DENTAL RADIOLOGY INTERPRETATION FOR TECHNICIANS

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Dental radiology poses challenges with not only positioning, but in learning how to train your eyes to see pathology. As technicians, we should never take the step into interpreting and diagnosing for the client, but we should have a general understanding of what constitutes a diagnostics image and where in the mouth that radiograph was taken. With time and experience, we should also begin to train our eyes to pick up some of the abnormalities the DVM will use to diagnose. In becoming better able to interpret radiographs you will be much better prepared to assist the DVM with impending procedures. You may also begin to perform preemptive pain management as early as possible.

Viewing the radiograph:

1. Orient the radiograph properly. Images should always appear as if you are outside of the mouth looking in at a window.
2. If using film, orient the raised dot so it is raised toward you. This will be done automatically with digital images (provided you have correctly told the software which tooth/teeth you are radiographing).
3. Rotate the film depending if you are looking at a maxillary view or mandibular view. In the maxilla, roots always point up and crowns point down. In the mandible, roots always point down and crowns point up.
4. Hints:
   a. All three rooted teeth are in the maxilla
   b. The palatine fissures are in the maxilla
   c. The nasal passages are in the maxilla
   d. The mandibular canal is only present in the mandible
   e. The horizontal ramus is quite pronounced as the bottom of the jaw in the mandible
5. Decide if you are looking at left or right. To do this decide which edge of the film the patient’s nose is. If the nose is pointing to the left, it is the left side. If the nose is pointing to the right, it is the right side.
6. If anyone at your practice take a radiograph extraorally, these images and films must be documented as such, otherwise, the above rule will not apply.
7. With digital images, always check that they are oriented properly and save them, label them as such. When bringing up previous radiographs you will want to be able to trust they are the teeth stated.
8. When looking at a full mouth radiograph “mount”, the patient’s right side is on the viewer’s left side and the patient’s left side is on the viewer’s right.

It is important the viewer is able to identify key anatomical details of the teeth. These structures are:

- Enamel – the outer covering of the crown
- Cementum – the outer layer of the root
- Cementoenamel junction – area where the enamel and cementum join together
- Pulp cavity – radiodense area within the tooth and root(s) which includes the pulp chamber, root canal and apical delta
- Periodontal ligament space – thin, radiolucent (dark), area between the root and the lamina dura
- Lamina dura – radiodense (light) alveolar bone which surrounds the root. It appears as a dense, white line adjacent to the periodontal ligament space
- Alveolar bone – bone surrounding the root and forming the ‘tooth socket’
- Alveolar margin – coronal edge of the alveolar bone, between teeth, comprised of dense bone
- Furcation – location where multiple roots converge on multi-rooted teeth
- Periapical – area surrounding the apex of the root
- Mandibular symphysis – radiolucent, straight line between the first two incisors

Foramen vs. Periapical lucency?
- Do not confuse normal foramen anatomy with pathologic periapical lucency
- If in question, aim the tube head either rostrally or caudally. If the lucency follows the periapical space of the root it is pathologic. If the lucency moves away from the apex, it is a foramen.

What does a diagnostic radiograph look like?
1. Entire crown is visible
2. Entire root is visible
3. Entire pulp cavity is visible
4. A minimum of 3 mm of alveolar bone surrounds the root
5. If multiple images are taken to evaluate one large tooth, anatomical signs of overlap from one image to the next must be identified.
6. There is neither elongation of foreshortening of the image
7. There are no teeth or roots superimposed over the tooth being radiographed.

Evaluating Tooth Resorption
- Radiographs are critical in staging and identifying tooth resorption as well as developing a treatment plan.
- Look for defects along the cementoenamel junction, appearance of destruction of the periodontal ligament space and resultant ankyloses, mottled appearances of roots.
- If the periodontal ligament space is visible around the majority of the root, a full extraction must be performed.
- If the periodontal ligament space has been destroyed and ankyloses is present over most of the root, a crown amputation is appropriate treatment.

Evaluating Periodontal Disease
- Widening of the periodontal ligament space.
- Destroyed bone density of alveolar bone horizontally along the CEJ, vertically from the CEJ along a root, furcation exposure.
- Use caution that if improper radiographic technique has been performed it may cause you to misinterpret bone loss.
Evaluating Endodontic Disease

- Periapical bone changes or loss
- Widening of the pulp cavity
- Widening of the periodontal ligament space
- Loss of radiodensity of the lamina dura
- Internal root resorption appears as an irregularly shaped pulp cavity.
- Careful to not misinterpret the chevron affect at the apices of the incisor and canine teeth as pathology. This is normal radiographic artifact. It is a true triangular chevron, whereas pathology will be much more circular.
- If there is ever question regarding whether or not an image is revealing pathology, try aiming the tube head rostrally or caudally and reevaluate the same tooth. Pathology will always stay with the structure it was first associated with, normal anatomy will move away from it.

Normal tooth development

It is important to note that when an immature permanent tooth erupts the apical delta is open and the tooth has a very wide pulp cavity. As the tooth descends into the alveolus the apical delta forms and layers of dentin are laid down making the pulp cavity narrower. Observing uniform larger pulp cavities is a normal association with a young patient.

RESOURCES

10. [http://www.progenyvetimaging.com](http://www.progenyvetimaging.com)