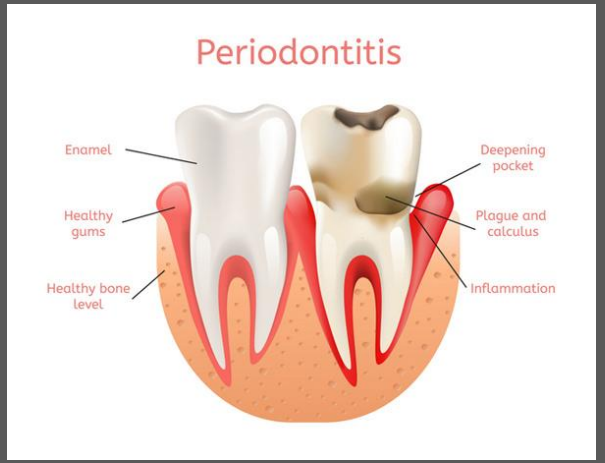
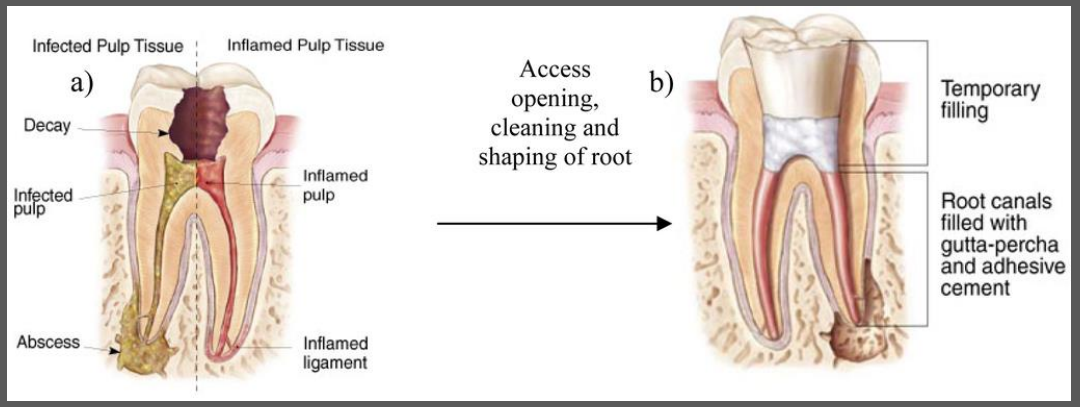
Endo Perio Interrelationships

DATE: Jan 20, 2021 PRESENTED BY: Danielle Wingrove, DDS

Objectives



- Discuss influence of pulpal pathosis on the periodontium
- Discuss influence of periodontal inflammation on pulp
- Define 6 types of lesions- pathways of osseous lesion formation
- Discuss etiology and contributing factors that may influence development of these lesions
- Discuss differential diagnosis potential with these lesions
- Discuss treatment options for these lesions



Influence of pulpal pathosis on periodontium

- Intercommunication between pulp and periodontal tissue
  - Apical foramen (most direct)
  - Lateral canals
  - Furcation canals
  - Dentinal tubules- especially when cementum is denuded
  - Developmental- palatogingival grooves
    - Incidence- ~2-8%
  - Iatrogenic accidents during RCT
    - Perforation, over instrumentation,
  - Vertical Root Fractures

Influence of pulpal pathosis on periodontium

- Pulp necrosis
  - Toxins, bacterial by-products, inflammation progress apically and into periodontium
  - Travel through apical foramen, lateral canals, dentinal tubules and elicit inflammatory response in PDL
- Extent of damage
  - Minimal- local damage of PDL and no extension
  - Severe- extensive destruction of PDL, bony socket and surrounding bone leading to local or diffuse swelling that occasionally involves gingival attachment
    - Sinus tract can form usually through buccal cortical plate but can also drain through sulcus or lingual cortical plate

Influence of pulpal pathosis on periodontium

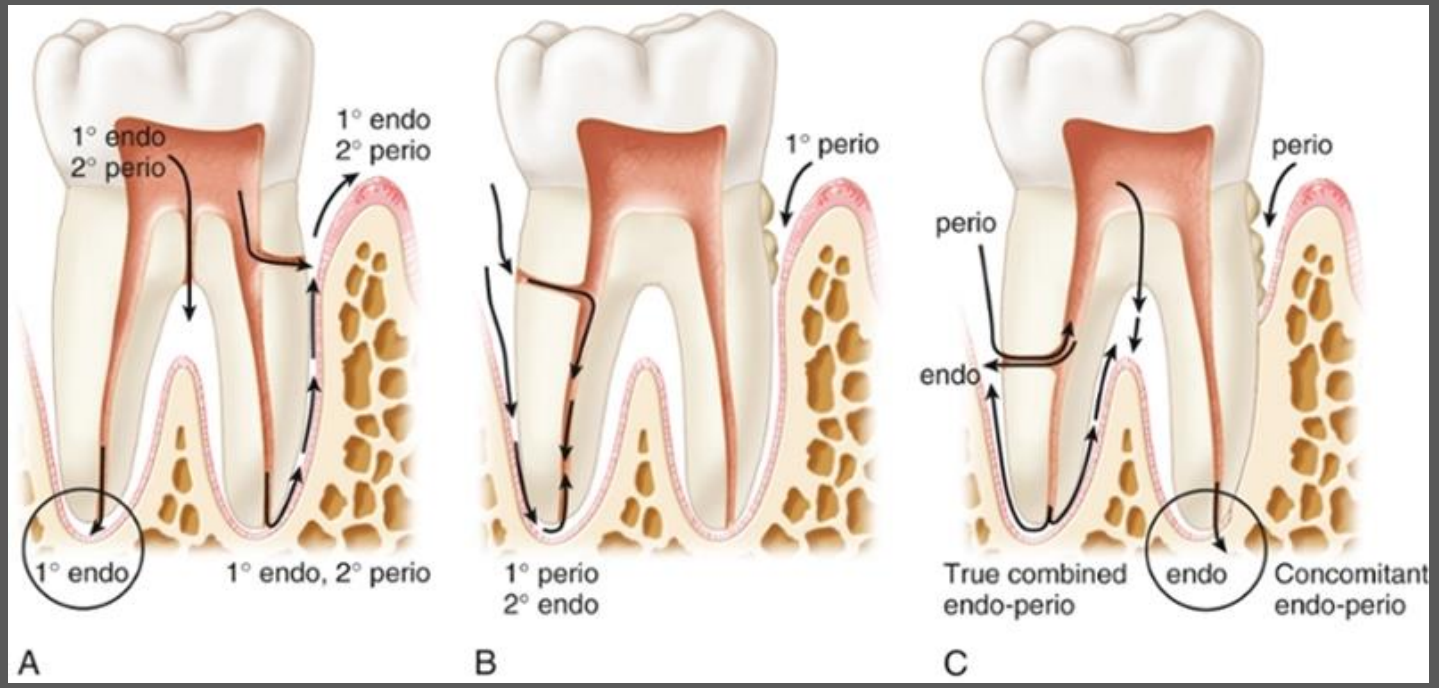
- Root canal treatment
  - Irrigants
  - Medicaments
  - Sealers
  - Filling Materials
  - Instruments

Influence of periodontal inflammation on pulp

- Infection from periodontal pocket may spread to pulp though:
  - Accessory canals or furcal canals
  - Dentinal Tubules
  - Thought that oral pathogens do not penetrate until uncovered by periodontal disease
- Pulp reaction is affected by:
  - Stage of periodontal disease
  - Type of periodontal treatment
  - Presence of cemental layer
    - Protect pulp from toxic elements produced by plaque microbiota
  - Canals with periodontally involved teeth were reported to be narrower than teeth with no periodontitis
    - **IB Bender, S Seltzer**: The effect of periodontal disease on the pulp. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 33:458 1972
    - **RL Lantelme, SL Handelman, RJ Herbison**: Dentin formation in periodontally diseased teeth. *J Dent Res.* 55:48 1976
  - If blood supply remains intact, pulp can withstand insult by periodontal disease

Pathways of osseous lesion formation

- Primary endo
- Primary endo, secondary perio
- Primary perio
- Primary perio, secondary endo
- True combined lesion
- Concominant disease



Primary Endo

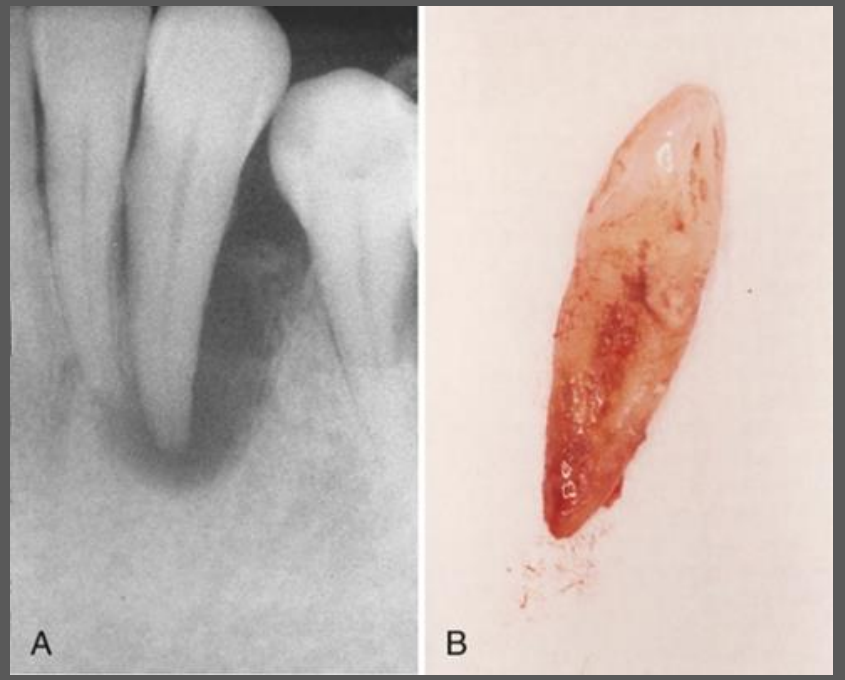
- Pulp necrosis leading to resorb bone apically/laterally and can destroy attachment apparatus
- Apical Periodontitis
  - Symptomatic
  - Asymptomatic
- Chronic apical abscess
  - Either through buccal plate or sulcus
- Treatment
  - RCT
  - Usually no periodontal treatment needed

Primary Endo, Secondary Perio

- Lesion of endodontic origin left untreated
  - Pathosis continues and can cause destruction of alveolar bone, interradicular bone and breakdown of hard and soft tissues
  - Plaque and calculus can accumulate in purulent pocket and perpetuate periodontal disease leading to further apical migration of attachment
- Appearance
  - Necrotic canal
  - Plaque and/or calculus formation- demonstrable with a probe and radiograph
  - May show generalized periodontitis with angular defects at initial site of endodontic involvement
- Treatment
  - Requires both endodontic and periodontic treatment

Primary Perio

- Periodontal disease involves accumulation of plaque and calculus producing inflammation and breakdown and loss of alveolar bone and supporting periodontal tissues
- Appearance
  - Pulp testing indicates a clinically normal pulpal reaction
  - Plaque and calculus accumulation
  - Probing depths present and pockets are usually wider
- Treatment
  - Periodontal treatment alone
  - Prognosis is dependent on severity of disease, periodontal treatment and patient compliance



Primary Perio, Secondary Endo

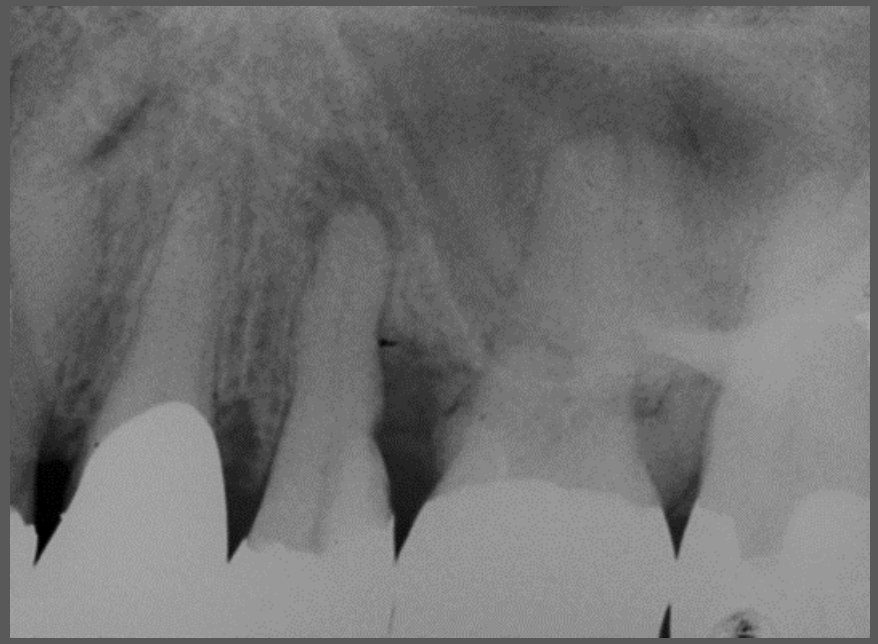
- Periodontal disease progresses apically
  - Exposed dentinal tubules or accessory/furcal canals exposed
  - Periodontal disease reaches apex of tooth
  - Pulpal inflammation due to periodontal pathogens
- Appearance
  - Deep periodontal probing with history of extensive periodontal disease and possible past periodontal treatment
  - Once pulp is involved usually involves signs and symptoms of pulpal disease
  - On radiograph may be indistinguishable from primary endo lesions with secondary perio involvement
- Treatment
  - Requires RCT and periodontal treatment
  - Prognosis depends on outcome of RCT but mainly on efficacy of periodontal treatment and patient compliance.

True Combined Lesions

- Pulpal and periodontal disease can occur independently or concominanatly
  - Once the lesions coalesce they may be indistinguishable and this is when we get a true combined lesion
- Appearance
  - Apical periodontitis due to necrotic pulp or failing RCT
  - Plaque, calculus and periodontitis will present in varying degrees
  - Radiographic may appear similar to vertical root fracture
- Treatment
  - Prognosis largely depends on the extent of the destruction caused by the periodontal disease component
  - Apical periodontitis may be expected to heal the periodontal tissues may not respond well to treatment.
  - Periodontal regenerative procedures may be beneficial.
  - Exploratory surgery to rule out fracture may be necessary

Concominant Endo-Perio Lesions

- Possible additional classification
- Presence of 2 separate and distinct entities
  - A lesion of endodontic origin and separately lesion of periodontal origin
  - No evidence one has influenced the other
- Often goes undiagnosed as a concominant disease process but separate entities
- Prognosis depends on removal of etiologic factors of both diseases
- Requires Endodontic and Periodontal treatment



Differences between Pulpal and Periodontal Disease

TABLE 25-2 Differential Diagnosis Between Pulpal and Periodontal Disease

	Pulpal	Periodontal
Clinical		
Etiology	Pulp infection	Periodontal infection
Vitality	Nonvital	Vital
Restorative	Deep or extensive	Not related
Plaque/calculus	Not related	Primary cause
Inflammation	Acute	Chronic
Pockets	Single, narrow	Multiple, wide coronally
pH value	Often acid	Usually alkaline
Trauma	Primary or secondary	Contributing factor
Microbial	Few	Complex
Radiographic		
Pattern	Localized	Generalized
Bone loss	Wider apically	Wider coronally
Periapical	Radiolucent	Not often related
Vertical bone loss	No	Yes
Histopathologic		
Junctional epithelium	No apical migration	Apical migration
Granulation tissues	Apical (minimal)	Coronal (larger)
Gingival	Normal	Some recession
Therapy		
Treatment	Root canal therapy	Periodontal treatment

Etiological factors

- Bacteria
  - Pathogens of periodontal and endodontic diseases are similar
  - Endo-perio interrelationships are a critical pathway for both diseases
- Fungi
  - Candida albicans has been found in root canals and also associated in some cases of periodontitis
- Viruses
  - Herpes simplex viruses present in gingival crevicular fluid and gingival biopsies of periodontal lesions
    - Contreras A, Nowzari H, Slots J. Herpesviruses in periodontal pocket and gingival tissue specimens. *Oral Microbiol Immunol*. 2000;15:15-18
  - Herpesviruses associated with increased occurrence of subgingibal pathogens: P. gingivalis, B. fosythus, P. intermedia, P nigrescens, T. denticola and A. actinomycetemcomintans
    - Contreras A, Umeda M, Chen, C et al. Relationship betwenen herpesviruses and adult periodontitis and perioodontopathic bacteria. *J Periodontol*. 1999;70:478-484
  - Cytomegalovirus and Epstein Barr virus type I also found in periodontal pockets and gingival tissue specimens
    - Also associated with periapical pathoses

Contributing Factors

- Inadequate endodontic treatment
- Coronal Leakage
- Traumatic Injuries
- Root Perforations
- Developmental malformations

Differential Diagnosis

- Lateral Periodontal Cyst
- Vertical Root Fracture
- Cemental Tear
- Systemic Diseases

Differential Diagnosis

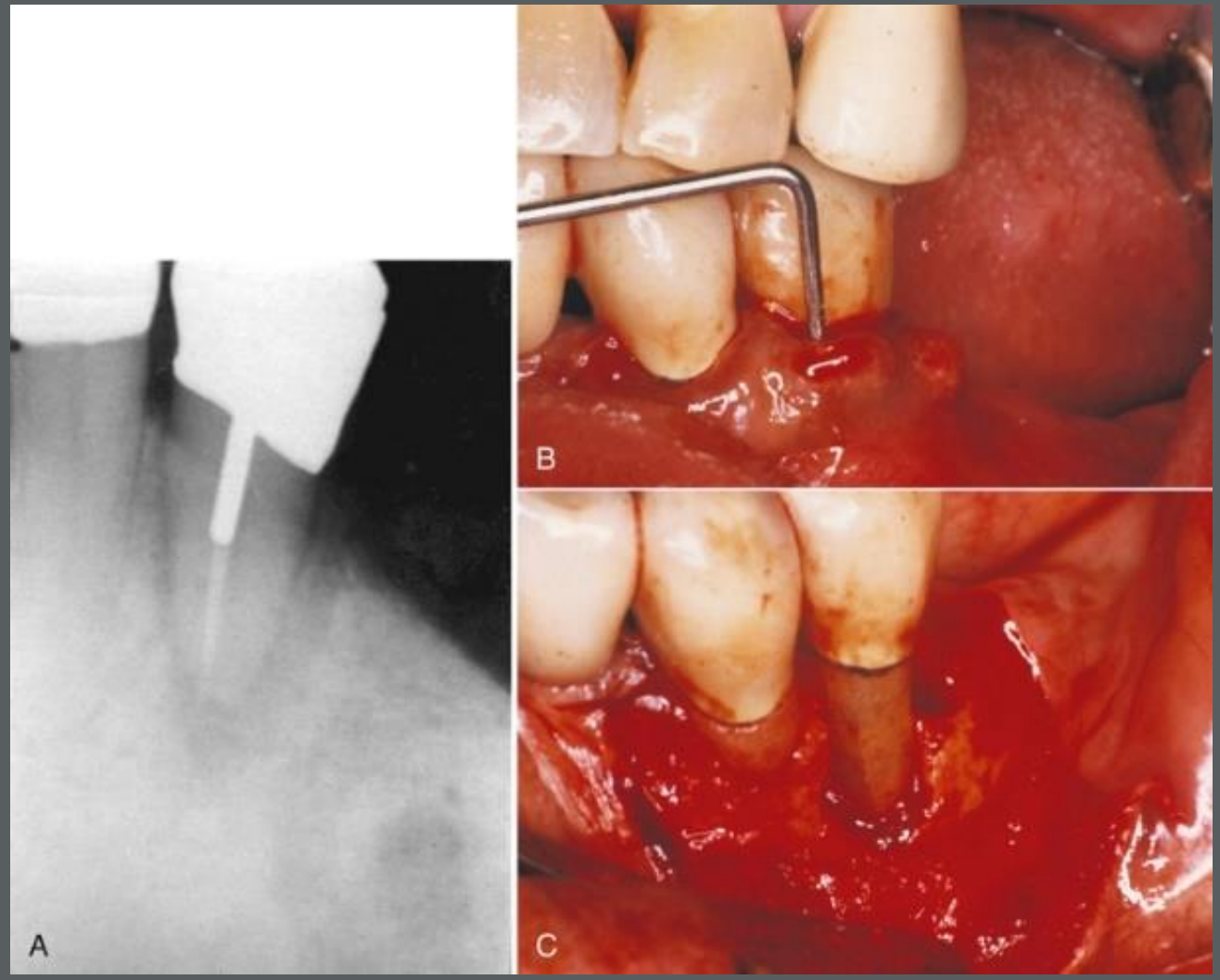
- Lateral Periodontal Cyst
  - May present as gingival swelling on facial and produce pain on palpation
  - Radiograph- well-circumscribed round or ovoid radiolucent area with typically a sclerotic boarder
  - Most are <1cm in diameter
  - Can be any location on root from apex to cervical margin
  - Etiologic theories
    - Reduced enamel epithelium
    - Remnants of dental lamina
    - Cell rests of Malassez
  - Treatment
    - Excision


A
B
C
D


E
F
G
H

Differential Diagnosis

- Vertical Root Fracture
  - Starts in root of typically endodontically treated tooth
  - J-shaped radiographic lesion
  - Deep narrow probing depth usually on buccal or lingual or both
  - Sinus tract very coronal or at gingival margin
  - Can mimic periodontal disease or failing endodontic treatment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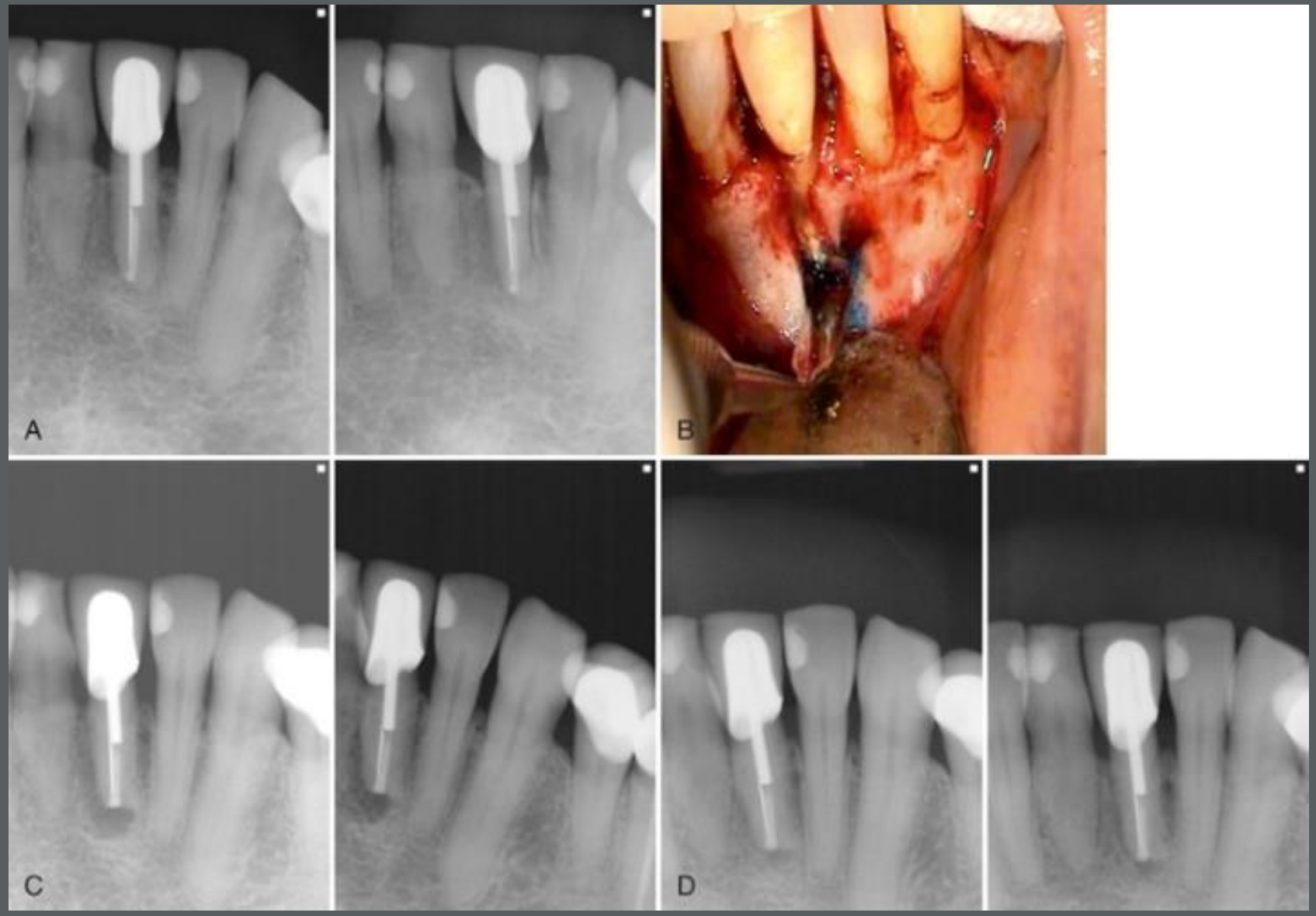
Differential Diagnosis

- Cemental Tear
  - Detachment of cementum from root surface usually due to trauma or aging
  - Often results in periodontal destruction and endodontic involvement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Differential Diagnosis

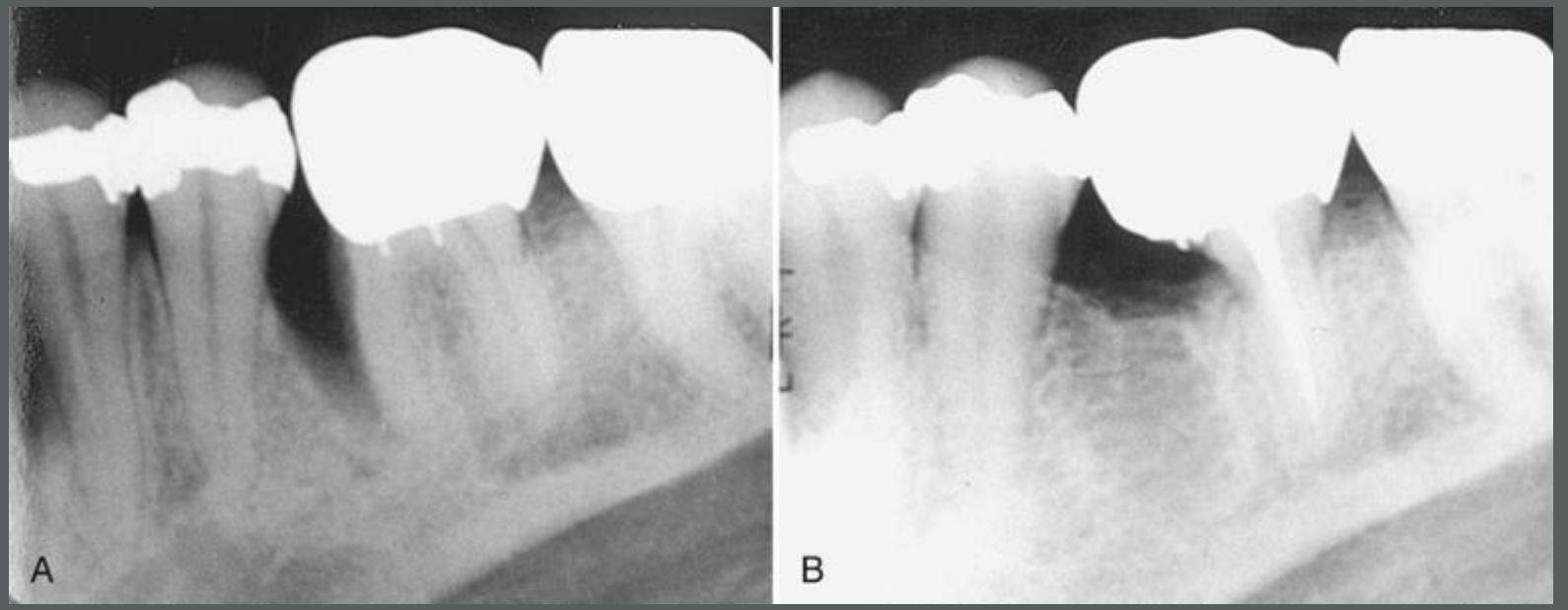
- Systemic Diseases
  - Scleroderma
  - Metastatic carcinoma
  - Osteosarcoma

Treatment alternatives

- Traditional treatment options insufficient- What do you do?
  - Root amputation
  - Hemisection
  - Regenerative procedures
  - Forced ortho eruption

Root Amputation

- Indications
  - Root fracture
  - Perforation
  - Root caries
  - Dehiscence
  - Fenestration
  - External root resorption involving only one root
  - Severe periodontitis involving only one root
  - Severe grade II or III furcation involvement
- Success Rates- 62-100% 3-12 year success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Hemisection

- Surgical separation of multi-rooted tooth
  - Typically with severe furcation involvement
  - RCT with core buildup
- FDP is usually placed to restore occlusal table


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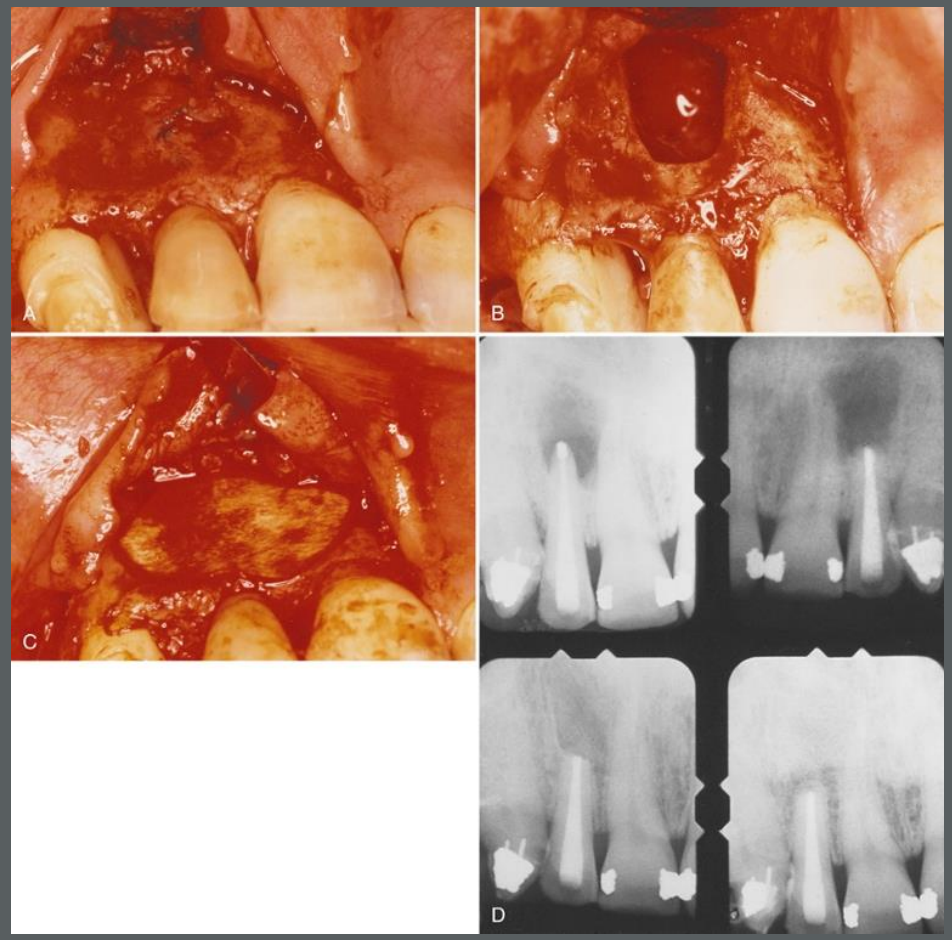
Regeneration

- Guided Tissue Regeneration and Guided Bone Regeneration
  - Membrane placed to prevent connective tissue contact to osseous walls of defect
  - Can be used with and without bone graft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A
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C
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Forced orthodontic eruption

- Indications
  - Fractured clinical crowns
  - Extensive occlusal decay
  - Internal or external root resorption
  - Lateral perforation
  - Straight, tapering, single-rooted teeth
- Alternative to crown lengthening if sufficient root length
  - Can preserve periodontal architecture


A
B
C
D

Summary

- 6 types of lesions
  - 1^{o} endo,
  - 1^{o} endo with 2^{o} perio,
  - 1^{o} perio,
  - 1^{o} perio with 2^{o} endo
  - True combined lesion
  - Concominant disease
- Etiology
- Contributing Factors
- Differential Diagnosis
- Treatment alternatives

Thank You