Radiographic Interpretation:
The Full Mouth Series and Panoramic Views

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"Give a person a fish; you have fed them for today. Teach a person to fish; and you have fed them for a lifetime"—Author unknown

Radiographs in Diagnosis

- Diagnostic imaging is an integral part of the diagnostic process in clinical dentistry.
- Radiographs are often obtained as part of a complete examination.
- Appropriate radiographic interpretation is used along with clinical information and other tests to formulate a differential diagnosis

Caravaggio's "The Tooth Puller"

The Diagnostic Process

- Chief complaint
- History of Present illness
- Medical History
- Clinical examination
- Diagnostic Imaging
- Further examination and testing
- Formulate a differential diagnosis

Quality of Image

- Is the radiograph of diagnostic quality?
  - Contrast and density
  - Region of interest (ie: the lesion) clearly visible
  - Surrounding normal tissue (approx. 2-3 mm)
  - No geometric distortion

Quality of Image

- Do I need more radiographs?
  - Which one(s)
  - Periapical, Bitewing, Occlusal, Panoramic
- Shall I obtain prior radiographs?
- What is the expected diagnostic yield from the radiographs?

Viewing the radiographs

- Appropriate viewing conditions
  - Dimly lit room
  - Bright viewbox
  - Mask all extraneous light
  - Using a magnifying glass as appropriate

No airplane views!

Use a systematic process

- Knowledge of normal radiographic anatomy is paramount
- Distinguish
  - Normal anatomy
  - Variations of normal anatomy
  - **PATHOSES**

Use a systematic process

- Start with the anatomical landmarks
- View the radiographs in order through the quadrants from upper right through lower right
- Identify the normal anatomy such as the bones, canals, foramina, cortices, etc.
- Check for symmetry

Use a systematic process

- Go back to the first quadrant and look at the trabecular pattern. Is it:
  - Normal
  - Symmetrical when compared to the contralateral side
  - Sparse
  - Dense
  - In the direction of anatomical stress
  - Altered

Use a systematic process

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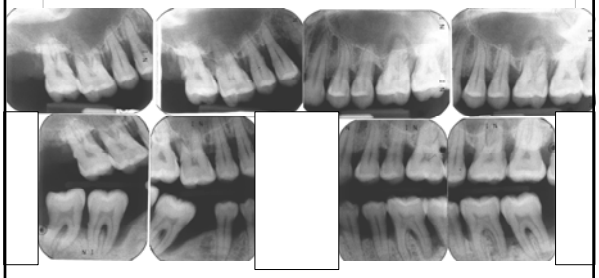
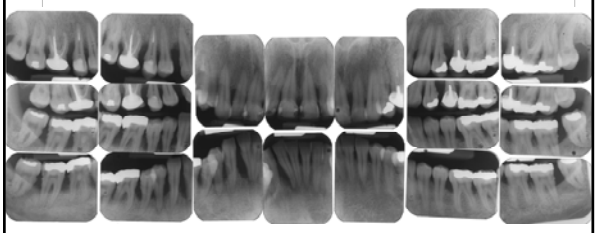
- Check the height of the interdental bone
- Bitewings are the optimal projection for proximal bone heights
- Look at
  - Cortication
  - Bone height
  - Shape of the bony crest

Use a systematic process



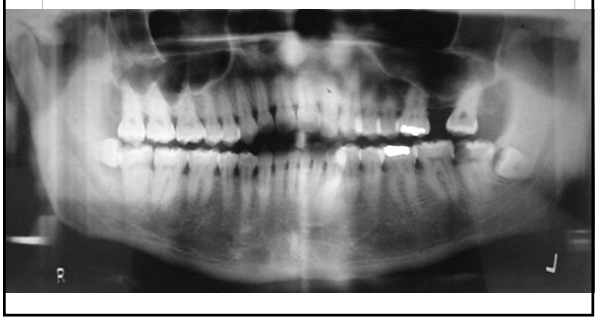
Use a systematic process



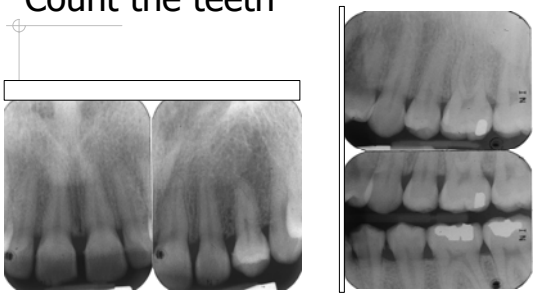
Use a systematic process

- Check the teeth
  - Count
  - Check enamel, dentin, and pulp
  - Count roots
  - Compare anatomy
  - Check restorations (bitewings are optimal)

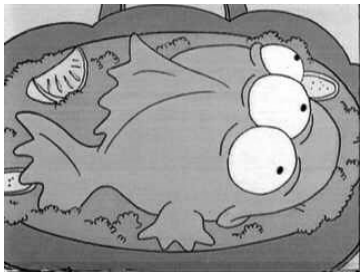
Count the teeth



Count the teeth



Count the eyes =: -)



Check enamel, dentin, cementum, and pulp

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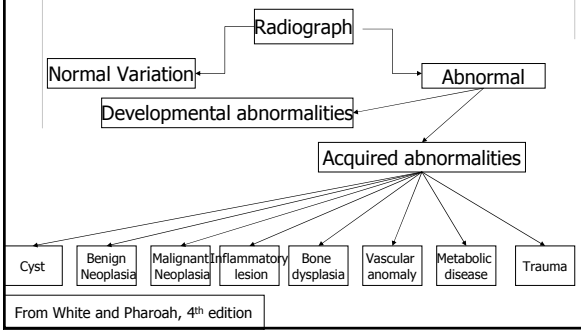
Check enamel, dentin, cementum, and pulp

Interpretation is an orderly process

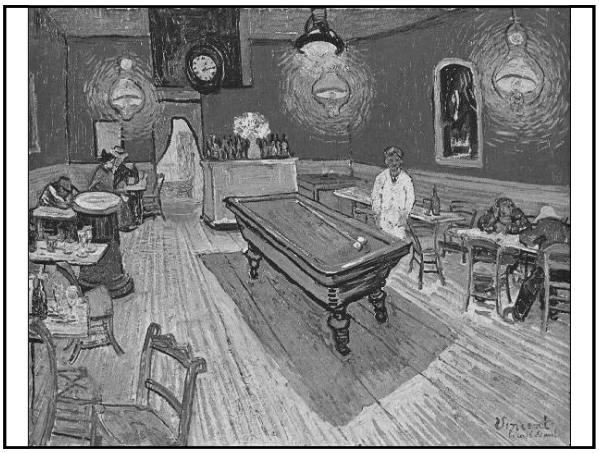


From White and Pharoah, 4th edition

Why describe the lesion?

- The radiographic description can give us indications of:
  - Tissue of origin
  - Biological behavior
  - Prognosis
  - Treatment concerns
  - Diagnosis or a Differential Diagnosis

Paint a Picture with your Words

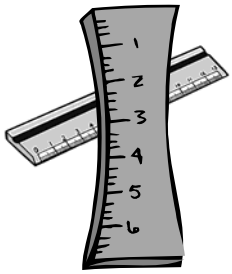


Describing the Lesion

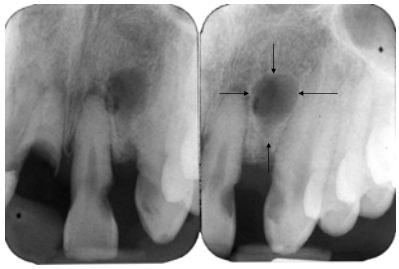
1. Size
2. Shape
3. Location
4. Density
5. Borders
6. Internal Architecture
7. Effect on adjacent structures

1. Size

- Measure the lesion with a ruler. If you must estimate, use surrounding structures as your guide
- Measure in two dimensions, width and height in mm or cm, as appropriate



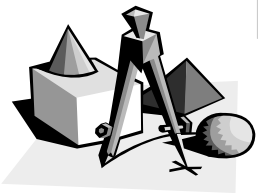
1. Size



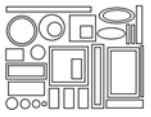
2. Shape

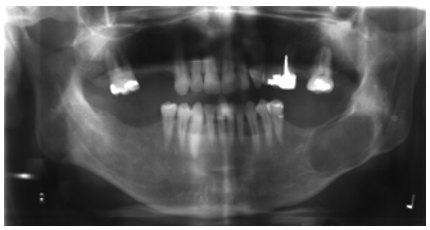
Regular
- Round
- Triangular
- Rhomboid, etc.

Irregular shape



2. Shape





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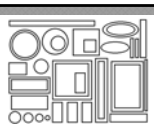


3. Location

- Is the lesion localized or generalized?
- Unilateral or bilateral
- Where is the lesion in relation to other structures and anatomic landmarks?
- Use terms such as:
  - Mesial, Distal
  - Inferior, Superior
  - Posterior, Anterior

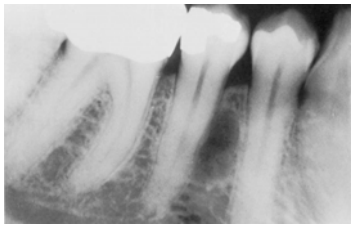
3. Location

- If the epicenter of the lesion is above the mandibular canal, the likelihood is that the lesion is odontogenic in origin.
- Cartilaginous lesions are found nearer the condyles.
- If the epicenter of the lesion is in the sinus, it probably is not odontogenic in origin.

3. Location

Image courtesy of
University of Athens
School of Dentistry

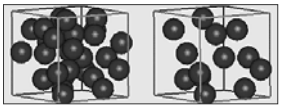
3. Location



3. Location

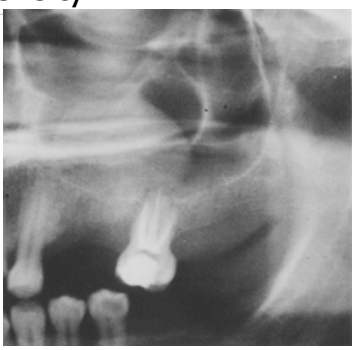
Image Courtesy of University of Alberta
Faculty of Medicine and Dentistry

4. Density



- Is the lesion Radiopaque, Radiolucent, or Mixed Density
- Remember that opacity is relative to the adjacent structures.
- If the lesion is of mixed density, describe the appearance

4. Density



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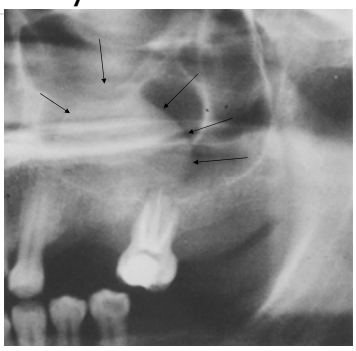

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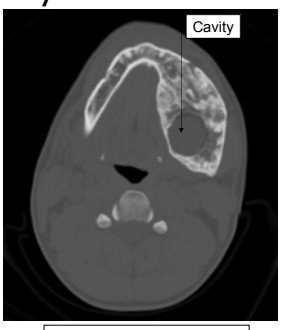


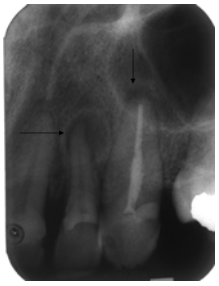
Axial CT in Bone Windows

4. Density

5. Borders

- Well or poorly demarcated
- Punched out (no bony reaction)
- Corticated (thin opaque border)
- Sclerotic (wide, uneven opaque border)
- Hyperostotic (increased density of trabeculation)

5. Borders



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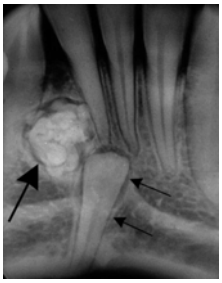
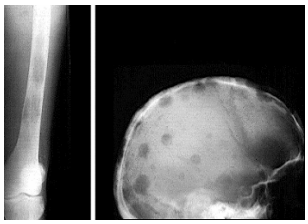


Image Courtesy of University of Alberta
Faculty of Medicine and Dentistry

5. Borders



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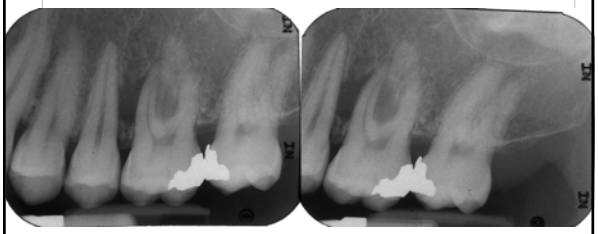

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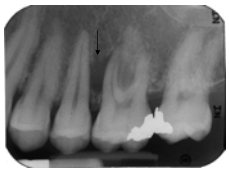
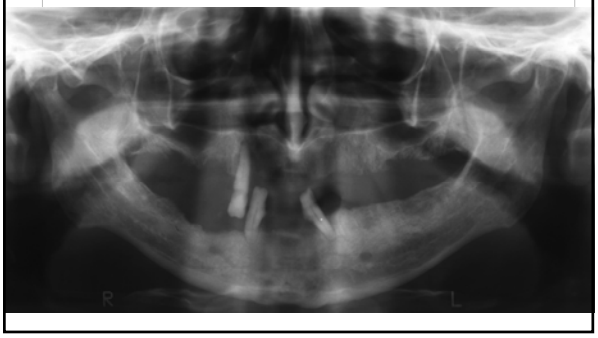


Compare borders

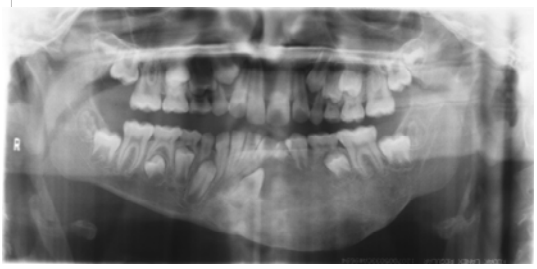
5. Borders



6. Internal architecture

- Is the lesion uniform?
- Internal structures such as septae or loculations
  - **Septae** are bony walls
  - **Loculations** are individual compartments
- Tooth-like elements
- Radiolucent rim
- Use terms such as: cotton wool, ground glass, wispy, orange peel, etc.

6. Internal architecture



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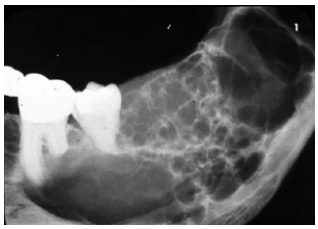


Image courtesy of USC School of Dentistry

6. Internal architecture

Image courtesy of Dr. L. Schneider, UMDNJ-NJDS

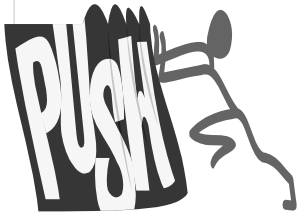
6. Internal architecture

7. Effect on adjacent structures

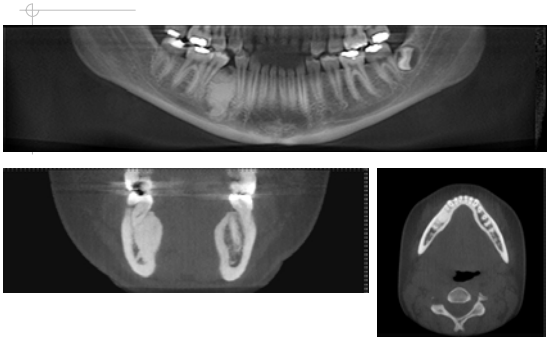
- Is the lesion causing:
  - Resorption
  - Displacement
  - Scalloping
  - Effacement
  - Destruction
  - Space occupying lesions displace other structures
  - Remodeling
  - Expansion
  - Thinning/thickening

7. Effect on adjacent structures

- Space occupying lesions displace other structures

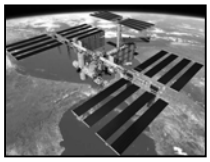


7. Effect on adjacent structures



7. Effect on adjacent structures

- A *Space Occupying* lesion creates its own space by displacing other structures, such as teeth, maxillary sinus, inferior alveolar canal, etc.



7. Effect on adjacent structures

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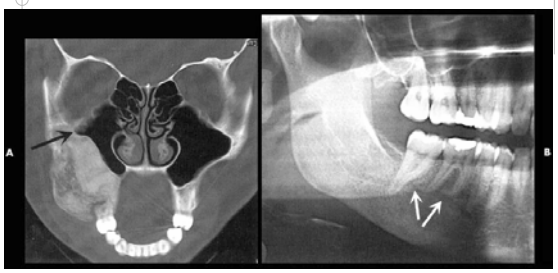
•May cause neurological symptoms if the lesion closes foramina

7. Effect on adjacent structures



7. Effect on adjacent structures

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Central Giant Cell Granuloma

7. Effect on adjacent structures

Central Giant Cell Granuloma

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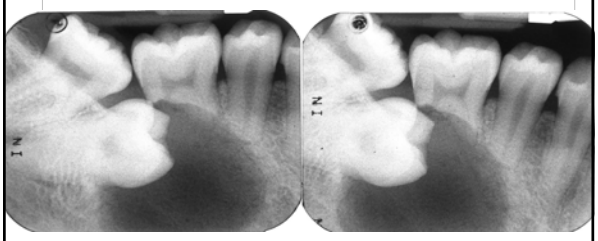

…when you have eliminated the impossible, whatever remains, however improbable, must be the truth.

Sir Arthur Conan Doyle, *(Sherlock Holmes)*
British mystery author & physician (1859 - 1930)

Thank you!

Take a deep breath and relax while
I get the hell out of here.