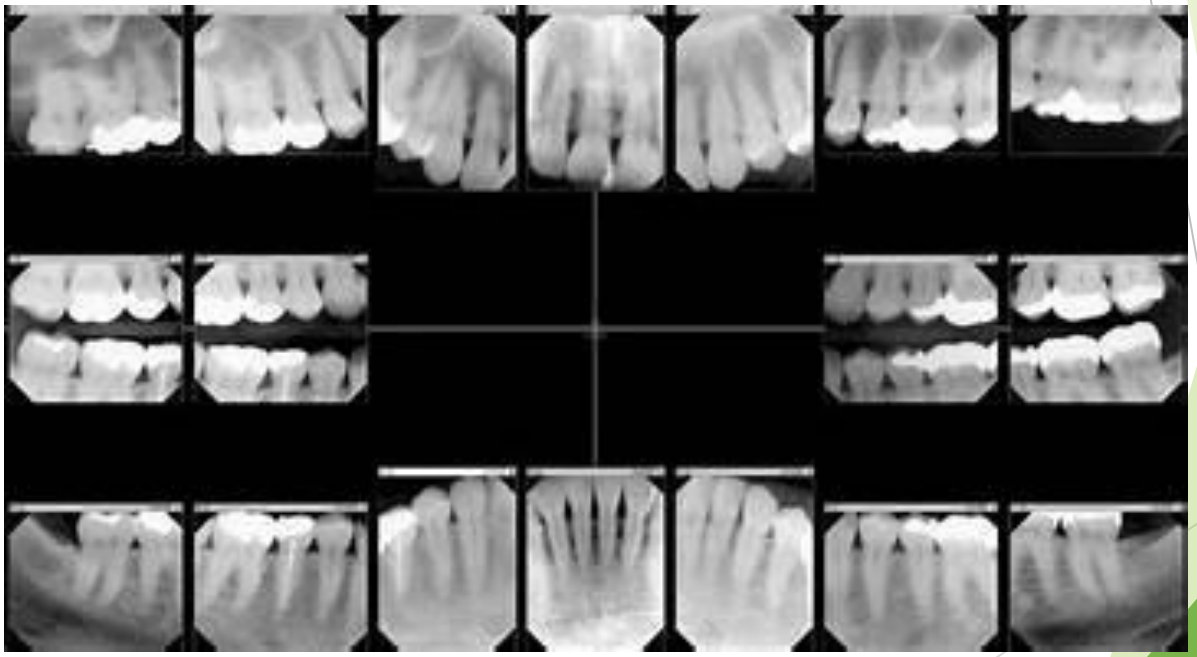
Interpretation of Dental Caries

Chapter 33

Full Mouth X-rays

FMX



Objectives

- Define dental caries.
- Explain why dental caries appear radiolucent on a dental image.
- Determine factors that may influence the image interpretation of dental caries.
- Critique the different classifications of dental caries.
- Share the importance of detecting caries on a dental x-ray.

Description of Caries

- **Caries** (Latin *cariosus* means “rottenness”)
  - The localized destruction of teeth by microorganisms
- **Cavitation**
  - In dentistry, the term ***cavity*** refers to a cavitation, or hole, in a tooth that is the result of a caries process

Detection of Caries

- **Clinical examination** and **dental images** are necessary to detect dental caries.
  - Dental images enable the dental professional to identify carious lesions that are not visible clinically.
  - They also allow the dental professional to evaluate the extent and severity of carious lesions.

Clinical Examination

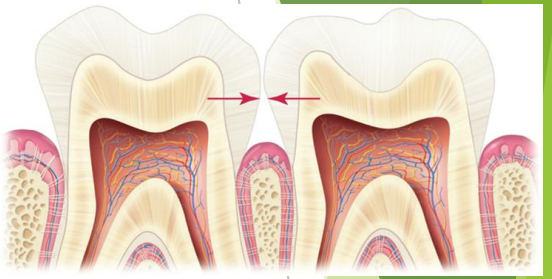
- Some carious lesions can be detected simply by looking in the mouth, and others cannot.
- Some teeth may exhibit a discolored area or cavitation or have no visible changes.
- Caries that occur between teeth may be difficult or impossible to detect clinically.
- Dental images play an important role in these situations.

Classification of Caries on Dental Images

- Interproximal caries
- Occlusal caries
- Buccal and lingual caries
- Root surface caries
- Recurrent caries
- Rampant caries

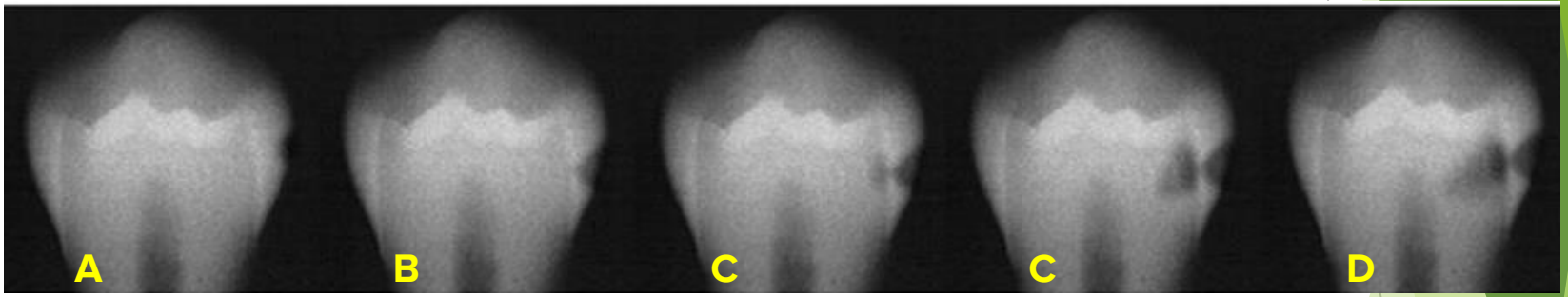
Interproximal Caries

- **Interproximal**
  - Between two adjacent surfaces
- Interproximal caries typically are seen on dental images *at or just below (apical to) the contact point*.
  - As caries progresses through the enamel, it typically assumes a *triangular configuration*.
  - When it reaches the DEJ, it spreads laterally and progresses through dentin.



Interproximal Caries

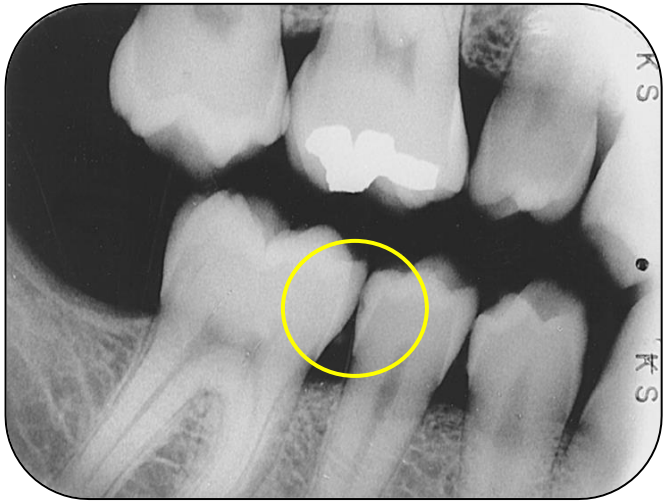
Interproximal caries can be classified according to the depth and penetration of the lesion through enamel and dentin.

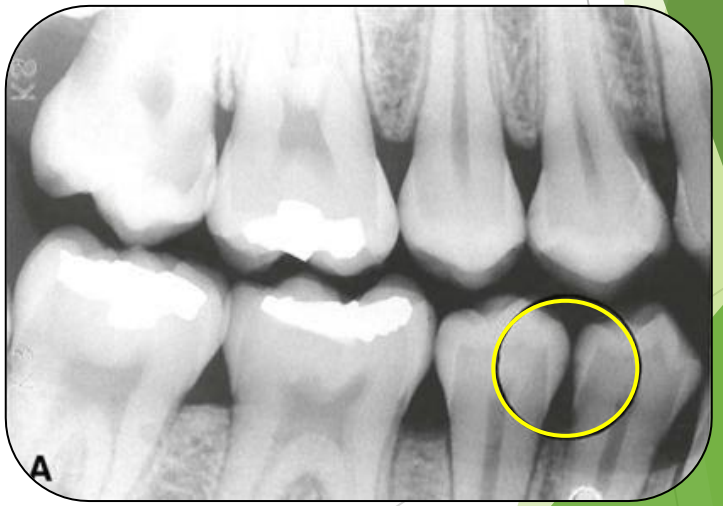


- (A) Incipient interproximal caries extends less than halfway through the thickness of the enamel.
- (B) Moderate interproximal caries extends more than halfway through the thickness of the enamel but does not involve the DEJ.
- (C) Advanced interproximal caries extends to or through the DEJ and into dentin, but does not extend into dentin more than half the distance toward the pulp.
- (D) Severe interproximal caries extends through enamel and dentin more than half the distance toward the pulp.

Incipient Interproximal Caries

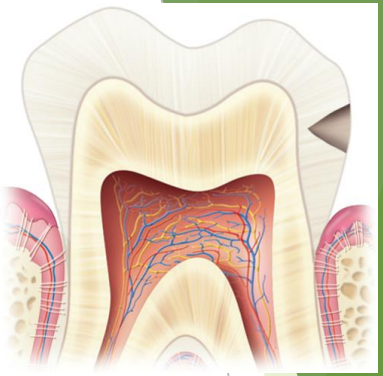
(extends less than halfway through the thickness of the enamel)

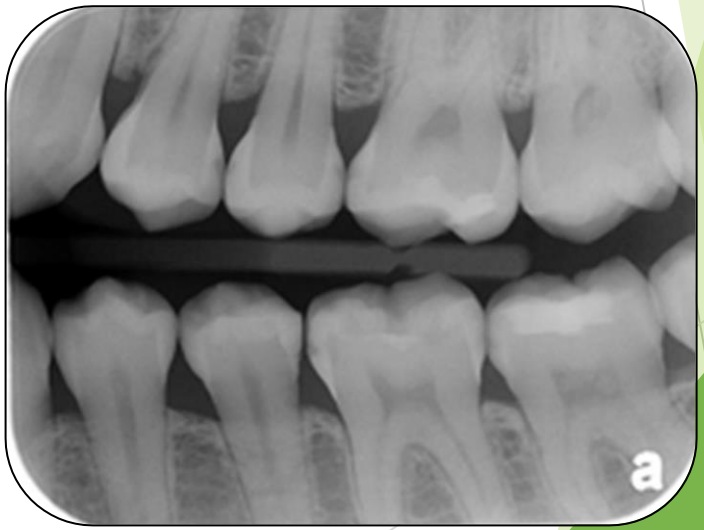




Moderate Interproximal Caries

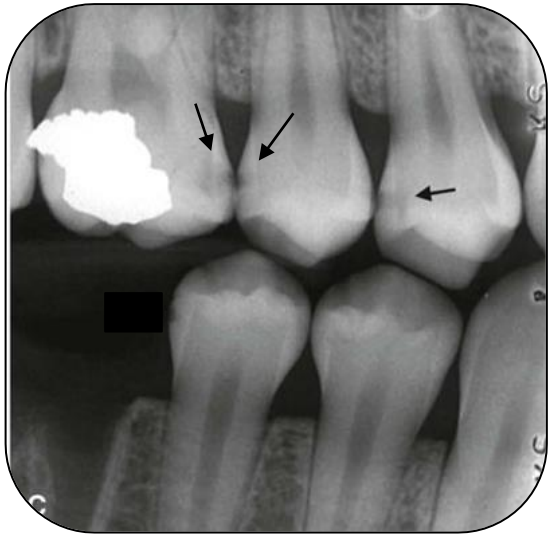
(extends more than halfway through the thickness of the enamel but does not involve the DEJ)

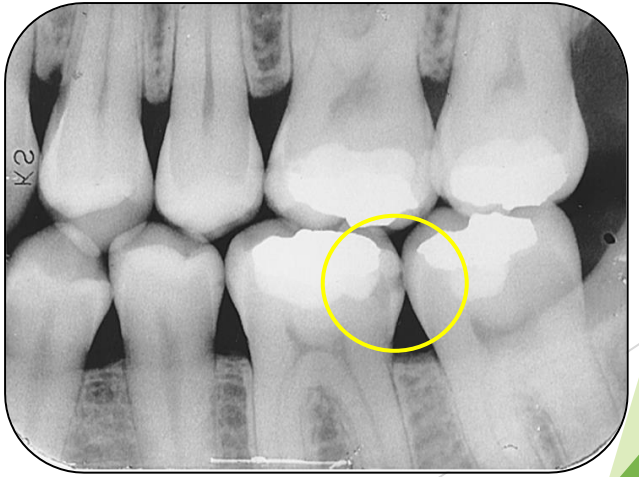




Advanced Interproximal Caries

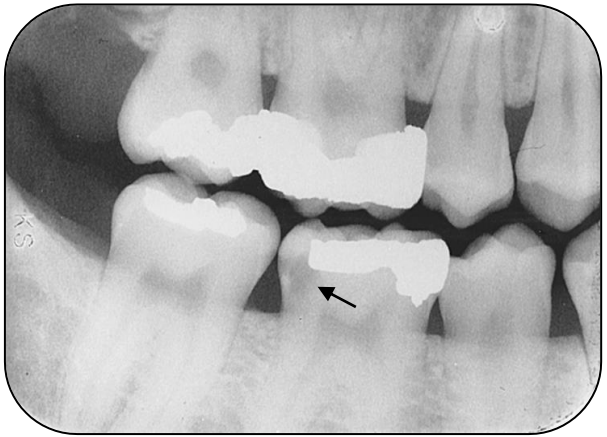
(extends to or through the DEJ and into dentin, but does not extend into dentin more than half the distance toward the pulp)

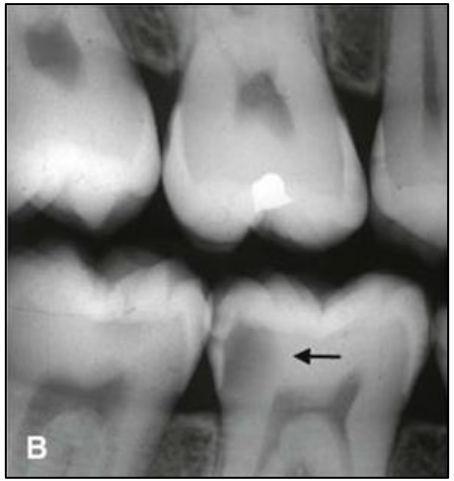


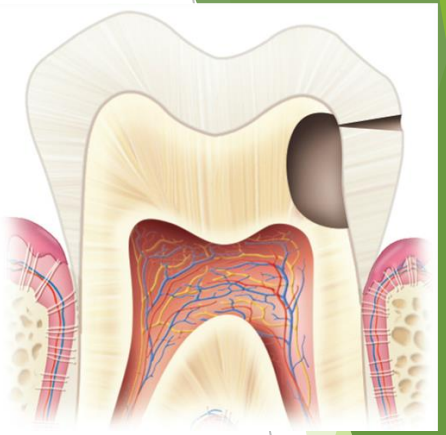


Severe Interproximal Caries

(extends through enamel and dentin more than half the distance toward the pulp)







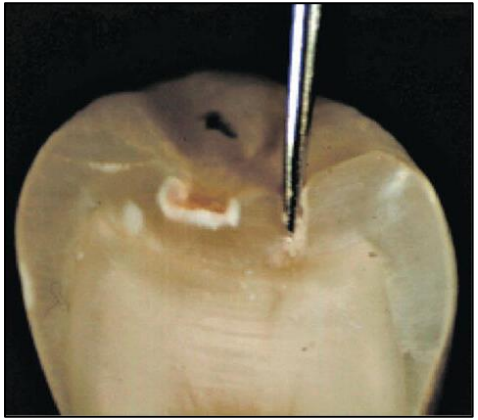
Occlusal Caries

- Occlusal caries are caries that involve the chewing surface of posterior teeth.
  - A thorough clinical exam is the method of choice for the detection of occlusal caries.
  - Early occlusal caries are difficult to see on a dental image.
  - Classified as incipient, moderate, or severe.

Incipient Occlusal Caries

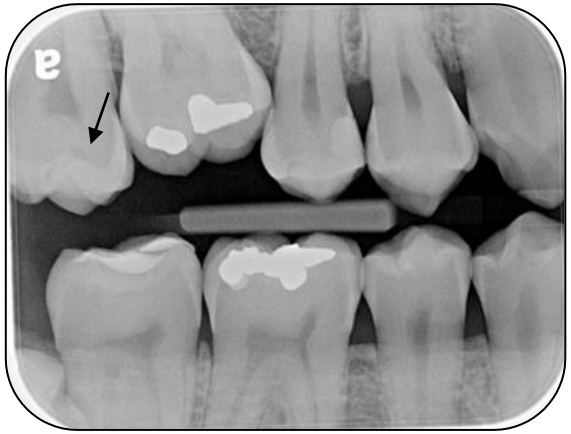
- Incipient occlusal caries *cannot* be seen on a dental image.
- **It must be detected with an explorer**.

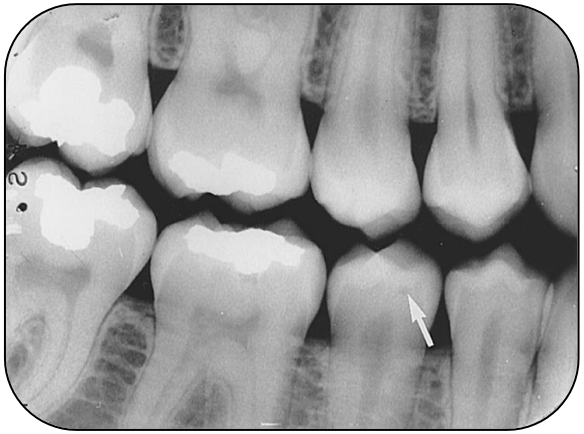
Incipient Occlusal Caries



Moderate Occlusal Caries

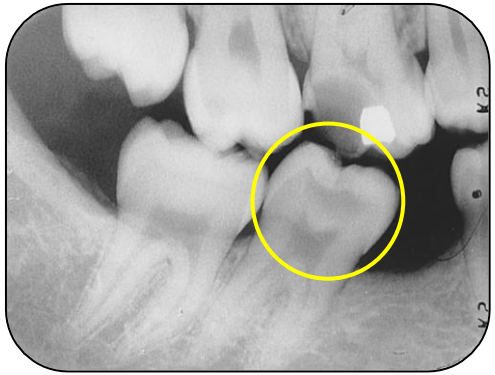
- Moderate occlusal caries extends into dentin.
  - Appears as a thin, radiolucent line.

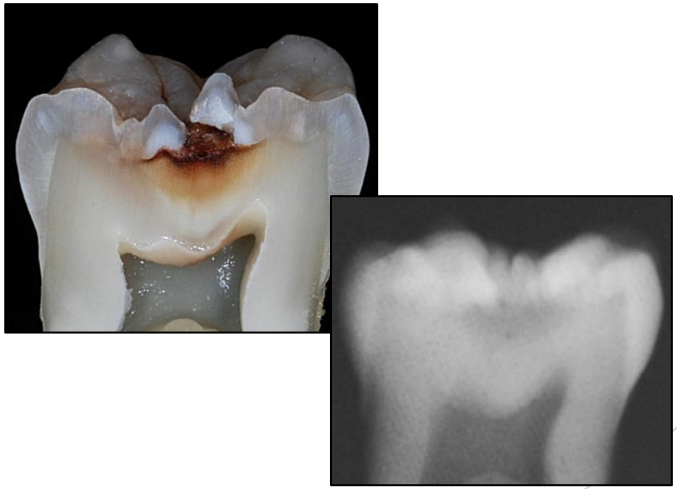




Severe Occlusal Caries

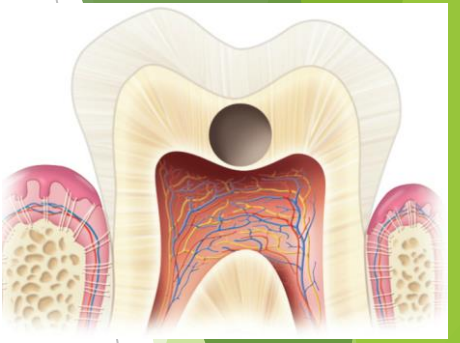
- Severe occlusal caries extends into dentin and appears as a large radiolucency.
  - The radiolucency extends under the enamel of the occlusal surface of the tooth.

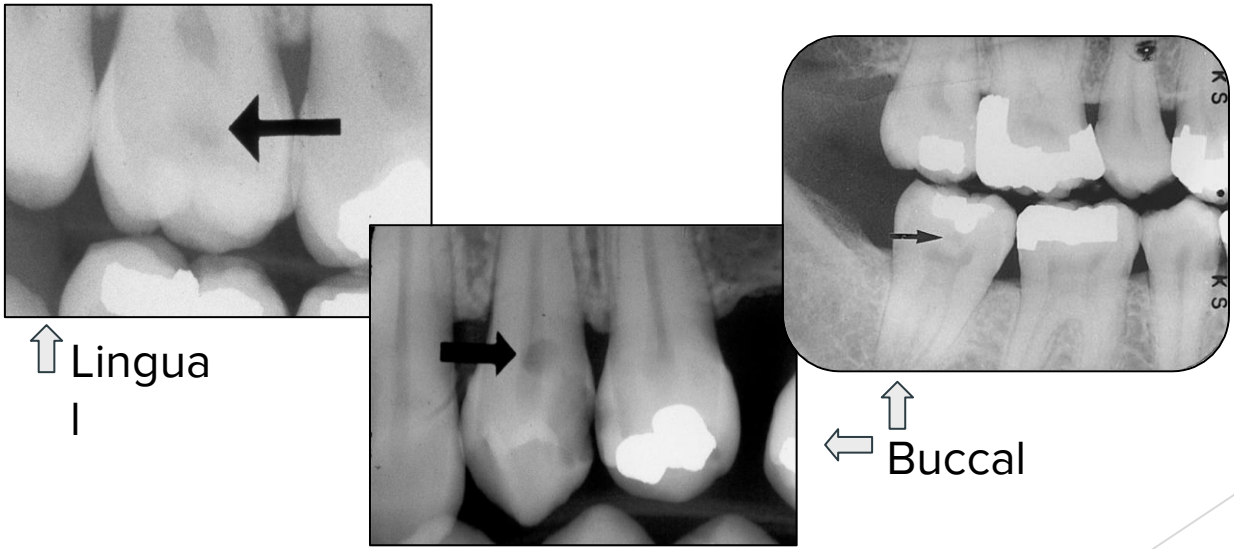




Buccal and Lingual Caries

- These are difficult to detect on a dental image because they are superimposed on tooth structure.
  - If seen on a dental image, they appear as a circular radiolucent area.





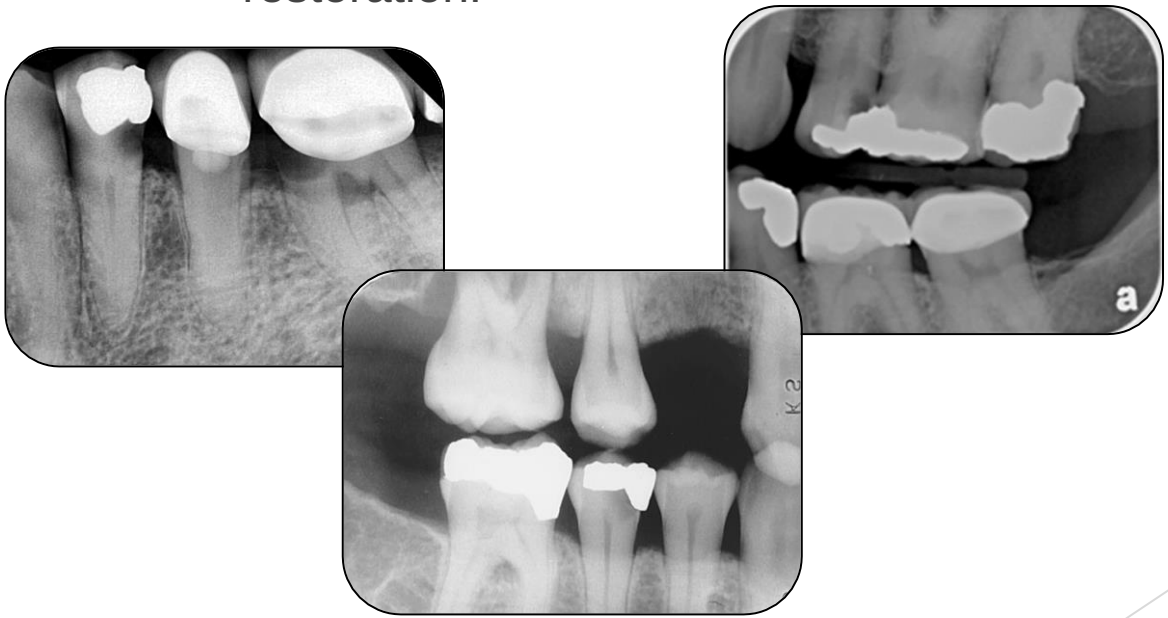
Buccal and Lingual Caries

Root Surface Caries

- Root surface caries involves only the roots of teeth.
  - On a dental image, it appears as a cupped-out or crater-shaped radiolucency *below* the CEJ.
  - Early lesions may be difficult to detect on a dental image.

Recurrent Caries

- Recurrent caries occurs adjacent to an existing restoration.
  - It appears as a radiolucent area just beneath a restoration.
  - It is most often located beneath the interproximal margins of a restoration.



Recurrent Caries

*always check crown margins with an explorer

Rampant Caries

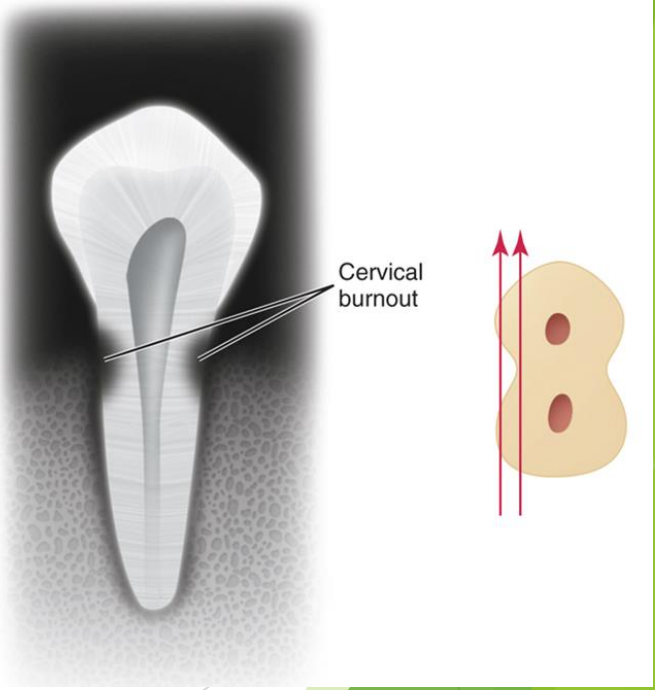
- Rampant caries is advanced and severe caries affecting a number of teeth.
  - This is associated with children with poor diets and adults with decreased salivary flow.

Conditions Resembling Caries

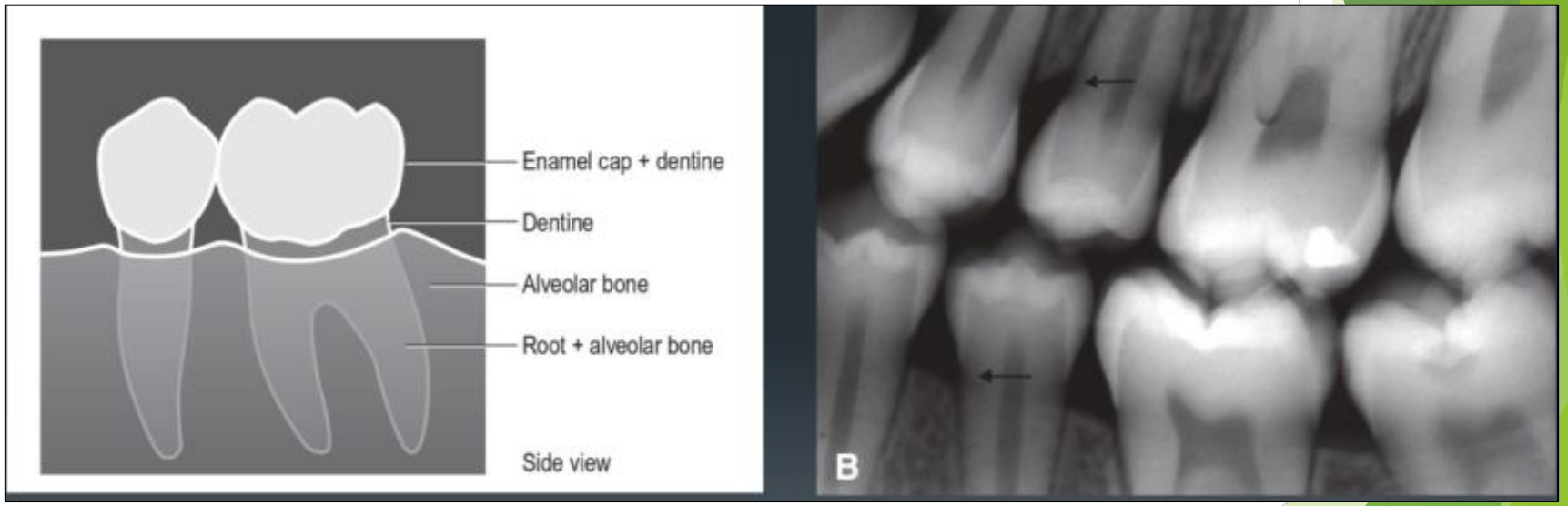
- On a dental image, conditions that may be confused with caries include:
  - Cervical burnout
  - Restorative materials
  - Attrition
  - Abrasion

Cervical Burnout

- Radiolucent artifact seen on dental images.
  - Often confused with decay.

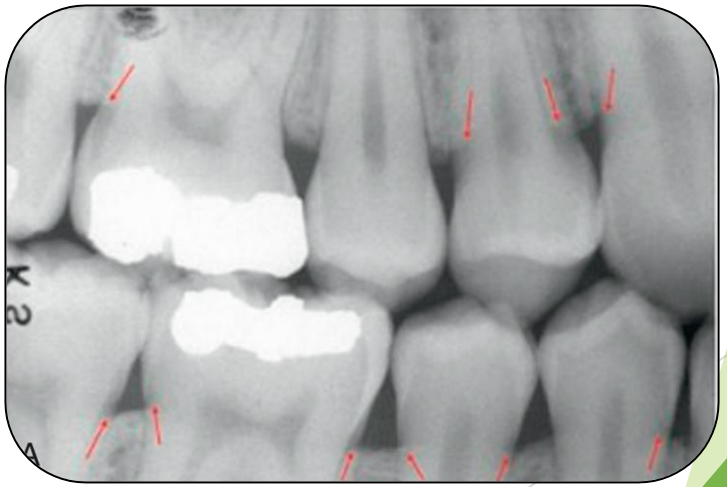


Cervical Burnout



Cervical Burnout

- Appears as a **collar-shaped** or **wedge-shaped** area *between the CEJ and alveolar bone.*
- May also appear as an ill-defined **wedge-shaped** radiolucency on the mesial or distal root surfaces *near the CEJ of posterior teeth.*



Restorative Materials

- Such as composites and acrylics.
- Appearance of a cavity preparation can be identified by the well-defined, smooth outline.
- Careful clinical examination helps the dental professional determine the difference between a restorative material and dental caries.

Composite restorations, when radiolucent, may be confused with caries.

Attrition

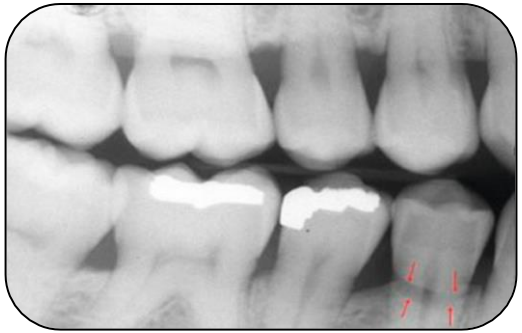
- Mechanical wearing down of teeth.
- May be seen on the incisal or occlusal surfaces of deciduous or permanent teeth.
- When the incisal or occlusal enamel is worn away, the underlying dentin wears away rapidly and shallow concavities may form.
- Clinical examination enables dental professional to distinguish attrition from caries.

Abrasion/Abfraction

- **Abrasion**: Wearing away of tooth structure from the friction of a foreign object.
  - Surface of the tooth affected depends on the causative factor.
  - Most frequent type of abrasion is caused by improper toothbrushing.
- **Abfraction**: an angular notch at the gumline caused by bending forces applied to the tooth.
- Clinically, the areas affected by abrasion/abfraction appear as hard, highly polished defects in dentin and should not be confused with root caries that appears brown and leathery.

Abrasion/Abfraction

Abrasion



Abfraction

Summary

I hope you now have a better understanding of dental caries and how they appear on a dental x-ray. Also, caries has different classifications. Remember there are different conditions that may resemble dental caries.

To expand on what you have learned today, it is encouraged that you:

- Review the handout provided.
- Practice case studies on www.dentalcare.com
- Explore scholarly articles.

Case Study

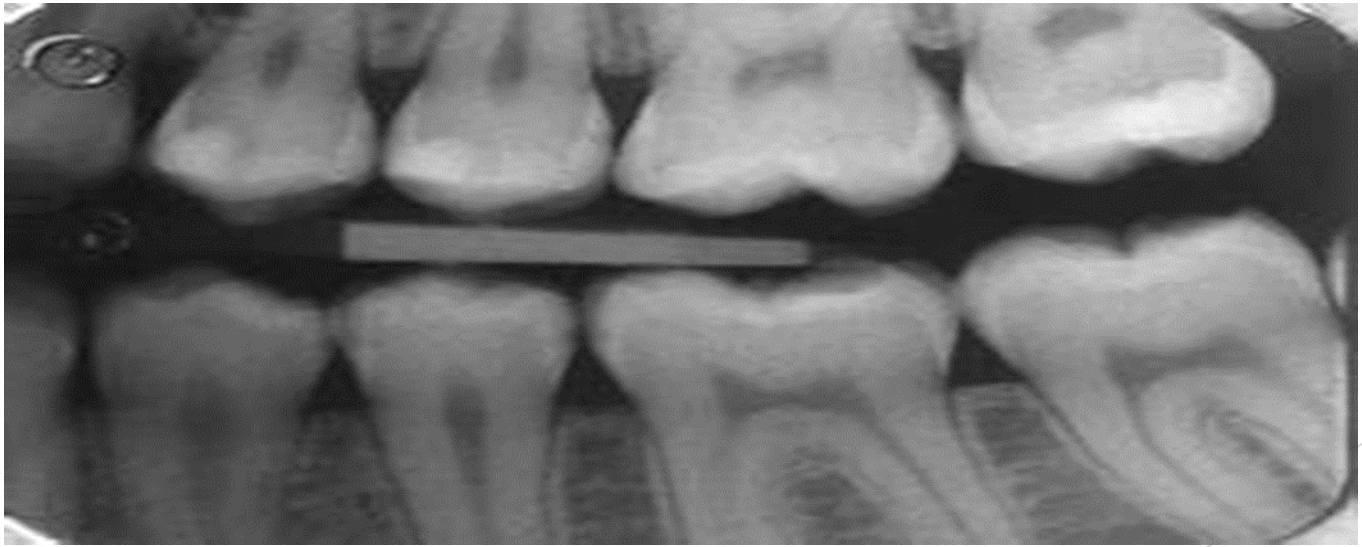
A 40-year-old male presents in the office and states he has not seen a dentist in 5 years. He has tooth pain sometimes. He brushes with a hard toothbrush every morning but does not floss.

Case Study cont.

Based on what you learned today what recommendations would you tell the patient about his at-home care?

Case Study cont.

Based on the x-ray classify the decay on tooth #13.



Case Study cont.

Based on the x-ray interpret what you see?

Questions?