

## Pulpal and Periapical Pathoses & Osteomyelitis

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## Pulpal Pathology

- Pulpitis
  - Similar characteristics with other inflammatory lesions
  - Difference: Confined area
  - Dilatation, edema, strangulation of capillary flow, vessel damage, inflammation and necrosis
  - Mechanical, Thermal, Chemical, Bacterial

## Pulpitis

- Acute or chronic
- Subtotal or generalized
- Infected or sterile

## Pulpitis

- Reversible
- Irreversible
- Chronic hyperplastic

## Reversible Pulpitis

Temperature extremes, sweet or sour food

- Mild to moderate pain
- Sudden
- Short duration

## Reversible Pulpitis

- Pain DOES NOT occur without stimulation
- Subsides seconds after removal of stimulus
- EPT: lower levels than tooth control
- No mobility, no sensitivity to percussion
- If stimulus continuous → irreversible

## Irreversible Pulpitis

- Early
  - Sharp, severe pain upon thermal stimulation
  - Pain continues after removal of stimulus
  - COLD uncomfortable (also warm and sweet)
  - Spontaneous or continuous
  - EPT: lower levels
  - Pain can be localized
  - Patient may be able to point to the offending tooth
    - With increasing discomfort, patient may be unable

## Irreversible Pulpitis

- Late
  - Pain increases in intensity
  - Throbbing pressure (night owl)
  - Heat increases pain
  - Cold MAY PROVIDE RELIEF
  - EPT: HIGHER OR NO RESPONSE
  - Usually no mobility or sensitivity to percussion
  - If the inflammation spreads beyond the apical area you may get sensitivity to percussion

## Irreversible Pulpitis

- NO BLACK OR WHITE
- Patients may have no symptoms
- Severe pulpitis and abscess formation may be asymptomatic
- Mild pulpitis may cause excruciating pain

## Chronic hyperplastic pulpitis

- Pulp polyp
- Large exposure
- Children or youth
- Deciduous teeth
- Hyperplastic granulation tissue that can become epithelialized from shedding epithelial cells
- Open apex decreases the chances of pulpal necrosis





Chronic apical periodontitis  
 Chronic localized osteitis  
 So-called dental granuloma  
 True dental granuloma

**Chronic localized osteitis**

- Apical inflammatory lesion
- Defensive reaction
- Bacteria in the pulp and spread of toxins
- Defense in the beginning
- With time the reaction less effective
- Can arise after quiescence of periapical abscess, or may develop as initial periapical pathosis
- Static or development of periapical cyst

**Chronic localized osteitis**

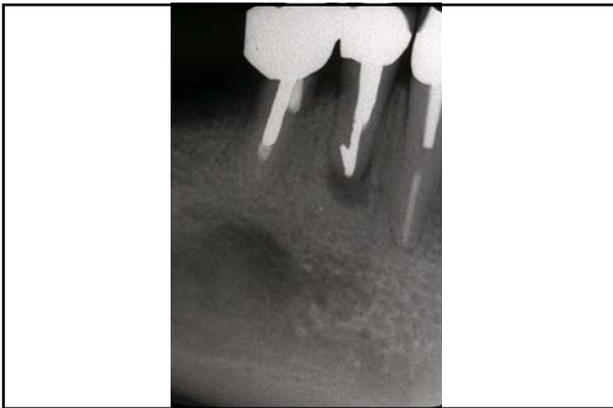
- Asymptomatic, pain or sensitivity if acute exacerbation occurs
- No mobility or significant sensitivity to percussion
- Soft tissue overlying lesion may be tender
- No response on EPT or thermal tests
- X-ray: Radiolucency, circumscribed or ill-defined, usually small; root resorption may be present

**Chronic localized osteitis**

- RCT
- Lesion may fail to heal because of
  - Cyst formation
  - Inadequate RCT
  - Root fracture
  - Periapical foreign material
  - Periodontal disease
  - Maxillary sinus penetration
  - Fibrous scar (no bone fill)

**Chronic localized osteitis**

- Repeat RCT
- Periapical surgery and retrofill
- Histopathologic examination because
  - You must have a record
  - The patient may not have periapical inflammatory lesion after all



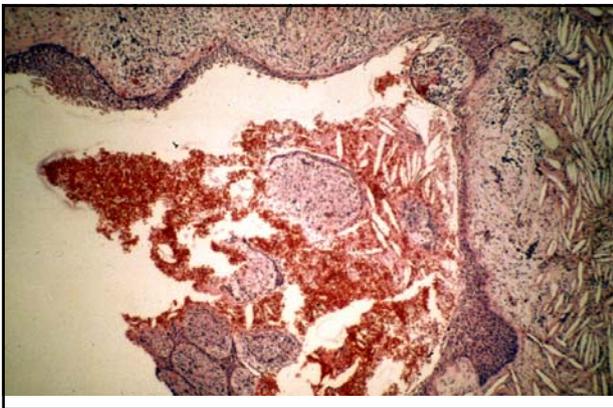
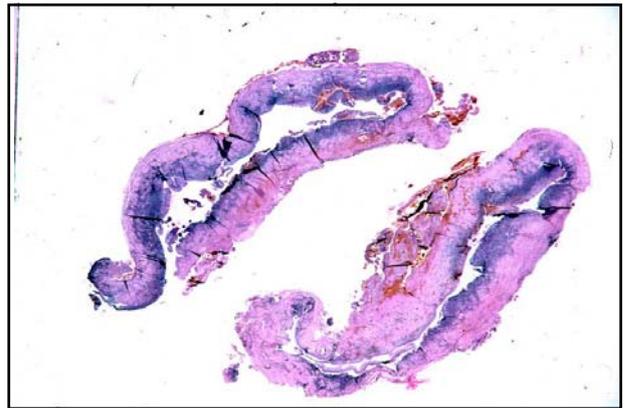
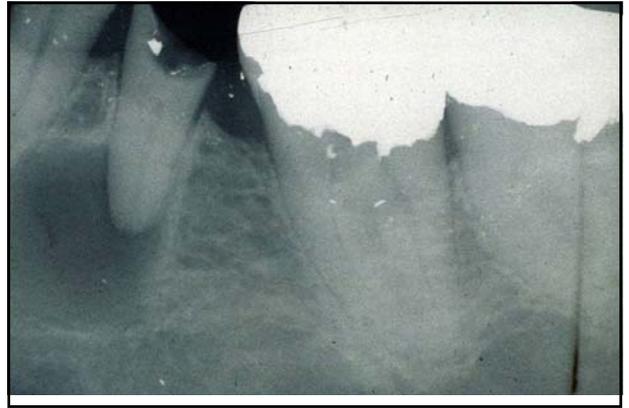
### Periapical Cyst

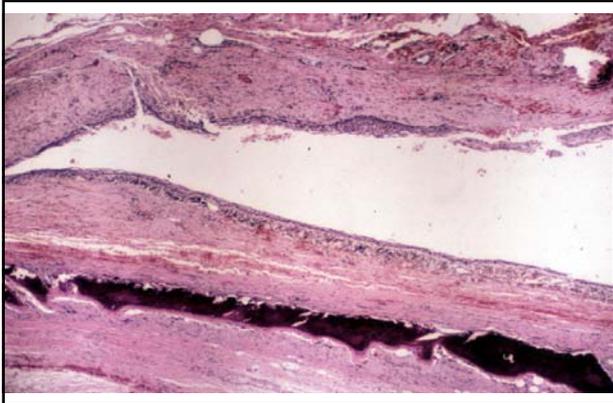
- Rests of Malassez
- Crevicular epithelium
- Sinus epithelium
- Lateral location (perio or pulpal disease)
- Residual cyst
- No symptoms generally
- Mobility may be present
- NO RESPONSE

### Periapical Cyst

- Well-defined radiolucency with sometimes sclerotic border
- Size or shape of radiolucency cannot differentiate between osteitis or granuloma and cyst







## Periapical Abscess

- Can be the initial pathosis
- Usually carious teeth but also trauma
- Acute apical periodontitis (acute localized osteitis) may or may not proceed abscess formation
  - Usually non-vital tooth
  - Tooth may be vital in cases of trauma
    - Occlusal contacts, or wedging a foreign object

## Periapical Abscess

- People talk about acute and chronic abscesses
- **THEY ARE MISINFORMING YOU**
- **IN ABSCESSSES YOU HAVE ACUTE INFLAMMATION. (PERIOD)**

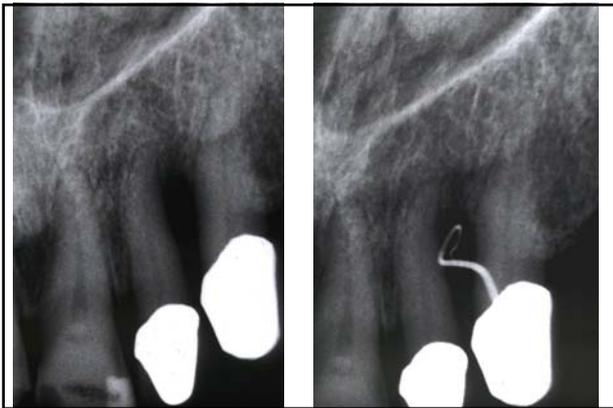
## Periapical Abscess

- Symptomatic or asymptomatic
- Phoenix abscess (acute exacerbation of chronic inflammatory process)
- Initially tenderness that can be relieved by pressure
- With progression more intense pain, extreme sensitivity to percussion, extrusion of tooth and swelling of tissues
- No Response to cold or EPT
- General symptoms

## Periapical Abscess

- Thickening of apical periodontal ligament
- Ill-defined radiolucency
- No alterations detected sometimes





Periapical Abscess

**MAY LEAD TO:**

- OSTEOMYELITIS
- CELLULITIS

Periapical Abscess

- If sinus tract develops you may have presence of little mass on the alveolus or palate or soft tissues or skin with an opening.
- Buccal surface
- Maxillary laterals, palatal roots of molars and mandibular 2<sup>nd</sup> and 3<sup>rd</sup> molars may drain lingual
- PUS
- Less symptoms because of drainage

Periapical Abscess

- Histopathology
  - Well delineated accumulation of PMNs, exudate, cellular debris, necrotic material, bacteria

## Osteomyelitis

- Acute or chronic
- Different form osteoradionecrosis
- Variations
  - Focal or diffuse sclerosing
  - Proliferative periostitis
  - Alveolar osteitis (dry socket)

## Osteomyelitis

- True osteomyelitis is uncommon
  - Odontogenic infection or fracture
  - Associated with ANUG → Noma
- Acute
  - Symptoms of acute inflammation
  - Fever, leukocytosis, lymphadenopathy, significant sensitivity, swelling; sequestrum, involucrum
- Chronic
  - May arise without acute phase

## Osteomyelitis

- Predisposing factors
  - Chronic systemic diseases
  - Immunocompromised status
  - Tobacco use, alcohol abuse, drug abuse
  - Diabetes mellitus
  - Infections
  - Tumors or tumor-like processes

## Acute osteomyelitis

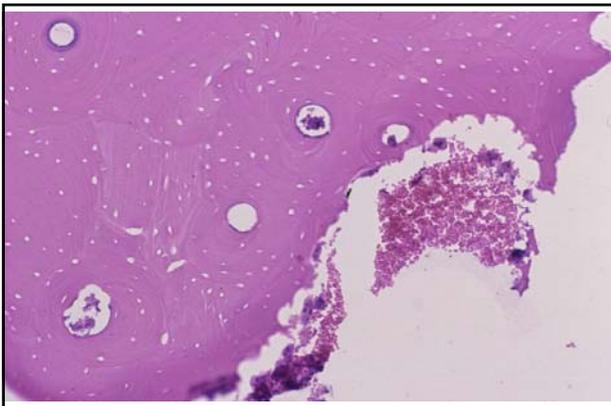
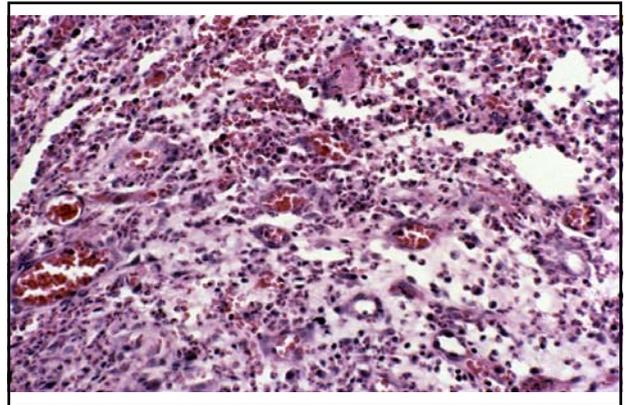
- Insufficient time for reaction by the body
- Spreads in the medullary spaces
- X-ray: Spectrum (No lesion → ill-defined radiolucency)
- Sequestrum
- Involucrum

## Acute osteomyelitis

- Fever
- Leukocytosis
- Lymphadenopathy
- Swelling
- Sensitivity

## Acute osteomyelitis

- Antibiotics and drainage
- Penicillin, clindamycin, cephalexin, gentamycin
- Sequestra should be removed



### Chronic osteomyelitis

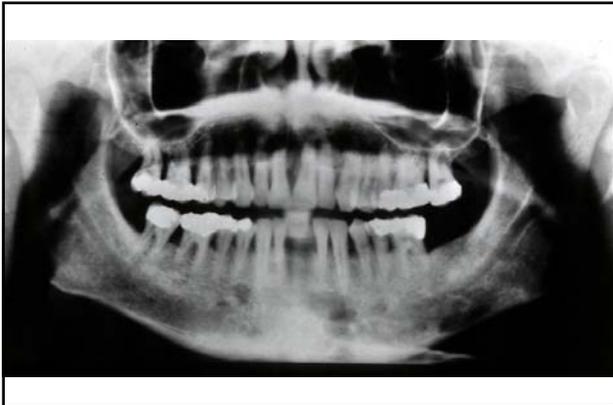
- May arise without acute phase
- Granulation tissue
- Scar formation
- Reservoir of bacteria
- Antibiotics do not reach easily the area
- Aggressive management

### Chronic osteomyelitis

- Features similar to acute
- Patchy, ill-defined radiolucencies
- Radiopaque sequestra (pts. can loose significant bone proper)
- Periosteal bone reaction

### Chronic osteomyelitis

- Intravenous antibiotics
- Removal of necrotic bone
- Immobilization of jaws
- Hyperbaric oxygen



- ### Condensing Osteitis
- Teeth have pathosis or restoration
  - Sclerotic bone
  - No clinical expansion
  - Density without lucent border
  - Vs. osteosclerosis: Not separated from apex





## Proliferative periostitis

- Garrè osteomyelitis (wrong term)
- Periosteal reaction
- Children
- Caries, dental inflammatory disease
- Occlusal or lateral oblique radiographs show opaque laminations like onion skin



## Dry socket (alveolar osteitis)

- Destruction of blood clot in the socket of an extracted tooth
- Fibrinolysis and formation of kinins → pain
- Causes
  - Inexperience
  - Trauma
  - Oral contraceptives
  - Smoking
  - Estrogens

## Cellulitis

- Spread of abscess in fascial planes of soft tissues
- Ludwig's angina
  - Submandibular region
  - Lower molars
  - Trauma, lacerations, peritonsillar infections
  - Extension to pharyngeal and mediastinal spaces
- Cavernous sinus thrombosis
  - Maxillary molars and premolars
  - Maxillary sinus, infratemporal fossa, orbit → cavernous sinus at the cranial vault

## Cellulitis

- Spread of abscess in fascial planes of soft tissues
- Ludwig's angina
  - Swelling: floor of mouth, tongue, submandibular region
  - Woody tongue and bull neck
- Cavernous sinus thrombosis
  - Edematous periorbital enlargement
  - Protrusion and fixation of eyelid and pupil dilatation
    - Blindness
  - CNS involvement, sometimes brain abscess
  - Deepening stupor, delirium

## Cellulitis

- Ludwig's angina
  - Maintenance of airway
  - Antibiotic treatment
  - Surgical drainage
  - Tracheostomy
- Cavernous sinus thrombosis
  - Antibiotics
  - Extraction of tooth
  - Corticosteroids to avoid vascular collapse from pituitary dysfunction

