

Out of Sight: The Critical Importance of Intra-oral Radiology

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Are dental radiographs essential for professional veterinary dental care? Absolutely! In practices that use radiology to evaluate dentistry patients with obvious clinical findings, radiographs revealed additional pathology in 50% of dogs and 53.9% in cats. In cases that had no gross pathology present, radiology exposed clinically relevant findings in 27.8% of dogs and 41.7% in cats. So, when practices are providing dentistry without evaluating the health of the tooth below the gum tissue, they are missing a vast amount of disease.

To provide this service, a dental X-ray unit is not necessary. For some years, vet dentists used their regular medical X-ray unit successfully. The key is to use intraoral film. This task is awkward and time consuming. Often it means transporting the anesthetized patient to a totally different room in the practice. But, it can be done.

Many veterinary hospitals site cost to the clinic as the number one reason for not purchasing a dental radiographic unit. Unfortunately, they are mistaken. Of all pieces of equipment in a practice, this unit is relatively inexpensive. To purchase a regular dental X-ray unit, the cost would amount to about \$4,000. If the practice goes digital, software and sensor can cost from \$6,000 to ~ \$9,200.

A cost analysis is valuable when evaluating the profitability of equipment. Let's say, for example, a practice is performing 3 dentistry per day. On the average they take (and this is very conservative) 10 radiographs per day. The average fee is \$10-20 per view, so let's split it in the middle...\$15 per radiograph. That produces \$150 per day. Do these 5 days per week; the practice generates \$750 per week. Do these 50 weeks per year, the practice produces \$37,000 per year. The equipment paid for itself in less than 6 months just on the revenue brought in by the images itself. I haven't included the increased pathology found and the revenue generated by treating it. These numbers are very reasonable in a large, multi-vet practice.

Consider a small, 2 vet practice. Let's imagine they perform 3 dentistry per week. They take 10 radiographs per week at \$15 each. That is \$150 per week. Do these 50 weeks a year and the practice has grossed \$7,500 a year. The equipment in that scenario paid for itself in less than 2 years. After the equipment is paid off, except for incidental supplies, the rest is all profit.

To use a medical X-ray unit, it is preferred that the head of the unit can be lowered and the angle changed. A focal distance of 12 inches is best. To be able to use the bisecting angle technique is often necessary to reposition the patient. Different X-ray units have different technique charts but you can try using 100 mA, 65 kVp at 1/10th second and adjust the technique accordingly.

Dental radiographic units have heads that are more adjustable so that the patient does not have to be manipulated and repositioned as much. The radiographic detail is much better.

So, once a practice decides it is interested in providing this service, some training and education is required. Fortunately, there are many venues for this education. There are numerous training facilities across the country; there are convenient online courses, many wonderful books and journals. Recognizing normal versus abnormal requires some knowledge of each.

Safety is also an important factor. It certainly is a fact that digital radiographs require about 1/10th of the radiation required when exposing film. But, that doesn't mean that one shouldn't prudently provide radiation protection. Stay 6 feet away from the head of the X-ray unit, do not stand directly in the line of the beam, do not hold the sensor with your hand, and always wear your radiation badge.

There are hand-held X-ray units available. These are often sought because they do not take up a large footprint within the dental operator. But, their approval is provided for use at an arm's length. These units are heavy and that may be difficult.

Once you have obtained the equipment and you have training in getting diagnostic images, it is important to begin to understand the baseline for normal versus abnormal tooth development and pathology. I recommend the following book when you are first getting your feet wet in this service:

[Atlas of Dental Radiography in Dogs and Cats, 1e](#) by Gregg A. DuPont DVM FAVD DAVDC and Linda J. DeBowes DVM MS DACVIM DAVDC (Jul 25, 2008)

In a normal, young patient, it is important to know that the dentinal wall is very thin and the pulp chamber is wide. As the patient ages the dentinal wall thickens hence the pulp canal narrows. Also, in very young animals, the apex of the tooth is still open. As they age, the apex closes.

Indications for radiographs are vast:

- areas where there are missing teeth
 - Impacted teeth often cause dentigerous cysts. As the tooth is developing, there is a sac of epithelium that covers the crown of the tooth. During eruption through the gingiva, the sac is lost. If the tooth is embedded, the sac remains and often begins to secrete fluid. As the fluid accumulated, a cyst forms. As the cyst enlarges, the surrounding bone is destroyed.
- to evaluate teeth experiencing periodontal disease
 - It is not enough to clean a periodontal pocket without radiographing the tooth to evaluate bone loss and whether or not the patient has secondary endodontic disease.
- to document destruction caused by tumors, including epulides
 - when evaluating tumor or epulide activity, radiographic findings should accompany the biopsy so that the pathologist can consider this in his/her diagnosis
- to evaluate discolored, worn or fractured teeth
 - Is there endodontic disease and what are the options for care?
- prior to extraction
 - What are the roots like?
 - Sometimes there three roots on a two rooted tooth
 - Sometimes the root is already fractured or resorbed
 - Sometimes mandibular molar roots curl at a 90 degree angle
 - Sometimes mandibular molar roots cross
 - Are the roots ankylosed?
 - No point in trying to take out a root if it has been incorporated into bone (usually feline)
 - What is the quality of the remaining bone
 - Is there sufficient bone to safely extract a tooth without fracturing the jaw?
 - Is there already a jaw fracture?
- post extraction
 - this documents complete root extraction
 - it documents the remaining integrity of the bone
- facial trauma

In summary, to provide complete and professional dentistry that will keep your patients happy and healthy, radiographic evaluation is very necessary. Extracting a tooth without radiographs is the same as repairing a femoral fracture without radiographs.

Some specialists feel that by the end of the decade, dental radiographs will be standard of care in veterinary medicine. Our clients are becoming ever so much more sophisticated in their expectations for their veterinary care. This is everyone's opportunity to be ahead of the curve rather than trying to play catch up.