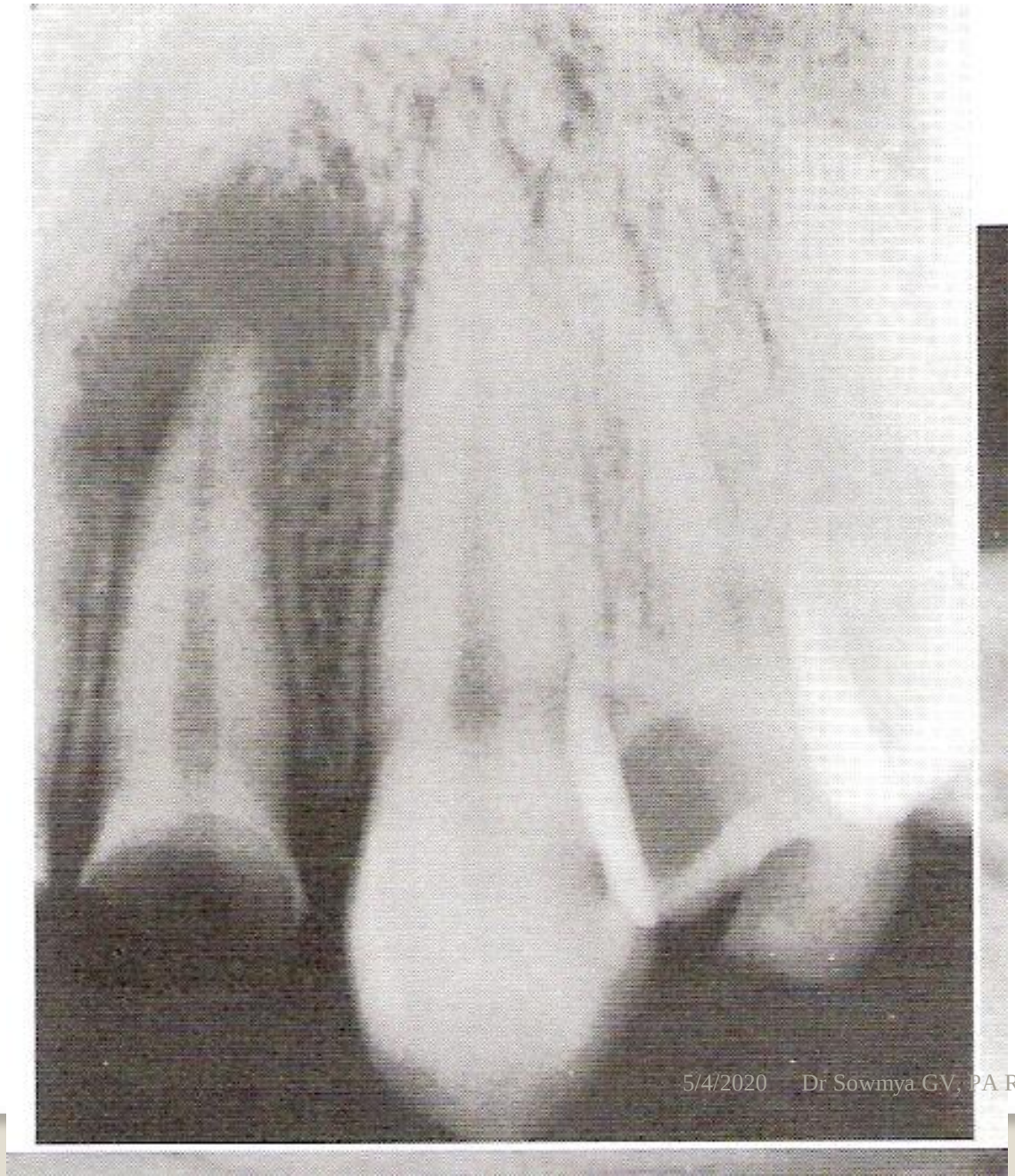


Dentoalveolar Abscess

- 2% of all pathological periapical R.L.
- Acute alveolar abscess-No radiographic findings
- Chronic-ill defined or occassionally well defined R.L ,Irregular,sometimes with a hyperostotic border,root resorption maybe present
- Seen as blurred region of lessened density
- Affected tooth usually shows deep restorations,non vital,extensive caries

Differential diagnosis

- *Periodontal abscess*-Originates from deep periodontal pocket,vital tooth,presence of R.L. in interdental area
- *Secondarily infected tumors/cysts*
- *Non Odontogenic cysts*-associated with vital pulps

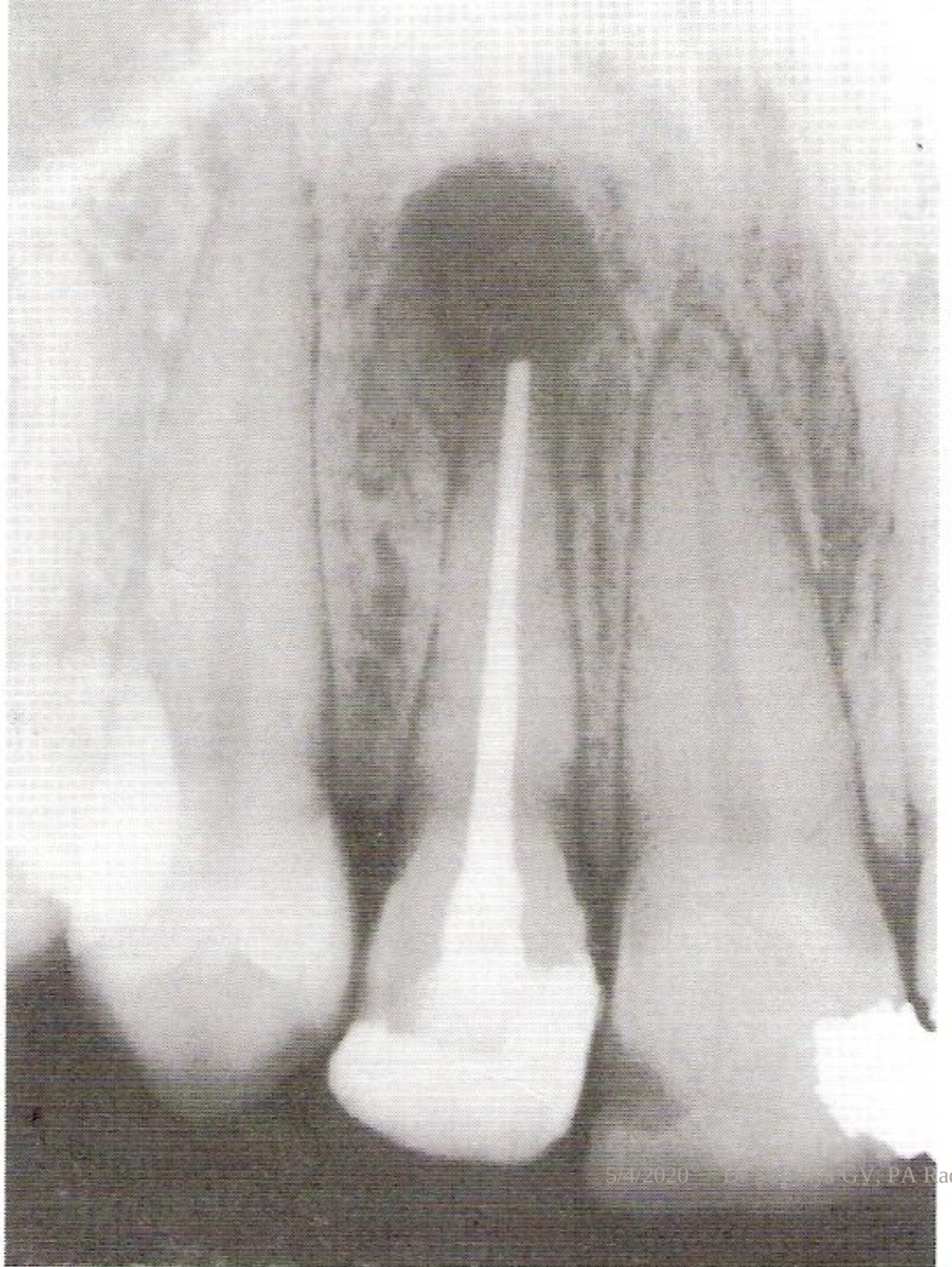


Surgical defects

- 2-3% of all periapical R.L
- An area that fails to fill with osseous tissue after surgery
- Commonly seen in root resection procedures where both labial and lingual plates have been destroyed
- Radiographically-rounded R.L, smoothly contoured,well defined borders,Approx 1 cm in size
- R.L usually decreases in size over period of time & resolves to a certain size and then remains constant
- Associated tooth is non vital
- If defect is large, can be palpated

Differential diagnosis

- *Pulpoperiapical lesions*-Surgical defect-H/o root resection, Asymptomatic, endodontically treated tooth,well defined R.L not >1cm
- Small depression in mucosa over periapical area
- If R.L. shadow caused by surgical defect-shows reduction in size over period of time



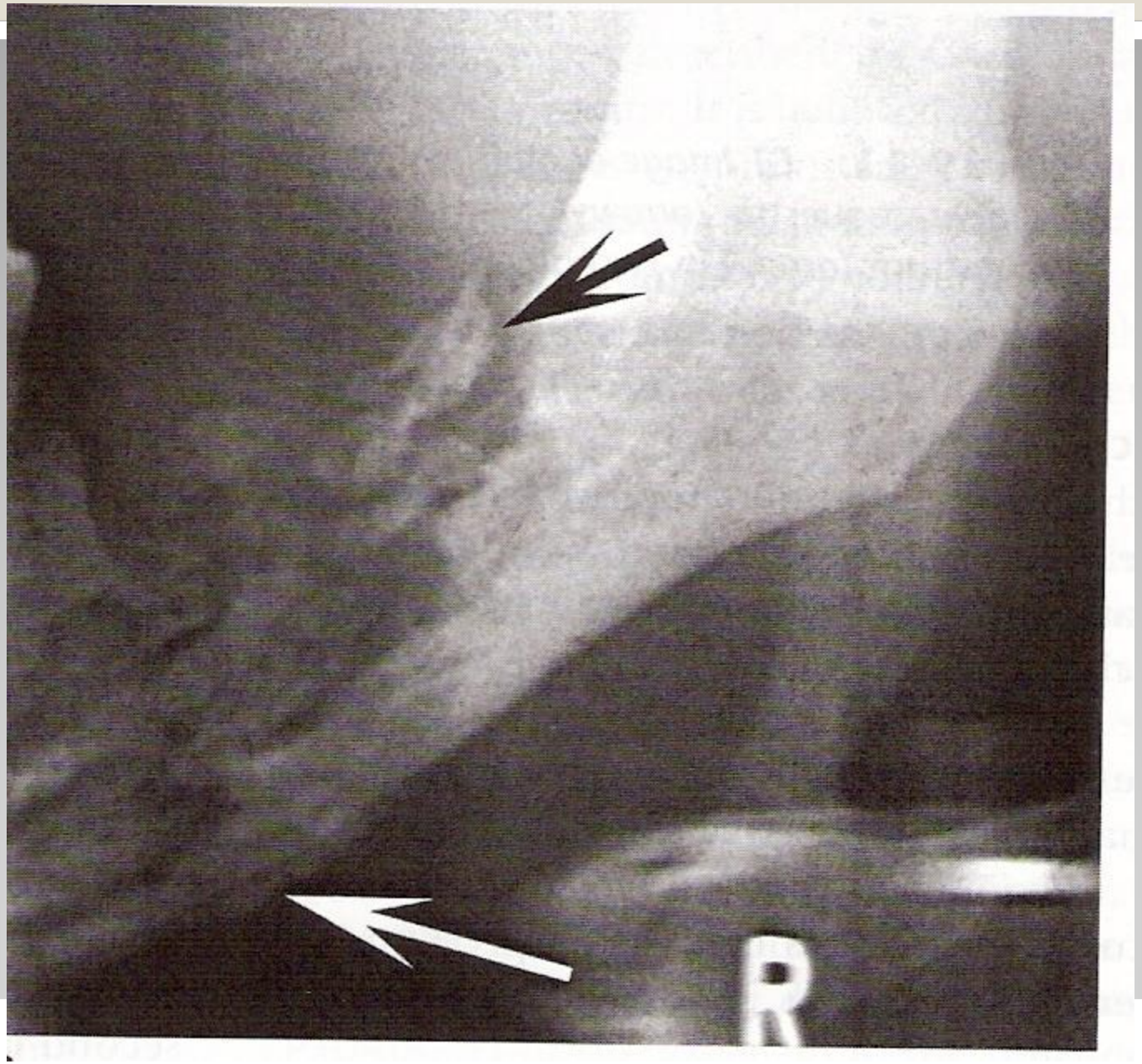
Osteomyelitis

- Infection of bone that involves all 3 components-periosteum,cortex & marrow
- Usually complication of Periapical abscess which casn develop into Acute/chronic Osteomyelitis
- Seen more in patients with decreased systemic resistance
- Not common in Maxilla,'coz of rich vascularity
- Acute Osteomyelitis-onset and course is rapid,hence bone resorption not seen

- Chronic Osteomyelitis-Bone destruction,4 distinct Rad.features:
  - Completely Radiolucent
  - Mixed Radiolucency
  - Radiopacity
  - Completely Radiopaque
- Chronic-characterized by irregular extensions of inflmmn & infn thru marrow spaces &channels in bone,hence-Periapical R.L seen as poorly defined,roundish R.L
- If sequestrum present-seen as R.O areas within Radiolucent region

Differential diagnosis

- *Chronic Alveolar Abscess*-Localized,Only Alveolar bone of jaw affected
- *Eosinophilic granuloma*-Area of bone destruction larger,not painful
- *Pagets disease*-Multiple bones involved,classic 'cotton wool' appearance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- Occassionally,position of crown of involved tooth & extension of cyst is such that the pericoronal R.L is projected over apex of neighbouring tooth
- In more than 50% of such cases-Resorption of neighbouring tooth root occurs

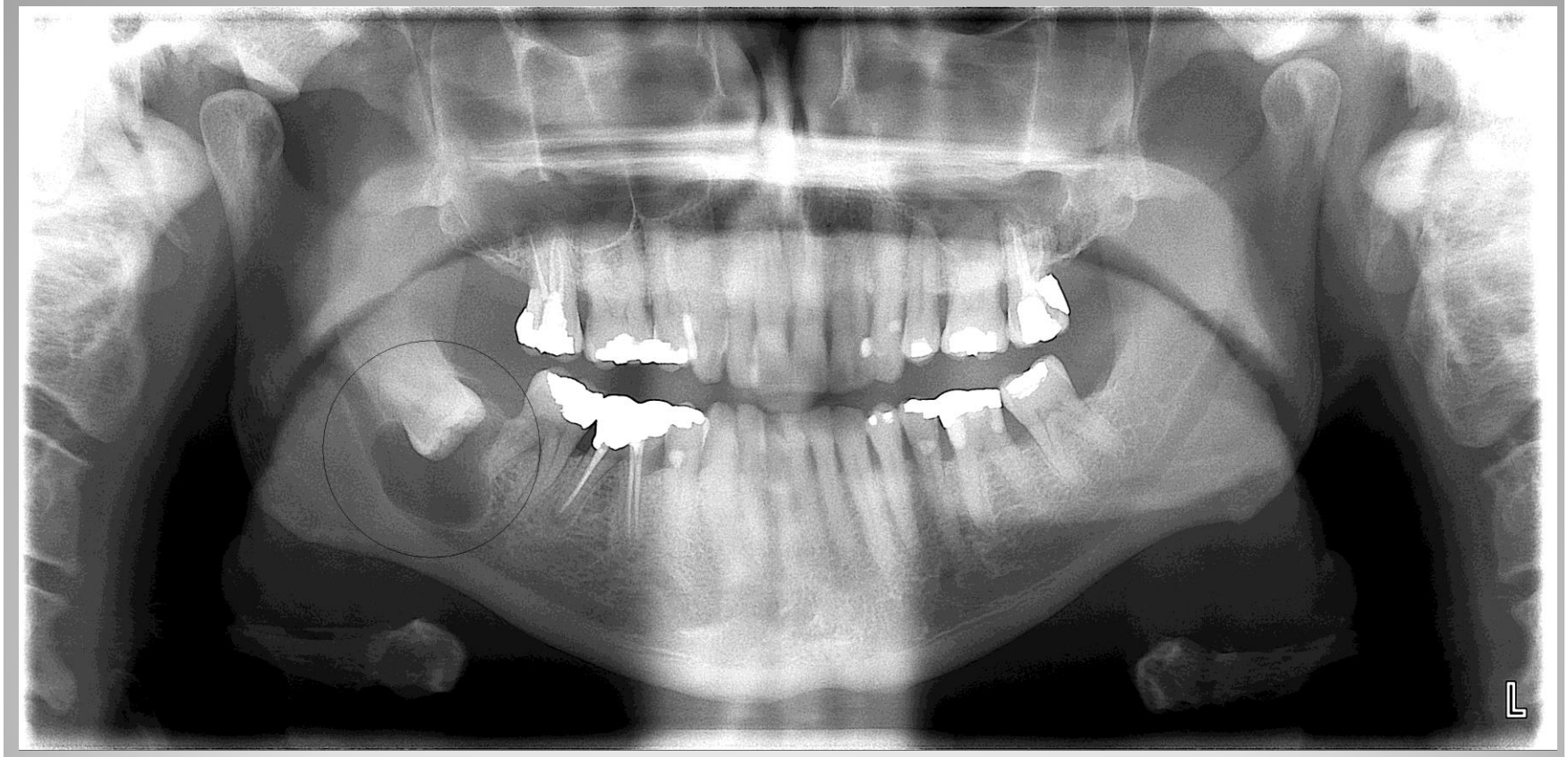
Dentigerous cyst

RADIOLOGICAL FEATURES:

- CENTRAL TYPE:

- LATERAL TYPE :

- CIRCUMFERENTIAL TYPE :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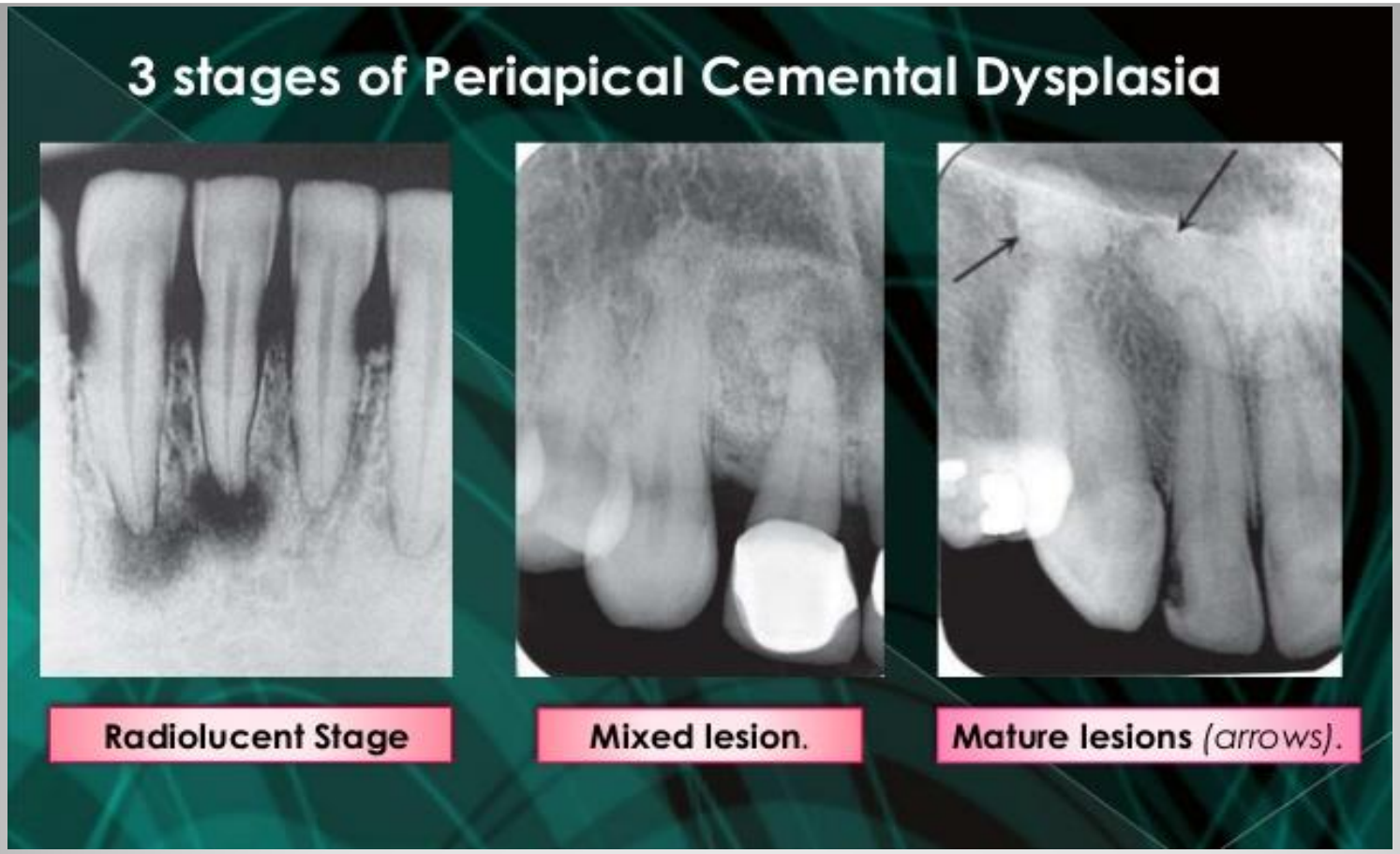
PERIPICAL CEMENTO-OSSEOUS DYSPLASIA

- Periapical cementoma
- Reactive fibro-osseous lesion
- 80%-seen in women,blacks-more affected
- 90% of cases-mandible,region of incisors-most common
- Solitary or multiple,Asymptomatic & usually < 1cm in diameter
- Calcified matter-cementum,osseous or mixed

- *Differential diagnosis*
  - *Anatomic Radiolucencies*
  - *Pulpo-periapical radiolucencies*
  - *Traumatic bone cyst*
  - *Focal cemento osseous dysplasia*
  - *Cemento-ossifying fibroma*
  - *Cementoblastoma*
  - *Malignancies*

- *Anatomic Radiolucencies*- project over periapices, can be separated from periapex - changing angle of xray beam.
- *Pulpo-periapical radiolucencies*- non-vital, grossly decayed teeth & PCOD -vital teeth, Asymptomatic, < 1cm –diameter
- *Traumatic bone cyst*-Larger ,younger age group, premolar-molar region & PCOD - intermediate stage-R.O. foci seen, Mand incisors.
- *Focal cemento-osseous dysplasia*-Premolar-molar, Margins –not discrete,t issue attached to bone at margins-appear fused - bone.
- *Cemento-ossifying fibroma*- younger people,premolar region,can be very large, requires surgical removal.

- *Cementoblastoma*-Rare lesion,exclusively at apices of molar region,seen extending higher on the roots
- *Malignancies*-Patients history,aggresive pattern of lesion,usually not localized to periapex & irregular margins



- **3 main types-radiographically & developmentally**
  1.Early stage-osteolytic-radiolucent
  2.Intermediate stage- mixed radiodensity
  3. Mature stage- calcified-well defined,homogenous R.O,surrounded by thin R.L.border

PERIODONTAL DISEASE

- Radiolucency seen in interdental area
- Advanced periodontal disease-R.L - in periapical area.
- Occasionally tooth appears to be floating in R.L
- Sometimes narrow vertical pocket extends to apex & appears as an exclusive well defined periapical R.L.
- *Differential diagnosis*-from pulpo-periapical condns-clinical examn-periodontal health .


ULT

TRAUMATIC BONE CYST

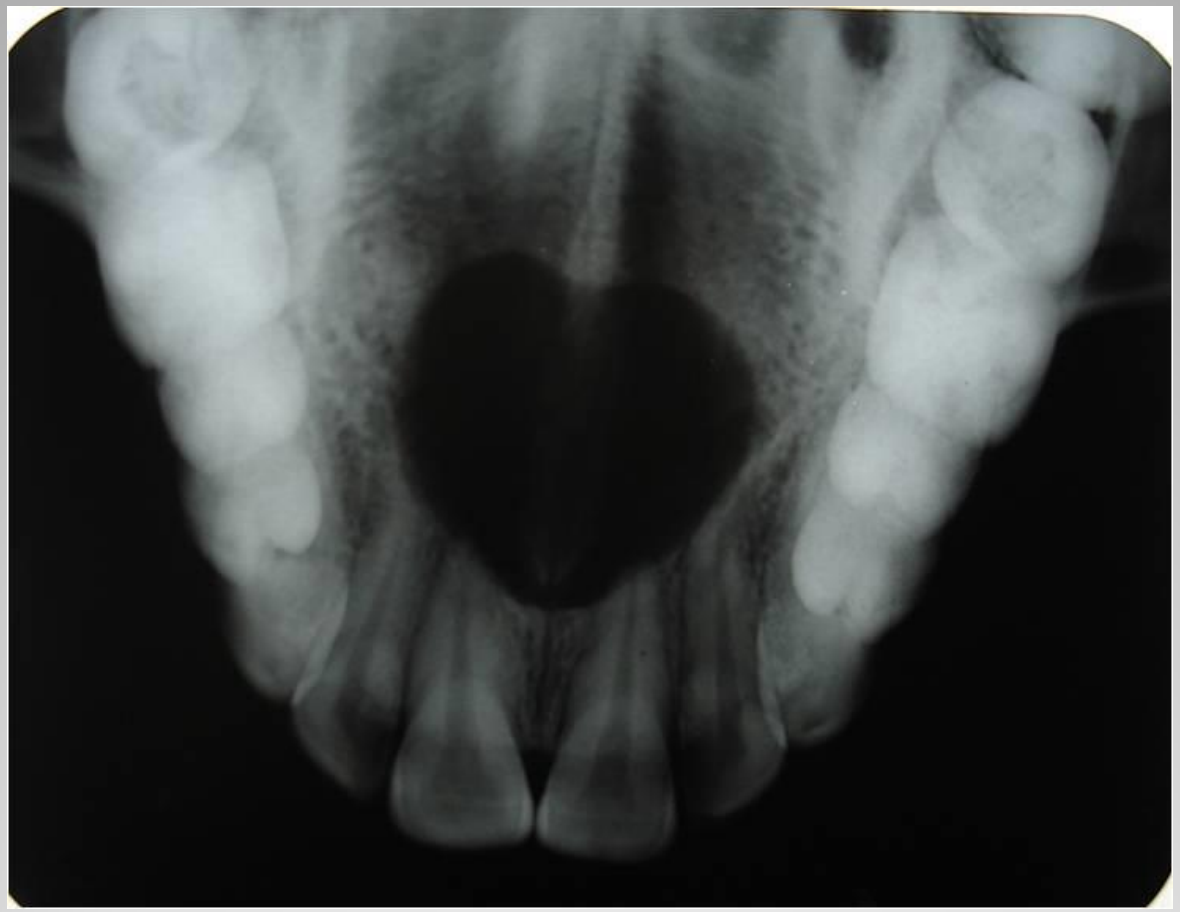
- Hemorrhagic bone, Solitary bone or Extravasation cyst
- Occurs in younger age group, False cyst of bone
- Exact Cause unknown, History of trauma
- Asymptomatic & more common in Mandible,Occasionally causes expansion of the jaw,Premolar-molar region most commonly affected
- Associated with vital teeth,Lamina dura - usually intact
- Well defined R.L,Above Mand. canal,extends superiorly between premolar & molar roots-scalloped appearance & lat. & inf borders –smooth outline

DIFFERENTIAL DIAGNOSIS

- *Radicular cyst*-Associated with non vital tooth
- *Periapical cemento-osseous dysplasia*-smaller,< 1 cm in size,predilection for incisor region & traumatic bone cyst-larger,predilection for molar region,younger age group
- *Median mandibular cyst*-Rare,midline of lower jaw,causes separation of teeth in the area,expansion of jaw-more commonly seen.

NON RADICULAR CYSTS

- Non odontogenic cysts like Incisive canal cyst,Midpalatine ,Median Mand.& primordial cyst- project over periapex
- Changing angle at which subsequent radiograph is taken will project R.L image of non-odontogenic cysts away from superimposed apices & differentiates them from radicular cysts,periapical granuloma & other pulpo periapical lesions
- Teeth associated with these cysts are usually vital.
- *Incisive canal cyst*->2 cm in diameter,assoc with vital tooth,change of angle leads to change in position of image.
- *Midpalatine cyst*-Large cystic area,especially in occlusal films-shows involvement of entire palate & vital teeth.

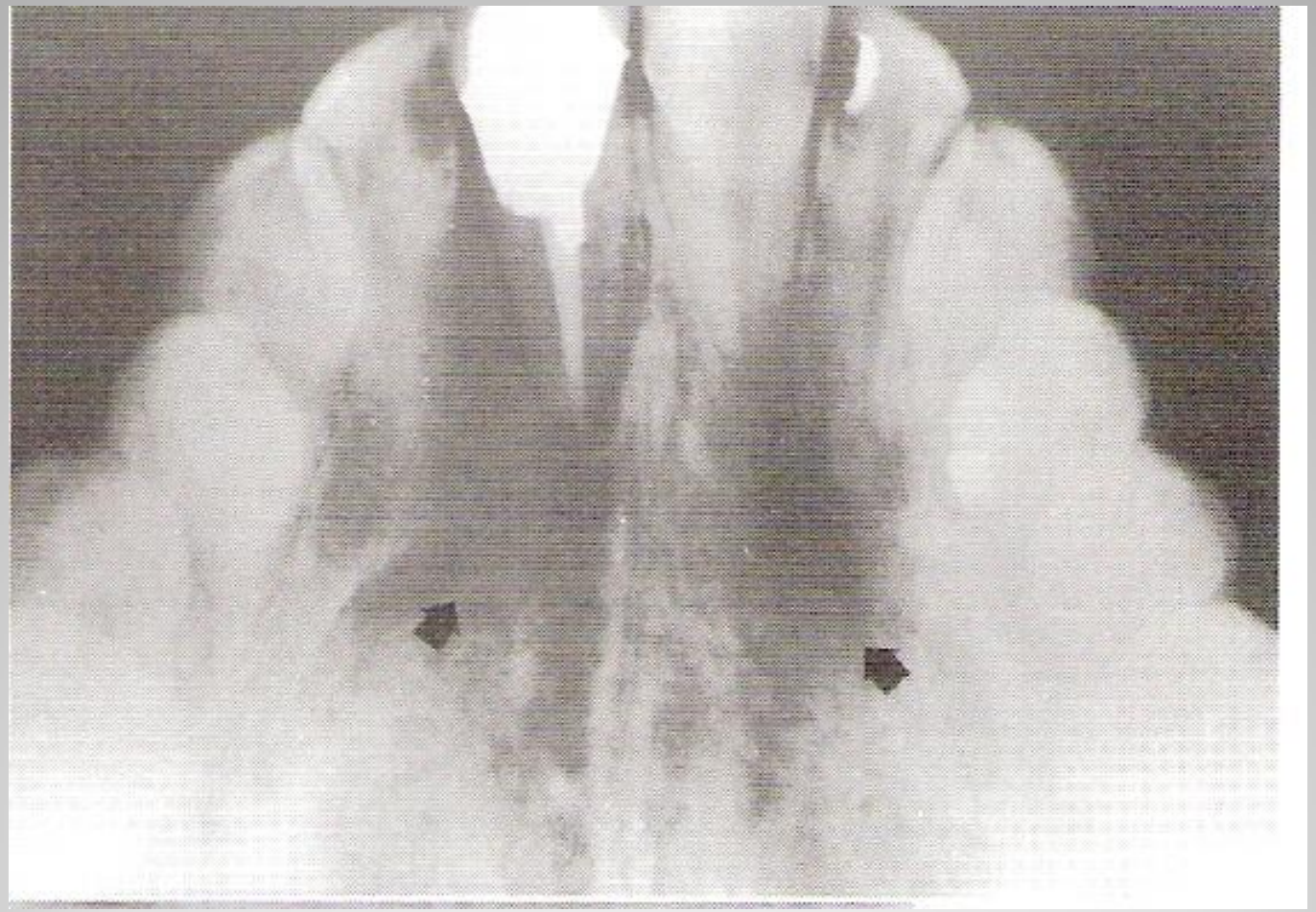


Nasopalatine duct cyst

Median palatine cyst

MALIGNANT TUMORS

- Suspected – lesions don't respond to conventional therapy Middle aged and old patients
- Advanced stages-Migration,looseninig of teeth,ging.bleeding,paresthesia &expansion of jaw
- Biopsy –mandatory for such lesions
- Found as single periapical R.L mimicking benign periapical lesion
- Common malignancies-Sq.cell.Ca, metastatic tumors,osteosarcoma, malignant melanoma,multiple myeloma
- Radiographically-R.L,symmetrical & Asymmetrical band like widening of PDL,Moth eaten appearance,Root resorption



RARITIES

- Ameloblastoma
- Aneurysmal bone cyst
- Ossifying fibromas
- Cementoblasotoma-early stage
- Giant cell granuloma
- Solitary & multiple myeloma
- Leukemia