

Advancing oral healthcare: A roundtable discussion

Dental concerns and care through the life stages of pets

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Dogs and cats can experience oral health problems in every life stage. Oral disease and tooth damage can affect pets' quality of life and overall health. The key to successful prevention is client education, which needs to start early—and recur often. Clients can be reluctant to make oral health care a priority, but with the advent of chewing-based products, home care is now more convenient—and effective—in protecting pets of all ages.

Dr. Karyl Hurley: In today's discussion, we will focus on life stages in cats and dogs, particularly as they pertain to oral health. Let's begin by defining life stages.

Dr. Brook Niemiec: The adage of seven pet years to one human year is not accurate. Cats are more standardized, but determining when old age begins for different dog breeds can vary greatly. A Great Dane is incredibly different from a Chihuahua. So if we are trying to base life stages on age, we are going to have to adjust it for giant, large, medium, and small dogs.

It is generally accepted that by traditional standards, the juvenile or pediatric stage is up to six months of age. Between six months and two years is adolescence. After that it depends on breed as to when the pet is considered middle-aged or geriatric. Anything over six or seven years is considered mature to old.

Dr. Margie Scherk: Traditionally life stages have been discussed and defined with respect to nutrition, but I think that there are other parameters that we need to consider.

Dr. Jan Bellows: I think the juvenile stage is longer than six months, when you consider dentistry. Adult

teeth start erupting at four months of age and should be present in the mouth by ten months, but it may be up to a year and a half before you see how all of the permanent teeth will settle into the dog's occlusion.

Niemiec: And you have to start thinking about periodontal disease at six months of age rather than at a year. I've seen Yorkshire terriers, poodles, and Maltese that have needed extractions as early as nine months of age. Cats, too. As soon as those permanent teeth are in, we need to start looking for and discussing periodontal disease with our clients.

Hurley: What are the most common dental issues you see with each life stage?

Bellows: In the juvenile animal, retained deciduous teeth, unerupted teeth, and malocclusions are what we worry about. In middle age, we concentrate on periodontal disease, oral masses, and tooth fractures. In older age, we have to consider progression of periodontal disease, neoplasia, and the other oral diseases.

Debbie Boone: You have to think about chewing damage, too, in young animals. Owners don't realize that many hard "chew toys" cause dental problems.

Breed differences

Hurley: What role does breed play in the development of periodontal disease?

Bellows: Periodontal disease is not as common in large breeds as in small dogs or cats. Large breeds might get



stage I periodontal disease if they don't eat right or the client doesn't take good care of their teeth. Periodontal disease is much more prevalent in smaller breeds at any age due to the decreased space around the teeth, predominately soft food diet, and longer life expectancy. Periodontal disease can start by age one early in Maltese or Yorkshire terriers. I rarely see a four-year-old Yorkie that still has its mandibular incisors or upper second molars.

Niemiec: The greyhound is one large-breed dog that commonly develops significant periodontal disease very early. But across the board, it's the small dogs—Yorkshire terriers, Maltese, toy poodles, Chihuahuas—that have severe periodontal disease at the youngest age. One reason for this is that they have the same number of teeth that larger dogs do, but they are crowded and rotated into a smaller area. The "normal" sulcal depth of a dog is considered to be 3 mm. Compare a 4-mm periodontal pocket on the tooth of a Labrador retriever that has a long root with a 4-mm periodontal pocket on a Yorkie's tooth. You may already have mobility of the Yorkie's tooth. Small dogs just don't have a lot of defense against periodontal disease.

Hurley: What about brachycephalic breeds?

Niemiec: Brachycephalic dogs often have rotated teeth, especially their maxillary premolars. I often recommend extracting these teeth for two reasons. First, they trap food as well as allow for the increased accumulation of plaque because they are rotated. Second, a lot of times the roots are no longer surrounded by gingival tissues, but rather palatine tissues, which are less resistant to periodontal disease. Many of these dogs lose these teeth by the time they are five or six years old. I often perform preemptive extractions of these

rotated teeth in brachycephalic dogs with owners who cannot or will not perform homecare.

Hurley: Is there such a thing as a normal dental arcade for a brachycephalic dog?

Bellows: Not really. Normal for all breeds is the quintessential scissor bite. Unfortunately this gets confusing because brachycephalic breeds do not have the "normal" scissor occlusion.

Hurley: Their bite is what predisposes them to having issues later on. So they need particular care, which means practitioners need to educate owners about dental issues that brachycephalic dogs face.

Niemiec: I honestly feel that all small and toy breed dogs should come with a warning about the dental care they'll require. Breeders sell these little dogs but don't talk to buyers about home dental care. When practitioners see a small or toy breed dog of any age, they should send it home with dental care products and instructions on home care. That being said, I have eight-year-old Yorkie and poodle patients that have all their teeth and no gum disease or periodontal pockets, but their owners brush the dogs' teeth and we clean them every six months. So it can be done.

Hurley: What about large- and giant-breed dogs? Do we not worry about them?

Niemiec: From a periodontal standpoint, no. From a broken teeth standpoint, yes. When I talk to clients about their pets' teeth, I tell them that small dogs get periodontal disease and large dogs break their teeth. One of the reasons bigger dogs may not develop as much periodontal disease is that they chew more than little dogs do. Sometimes they chew inappropriate objects, things that are too hard, and they break their teeth. Commonly, however, they get slab fractures with direct pulp exposure or uncomplicated crown fractures on their maxillary fourth premolars. Even if they just chip off the enamel, it exposes the dentin, which is like having a painful, deep cavity.

Hurley: And what about different breeds of cats?

Scherk: Cat breeds don't seem to differ from each other very much in their predisposition to periodontal disease. Some individuals are prone to having duplicate mandibular teeth (307, 407) or rotation of these same



teeth, however there doesn't appear to be any breed predilection to these congenital anomalies.

Hurley: What about other breed-related dental disease processes in dogs?

Bellows: We did a study that showed that 50% of the Yorkshire terriers and Maltese dogs studied did not have erupted first premolars by the time they were spayed, and 50% of those needed surgery to extract those teeth.

Niemiec: It's clinically important to notice if a dog has a tooth that has not erupted. If you don't deal with unerupted teeth at five months of age and instead wait a year or two, some can develop dentigerous cysts and pathologic fractures. Every brachycephalic dog should have dental radiographs at a young age if the teeth are not emerging as expected.

Bellows: It is important for practitioners that are spaying or neutering small-breed dogs at six months to thoroughly examine the mouth and radiograph those areas that are missing teeth. You might be surprised by what you find. In my opinion, taking care of unerupted teeth is just as important as the spay or neuter procedure at the time. If they get a dentigerous cyst, it just grows bigger and could fracture the jaw.

Niemiec: I've seen a fractured jaw from a cyst in a one-year-old dog. It is typically in brachycephalic breeds and Maltese, but it can be any breed. Retained persistent deciduous teeth are also commonly diagnosed and can be there at about six months of age. If they are present, they need to be extracted.

Bellows: Dachshunds are prone to both upper and lower double retained deciduous teeth, so they can develop horrible periodontal disease involving their canine teeth. The disease can develop to the point that a maxillary canine tooth can fall out and leave an oronasal fistula.

Predisposing conditions

Hurley: What acute or chronic diseases or conditions are associated with an increased risk of developing oral disease?

Niemiec: The number one disease that exacerbates gum disease in dogs and cats is diabetes mellitus. Diabetes weakens the immune system in general, which in turn weakens the defenses within the gingival

sulcus and causes worsening of periodontal disease. Periodontal disease is a stress on the body. Stress on the body increases endogenous stress hormone release. Therefore, poor diabetic control creates more severe periodontal disease and vice versa. It is a vicious cycle. I have internists send me cats with uncontrolled diabetes to have all their diseased teeth extracted. Sometimes they don't even need insulin after the extractions.

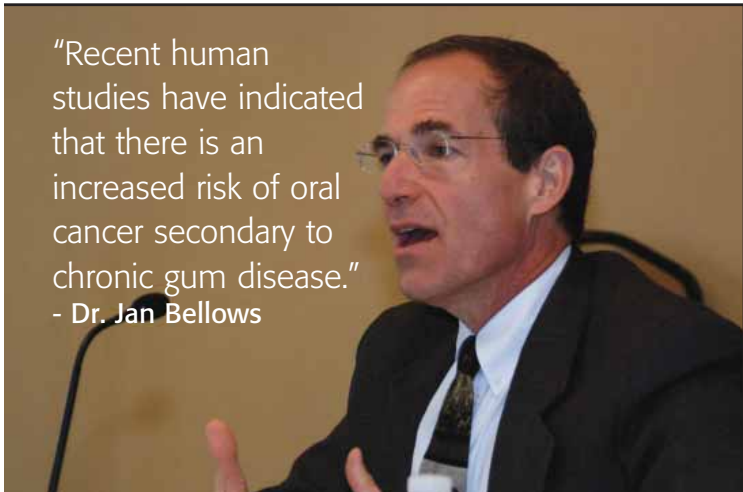
Bellows: Sometimes, in trying to treat feline chronic gingivostomatitis with a repositol corticosteroid injection, diabetes mellitus results. Historically, the cat gets better after receiving the injection, so the client is happy. The effect lasts two to four weeks, then wears off, and clinical signs return worse than before. After a series of three or four injections, the cat becomes diabetic making treatment even more complicated than usual. So the lesson is, when you see inflammation all around a tooth or when you see local or generalized stomatitis, don't reach for repositol corticosteroids. The cat is not corticosteroid-deficient. It needs definitive oral assessment, treatment, and prevention (ORAL ATP™).

Scherk: In diabetic cats you always have to look for uncontrolled inflammation anywhere, especially in the mouth and urinary tract. Renal insufficiency that causes uremic gastritis due to increased acidity also causes stomatitis by a different mechanism. Increased urea in the body favors urease-producing bacteria resulting in more ulceration as a result of ammonia buildup and even sometimes necrosis of the tongue tip. This appears to be very painful and understandably results in anorexia or inappetence. So, if there are a lot of bacteria in a mouth, because of periodontal disease or poor dental hygiene, those individuals are more prone to uremic ulcers. Sadly, that is not uncommon in the geriatric cats in my practice.

Hurley: The uremia actually changes the environment of the mouth. Different kinds of bacteria will grow and more plaque, calculus, and gingivitis develop.

Scherk: These patients have a whole constellation of clinical signs associated with their illness. They are dehydrated, they have painful mouths, and they aren't eating. It becomes a vicious cycle, too. I think the important thing is to look at it from a pathophysiologic point of view. Whatever causes dehydration or physiologic stress alters the immune response. It may up-regulate some aspects of it and down-regulate

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- Dr. Jan Bellows



others. If the cells are dehydrated throughout the body, there will be changes in the saliva and biofilm on the teeth. The cells' ability to heal themselves will be affected. Infection with viruses, such as the feline leukemia virus (FeLV) or the feline immunodeficiency virus (FIV), can cause oral disease. Chronic upper respiratory infections and chronic bacterial conditions can, too. Various medications a patient may be receiving, such as corticosteroids, are immunomodulatory or immunosuppressive. Those things affect how the body works as a whole. That is why we have to look for chronic diseases elsewhere; there will be a ripple effect on oral health.

Niemiec: Immunomodulating drugs such as corticosteroids cyclosporine, and chemotherapy agents will also negatively affect the oral immune system. I've seen many dogs on these drugs and though they work well for the conditions being treated, the periodontal disease in these dogs appears more significant than in non-treated patients. Radiation therapy also has an effect on periodontal disease; I've seen xerostomia and chronic periodontal disease from it. Vasculitis, which causes problems with the capillaries, can result in periodontal problems, too.

Hurley: So your recommendation is that when you see an animal with periodontal disease, look at its overall general health.

Scherk: Today, when we have access to sophisticated diagnostic tools, we must not forget to conduct a comprehensive physical examination and take a thorough patient history. Certainly we need to perform a complete blood count (CBC), serum biochemistry profile, and a urinalysis. Also, in cats, we need to know their retroviral status.

Secondary conditions

Hurley: What secondary diseases or conditions are associated with periodontal disease?

Niemiec: Oronasal fistulas are the most common severe local problem seen secondary to periodontal disease. An oronasal fistula occurs when the periodontal disease erodes the bone on the palatal aspect of a maxillary tooth (typically the canine tooth). It creates a communication between the oral cavity and the nasal cavity. Everything that goes in the mouth then can go into the nose, resulting in a chronic sinusitis. It's common in dachshunds and other small breeds, but I've also seen it in Labrador retrievers, rottweilers, and cats.

Scherk: It's important that pets with chronic nasal discharge undergo a comprehensive examination of their mouth and teeth and have dental radiographs taken.

Niemiec: Osteomyelitis can also result from periodontal disease. I had a case in which the dog lost its entire left mandible because of osteomyelitis due to periodontal disease. I also had a case in which a dog had chronic systemic infections for years, and no one could figure out why. I found an area of osteomyelitis in the mouth, removed it, and the infection was cured. I've seen quite a few cases where animals had to have an enucleation secondary to severe periodontal disease of the upper first molars.

Bellows: Recent human studies have indicated that there is an increased risk of oral cancer secondary to chronic gum disease.¹

Scherk: We're learning that any chronic inflammatory lesion can potentially undergo malignant transformation.

Niemiec: But diabetes is the major disease associated as both a cause and an effect of periodontal disease. Does it directly make a cat diabetic? No, but it can push them over the edge if they are predisposed. Chronic kidney and liver problems can result from oral disease, too.

Hurley: When you have any inflammatory disease, particularly in the oral cavity, you can end up with glomerulonephritis.

Niemiec: Valvular endocarditis as a result of periodontal disease is one area that seems to be controversial. Some experts feel that a cause and effect relationship has not been established.



Hurley: Regardless of your beliefs about that issue, do you give animals that have heart murmurs antibiotics prior to a dental cleaning?

Niemiec: Most veterinary dentists do not give pre-operative antibiotics, but almost everyone agrees that perioperative antibiotics, especially for animals that have heart issues, are important. Then postoperative administration again is controversial.

Hurley: How do you choose your antibiotic? Is it an empirical choice?

Niemiec: Yes. Under anesthesia, I generally use ampicillin intravenously or clindamycin orally or intramuscularly. Then I prescribe amoxicillin-clavulanate or clindamycin for one to two weeks depending on the severity of disease.

Bellows: I like clindamycin because the time from which it is given orally to the time it is in the sulcular fluid at the proper concentration is only 20 minutes. You don't have to give it intravenously. This necessitates it being given preoperatively; we usually give it orally before general anesthesia.

Scherk: I prefer clindamycin for postprocedural home care in cats because it doesn't predispose them to diarrhea the way the penicillins can. Certain clients can be trained to give subcutaneous injections of clindamycin, which is much easier than giving something by mouth, especially because the cat has dental disease and may have just had a tooth extracted.

Hurley: The systemic effects of periodontal disease are controversial in veterinary medicine, too, because not much data are available on which to base your opinion. Based on your experience as practitioners, practice owners, and dentists, do you believe periodontal disease has negative systemic effects and, if so, which is most concerning?

Dr. Richard Goldstein: Despite a real lack of clinical studies in dogs and cats, periodontal disease is very inflammatory and the localized inflammation in the mouth does spread systemically via release of inflammatory agents. Is that enough to cause overt clinical signs of systemic disease? That needs to be examined on a case-by-case basis. What I think is likely to be more common is that it makes any other existing condition worse or harder to control, like diabetes or inflammatory liver disease.

Bellows: I certainly believe that after we clean our patients' teeth, they are better off. But I don't think we should scare clients by claiming life-threatening health effects of periodontal disease. In a majority of the cases animals die from other diseases not caused directly by periodontal disease.

Scherk: Again, everything works as a whole.

Niemiec: I believe there has to be some systemic drain on any animal with periodontal disease, just like any chronic condition.

Hurley: Is there a difference in how you approach oral health and oral disease in early, adult, and geriatric life stages?

Niemiec: To me it doesn't matter how old the pet is, just what the mouth looks like. You can see dogs that are nine years old that have beautiful mouths, and you can see animals that are nine months old that have horrific mouths.

Hurley: You should customize your oral health programs to the individual.

Niemiec: You can generalize, but there is an exception to every rule. It really has to be tailored to each patient.

Boone: I think veterinarians tend to be complacent about oral care of patients in the early adult stage of life. You should be proactively trying to work with clients and assess these animals.


Bellows: Commonly the middle-aged patient with even a moderate amount of plaque and calculus only has its teeth cleaned without much effort placed on the ORAL ATP™ process. Most do not have oral survey radiographs taken at the time of the professional hygiene visit.

As time goes on, more veterinarians are purchasing digital radiography equipment and clients are accepting its use. Many veterinarians now have changed their protocol so that every animal that gets its teeth cleaned gets a complete set of dental radiographs.

Client education and compliance

Hurley: Now let's talk about client education and compliance. How do you educate clients about dental problems and periodontal disease?

Bellows: Models are very effective, and often less shocking and potentially offensive to some clients than



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- Debbie Boone

graphic photographs of dental disease. If I use photos, I choose ones that aren’t shocking. I show clients where their pet is at the moment and where it could be.

Niemiec: I mostly use a dry erase board, especially when I’m talking about root canal problems. I talk about the bone loss, and then if I need to, I show clients examples of digital dental radiographs.

Bellows: Veterinary Information Network (VIN) also has original, helpful images available for viewing.

Hurley: Ms. Boone, do you show clients pictures and talk about cases?

Boone: We do. People typically only see the front of their pet’s mouth. They never see the back. We use brochures that have pictures similar to what their pet’s mouth looks like and what it should look like—before and after photos. One of the best things our practice does is perform very thorough dental cleanings and oral evaluations. After a dental cleaning, we ask clients to return in two weeks for a recheck of the teeth and gums— this is included in the price of the dental cleaning. At that time, we usually get the feedback that their pet feels so much better and its breath is great. Then we say, “Let’s keep it this way.” We talk about brushing teeth, feeding Greenies® dental chews or treats, adding BreathaLyser Plus (imRex) to the pet’s drinking water, and routinely monitoring their pet’s mouth, both at home and at clinic visits.

Scherk: If you reinforce the behavior and make clients feel good about what they have done, they are more likely to continue with this level of care.

Niemiec: Do you use a reminder system?

Boone: After the dental work is complete, the client’s information is entered into the computer’s automatic reminder system. When we do our annual and semi-annual wellness exam, there is an oral exam reminder linked to that as well.

Bellows: Rather than just sending out a yearly reminder, we link our reminders to the stage of periodontal disease for that individual pet.

Niemiec: So if that pet needs more frequent rechecks, the client gets more frequent reminders?

Bellows: Yes. It is easy to do with today’s computer software. A pet with stage IV periodontal disease gets monthly rechecks; stage III dental disease, every three months; and stages I and II dental disease, every six months. So the longest we go without seeing any patient is six months.

Hurley: What do you see as the most important issue interfering with client compliance for dental cleanings and how do you handle it?

Boone: The big fear people have when it comes to dentistry is their pet undergoing anesthesia. Because our patients are not cooperative, anesthesia is a necessity. All staff members, from the kennel workers to the exam room technicians, have to emphasize that anesthesia is not a problem and that the risk of not doing a dental procedure is greater than the risks associated with doing it.

Scherk: I hear clients say, “My previous veterinarian said my cat was too old to be anesthetized.” This perception is a real problem. I point out that in people, the age group that undergoes the most procedures requiring anesthesia is the elderly. Secondly, I explain that the physical status classification system that the American Society of Anesthesiologists has developed for preanesthetic patient evaluation has nothing to do with age. It is based on overall well being.

Puppies and homecare

Hurley: Do you include anything related to oral care in the puppy or kitten kits that you send home with clients? What do you tell owners of puppies and kittens about preventive oral care?

Boone: Our kits include a meat-flavored toothpaste sample and a pet toothbrush with the hospital’s name on it. These can be ordered from many distributors. We



don't just hand them the package and send them out the door; we discuss its contents.

When a puppy or kitten is brought to our office, we have the perfect opportunity to start that pet out right. If we can get them started with proper care, the owners will continue it. Plus it is much easier to train a puppy to allow its teeth to be brushed than to train an older dog. Educating your clients from the beginning is so important. They want to take good care of their pets. Our job is to be educators. The puppy and kitten stage is the perfect time to start the education.

Niemiec: If you start training a puppy or kitten to allow your hands in its mouth at six weeks of age, when do you start the actual brushing? Do you start them that young?

Bellows: We recommend that the brushing starts after the adult teeth have erupted. Their first professional ORAL ATP™ comes at the time of the spay or neuter surgery, for both cats and dogs. That is important. Some veterinarians wait until the pet is a year or two old and they have halitosis and gingivitis. We start them right at the beginning. At the spay or neuter appointment, we clean their teeth, take dental radiographs, apply OraVet Barrier Sealant (Merial), and send them home with the OraVet Plaque Prevention Gel homecare pack and dental wipes.

Niemiec: That's a good plan to start them that young. I don't think most veterinarians do that.

Hurley: What is your compliance rate?

Bellows: Compliance for teeth cleaning at the spay or neuter appointment is excellent. The pets will already be under anesthesia. It is rare for a client to decline.

Preventive care

Hurley: So what about preventive maintenance? Will clients brush teeth? What do you recommend?

Bellows: In my experience, most clients won't brush their pet's teeth. There are many reasons why they won't, including inability to place their fingers in their pet's mouth; what to do with the tooth brush after; and how to brush the lingual surfaces of the teeth (which is not necessary). This is why we send every patient home with dental wipes. We prefer the DentAcetic Dental Wipes (DermaPet) with acetic acid and sodium hexametaphosphate. They are cinnamon flavored and most animals like them, even cats.

Niemiec: My clients are good about brushing. Probably 50% do it at least three times a week. But I have a select clientele who are coming to a veterinary dentist.

Scherk: I'd like to say differently, but I only have two clients who brush their cats' teeth. It is just no fun working with cats that way. Clients ask me if I brush my own cats' teeth, and I tell them that I would rather anesthetize them once or twice a year and clean their teeth and have a good relationship with them the rest of the year.

Niemiec: Brushing is obviously the gold standard but because many clients do not do it, we recommend chewing-based products, such as Greenies® dental chews and treats, and dental diets, such as Hill's Prescription Diet t/d. One important point about chewing-based products, however, is that they don't do a lot for the incisors and canines, because dogs don't chew there. In one European study, researchers found that for teeth behind the canines chewing-based products are more effective than brushing. For the canines and incisors, brushing is more effective than chewing-based products.²

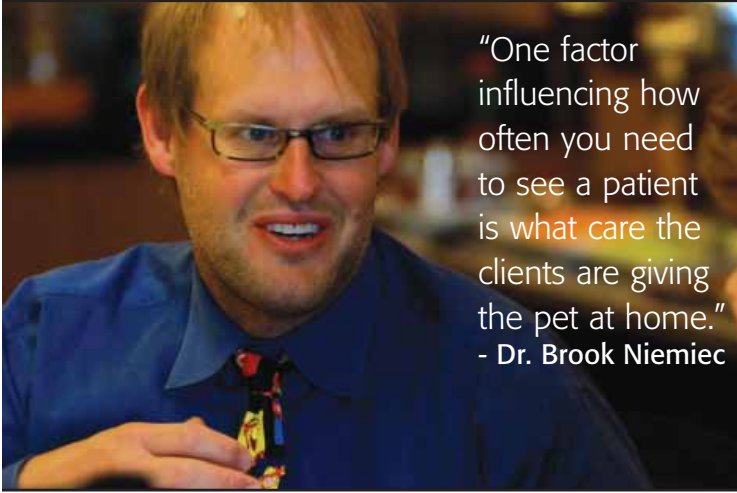
Scherk: These are the teeth that are actually easiest to brush. So you can brush their front teeth and give them Greenies® dental chews or treats for the back teeth.

Niemiec: That's what I have most of my clients doing. Most of them cannot brush back there. Most clients think that the last teeth are the carnassials (maxillary fourth premolar/man-dibular first molar). There are two teeth behind them on the top and three on the bottom.

Bellows: We encourage clients to give a Greenies® dental chew or another Veterinary Oral Health Council-approved dental treat every day. The next step is the dental wipes, twice a day. Then from there, the next level is tooth brushing. Rarely do we send clients home with toothbrushes and toothpaste. We found that compliance was not there. Six months later, clients brought back the sealed toothpaste container that they never opened.

Niemiec: Do you use chlorhexidine rinse?

Bellows: No. The problem with chlorhexidine is that it has to stay in contact with the tissue for at least a minute or two. For people, that works because they gargle and swish the fluid back and forth. Animals aren't too good at that. That's why we do recommend C.E.T. HEXtra Premium Chews with chlorhexidine (Virbac), but not the rinse.



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- Dr. Brook Niemiec

Boone: How do your clients do with the OraVet treatment at home?

Bellows: Not as well as I would like. I believe in the product and was involved with a double-blind study, which showed statistically relevant plaque prevention when used weekly in cats. It would be great if clients would use it like clockwork but many do not.

Bellows: It has to be put on clean teeth.

Boone: Yes, you have to start using it after a professional cleaning. There are two different kits. They have a kit for in-clinic use after the cleaning and one for weekly home use beginning two weeks after the cleaning.

Bellows: In some of our paradental stomatitis cases, we use OraVet every day. This condition is fairly common and very painful. The OraVet helps by putting an interface between the plaque and the gingiva.

Hurley: Do you have any thoughts on dental products or treatment schedules for different life stages?

Niemiec: One factor influencing how often you need to see a patient is what care the clients are giving the pet at home. If they are providing good home care, you can extend that treatment interval. This is a selling point. If they want to have their pet anesthetized less frequently, either because of fear of the anesthetic or the cost of the procedure, then they need to follow our homecare instructions. They need to brush the pet's teeth or use more Greenies® dental chews or

treats or feed a dental diet. The more homecare they do, the longer the time between cleanings. When clients ask when they should come back I say, “Let's see you back in six months to see how you are doing with homecare. If you are doing well, maybe we'll move to yearly rechecks. If you are not, then we'll see you every six months.”

Scherk: The goal is to have clients bring their pets in twice a year after the age of seven. If we can get them in twice a year, we can conduct a comprehensive physical exam and have the opportunity to counsel clients.

Bellows: There are so many ways to prevent plaque. We sit down with a client after the first ORAL ATP™ and review a sheet with images of 15 plaque-control products. We tailor the control program to each client and each dog. For example, we might have an owner who is willing to do anything, but the pet might bite the owner when they try to wipe the pet's teeth. Or the pet would behave well for a homecare routine, but the owner might be too busy to do anything. Just telling the owner to brush the pet's teeth or give it a Greenies® dental chew or treat doesn't work. We tailor the preventive care program to the patient, which has worked out very nicely for our patients and their owners. The best part about being a veterinary dentist is having the clients come back two weeks after a much-needed ORAL ATP™ to tell me that we gave them a new dog or a new cat. “His breath is wonderful and he must have been in pain because he feels so much better now.”

Hurley: The relationship between increasing age and the development of oral disease can be managed with appropriate and regular oral care (assessment, treatment, and prevention). Twice yearly oral examinations, dental cleanings, and encouraging clients to practice preventive dentistry at home are excellent ways of warding off oral disease in pets as they move into their older years.

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