The keys to treating and controlling periodontal disease in companion animals and humans are the same: removal and prevention of accumulated plaque. Bacterial plaque and its inflammatory byproducts are the instigating agents of periodontal disease in the form of gingivitis; however, the body’s individual response determines the progression of disease. (For a brief overview of the stages, clinical signs, and welfare aspects of periodontal disease, please see “Current Concepts in Periodontal Disease” in the January/February 2020 issue of Today’s Veterinary Practice.)

Depending on the degree of attachment loss (i.e., periodontal pockets and gingival recession) and client wishes and ability, plaque removal is accomplished through a combination of the following measures:

1. Routine professional dental cleaning
2. Periodontal flap surgery
3. Tooth extraction
4. Home plaque control

Dental Cleaning
Dental cleaning is a medical procedure that must be performed meticulously to provide a measurable benefit for the patient. General anesthesia is an essential aspect of professional cleaning, for both health and welfare reasons (BOX 1). Protocols (and terms) for dental cleaning vary, but the authors recommend the following steps:

1. A thorough preanesthesia examination and workup. This helps ensure safer anesthesia and creation of a reasonable estimate of time and cost.
2. Proper anesthesia and monitoring. Dental procedures are typically lengthy and are often performed on older patients. The level of monitoring must be excellent to avoid mishaps.
3. Chlorhexidine lavage. This decreases bacterial load not only for the patient but also for the practitioner, staff, and environment.
4. Supragingival scaling. This is generally accomplished with an ultrasonic scaler.
5. Subgingival scaling. This is by far the most

PROFESSIONAL CARE
The foundation of all periodontal care is a thorough professional dental cleaning. If careful oral examination finds no pathologic periodontal pockets (i.e., >3 mm in dogs, >1 mm in cats), minimal to no gingival recession, mild to no radiographic evidence of bone loss, and no mobile teeth, only a professional dental cleaning and home dental care are required. Unfortunately, most veterinary patients do not receive care until significant periodontal disease is present, and more extensive procedures are usually necessary.
important step. Unless the subgingival plaque is completely removed, minimal to no medical benefit has been achieved. This step can be performed with an ultrasonic scaler if a subgingival tip is used (FIGURE 1). However, if there is any attachment loss, hand scaling with a curette is recommended (see CLOSED ROOT PLANING).

6. Polishing. This smooths the tooth to retard future plaque attachment.

7. Sulcal lavage with chlorhexidine, saline, or lactated Ringer’s solution. This has been shown to decrease bacterial counts as well as remove debris (e.g., calculus, prophy paste).

8. Oral examination and charting. Periodontal probing (FIGURE 2) and exploring (FIGURE 3) should be performed on all surfaces of all teeth and marked on a high-quality dental chart (a copy of this chart is available for download at dogbeachvet.com). Probing and exploring are

**BOX 1 The Case Against Nonanesthesia Dentistry**

General anesthesia is required for all professional periodontal treatment. While heavy sedation or nonanesthetic options may seem enticing, only when the patient is anesthetized can a complete (and safe) cleaning and oral evaluation be performed. Nonanesthesia dentistry (NAD) provides little to no medical benefit, as cleaning the supragingival surfaces of the teeth (especially if only the visible, buccal side) without subgingival cleaning and radiographic examination is cosmetic at best (FIGURE A) and potentially deleterious to patient welfare and health at worst (FIGURE B). A recent peer-reviewed study showed that patients that received nonanesthesia procedures had more progressive periodontal disease than a control group that received no professional care. Another study found that pets that received more professional dental cleanings under general anesthesia lived longer than those that received no cleanings. At this time, peer-reviewed published research to support or show positive benefits from NAD is severely lacking, despite the growing popularity of this service and the economic gains made by individuals and companies providing it.

Studies have proven that conscious (awake) oral examinations woefully underestimate the frequency and severity of periodontal disease in dogs and cats. Based on these studies, as well as the experiences of veterinarians and veterinary dentists worldwide, numerous veterinary associations, including the American Veterinary Dental College, have position statements against NAD. The World Small Animal Veterinary Association Dental Guidelines Committee considers NAD to be an animal welfare concern. It is against the standard of care of several governing bodies and is illegal in several states when performed outside of a veterinary practice. For a list of governing bodies with a stance against this practice, visit wsava.org/global-guidelines/global-dental-guidelines.
crucial. A simple visual examination will miss significant pathology (FIGURE 2).

9. **Dental radiography.** Radiographs are mandatory for proper diagnosis and treatment. Full mouth dental radiographs are always recommended to allow complete assessment of all teeth,17,18 at a minimum, all pathology, no matter how minor, must be radiographed.

10. **Treatment planning and any additional therapy.** Based on the visual, tactile, and radiographic findings, a treatment plan can be devised and the client contacted for consent. If it is determined that the procedure will be lengthy (i.e., >3 hours), staging the procedure is acceptable.

The handling required for thorough periodontal probing, scaling, and polishing all aspects of the teeth is intense and can cause significant patient pain and anxiety. To avoid compromising patient welfare, gentle, respectful patient handling techniques should be employed from start to finish (BOX 2), and analgesia should be used as needed. Minimizing fear and stress not only improves the patient’s experience and memory of the event, but also has been shown to decrease the amount of anesthetic needed and improve the postoperative rate of healing.26-28

Postoperative analgesia is also an important part of pain management. Reduction of pain and inflammation is harder when analgesia is not used before the inciting incident. Animals experiencing acute, unaddressed postoperative pain have extended healing times and higher physiologic stress levels than animals in which pain is adequately addressed.29

![FIGURE 1. Ultrasonic scaler tips. Supragingival tips (A and B) are shorter and thicker than subgingival tips (C and D). The subgingival tips are designed to be used on lower power settings because they are used on cementum-covered roots as opposed to more robust enamel-covered crowns. Their design also allows coolant to reach the end of the instrument, thereby avoiding overheating of the teeth and associated soft tissue.](image1)

![FIGURE 2. Periodontal probing is required for complete periodontal diagnosis. (A) The outward appearance of this left mandibular first molar (309) is mild inflammation and gingival recession. (B) Probing revealed a 12-mm pocket. This tooth was significantly infected and required extraction. Without probing, this diagnosis would have been missed and the patient left in pain.](image2)

![FIGURE 3. Exploring along the gingival margin reveals a resorptive lesion in a cat.](image3)
**Periodontal Surgery**

In teeth without mobility or furcation exposure class 2 or greater (**BOX 3**), periodontal pockets measuring 3 to 6 mm in dogs and 1 to 4 mm in cats can be effectively cleaned with closed root planing. All teeth with deeper pockets (**FIGURE 4**), furcation class 2 or 3 (**FIGURE 5**), or bone loss of >50% (**FIGURE 6**), or that are pathologically mobile require further therapy. It has been shown that it is impossible to effectively clean affected roots without direct visualization. Treatment options for these significantly diseased teeth include periodontal flap surgery and extraction. The patient can be referred for surgery, but these procedures can also be learned by general practitioners.

**BOX 2 Tips for Addressing Patient Fear, Stress, and Anxiety in the Clinic**

Multimodal approaches that allow for the sensitivity of individual patients are best and may include:

- Thoughtful patient placement within the hospital, such as placing cats high in the waiting area and in kennels or in cat-only areas away from barking or other loud noises; providing hiding areas or a patient’s own carrier for use inside the kennel; and playing species-specific music in kennel areas.
- Allowing patients to wait with their owner outside the clinic when appropriate.
- Use of species-appropriate pheromones at admission (on towels placed over carriers, in kennel areas, or on bandanas).
- Administering anxiety-relieving medications as soon as possible.
- Use of carefully selected “treats” (e.g., frozen broth popsicles) during surgical preparation procedures such as IV catheter placement (recent studies have shown that consumption of small amounts of easily digested, liquid-based nutrition does not change regurgitation or anesthetic risk).
- Use of treats during nonsurgical oral examinations (**FIGURE A**).
- Anticipating when the patient may experience pain during each step of the professional cleaning and seeking to alleviate conscious perception of this pain though the use of multimodal pain relief (e.g., topical anesthetic applied to IV sites, dental blocks for all extraction sites).

**BOX 3 Furcation Exposure Classes**

The furcation is the area between the roots in a multirooted tooth. In veterinary patients, the furcation is very coronal, meaning minimal attachment loss will result in exposure. There are 3 classes of furcation exposure:

- **F1**: The probe passes up to one-third of the way through the furcation.
- **F2**: The probe passes more than one-third of the way through the furcation, but not all the way through.
- **F3**: The probe passes completely through the furcation.

**FIGURE A.** A feline patient enjoying whipped cream as a distraction and reward during an awake oral examination.

**FIGURE 4.** A 10-mm pocket on the palatal surface of the right maxillary canine (104). This tooth requires periodontal flap surgery (ideally with guided tissue regeneration) or extraction.
If periodontal surgery is elected, the owner must be aware that diligent postoperative homecare and regular rechecks are necessary.

Closed Root Planing

Closed root planing is a challenging technique and must be performed meticulously to effectively clean the teeth and allow reattachment of the gingival tissues. Ideally, it is accomplished using a combination of ultrasonic scaling with a subgingival tip (FIGURE 1) and hand scaling with a curette. The roots must be planed until they are clean and smooth. It is strongly recommended that the operator take a hands-on class to sharpen their skills in this critical technique.

After scaling, the authors recommend applying a perioceutic to improve ginigival attachment. While a recent veterinary study refutes the effectiveness of these products, numerous other studies show that they decrease bacterial counts and improve attachment gains.

Periodontal Flap Surgery

If the client wants to salvage a significantly diseased tooth, periodontal flap surgery can be performed. The flap allows visualization and cleaning of the infected areas to remove the infection and allow increased soft tissue attachment. Guided tissue regeneration can be considered in areas where bone may be regrown, such as the palatal surface of the maxillary canine and furcation exposure class 2 (especially for carnassial teeth), but sites should be carefully evaluated for appropriateness.

Extraction

Extraction is typically the best therapy for nonstrategic, severely diseased teeth. While clients may find it extreme, it is the true cure for periodontal disease.
With all other therapies, the infection will quickly recur, unless the client commits to regular homecare and professional cleanings.

HOMECARE
Homecare is a crucial aspect of lifelong periodontal care. Plaque attaches to clean tooth surfaces within 24 hours of a dental cleaning, and in the absence of any other preventive dental care, bacterial counts return to pretreatment levels in just 1 week. Therefore, without homecare, gingival infection and inflammation quickly recur.

Active homecare is most effective for the incisor and canine teeth, while passive homecare works best on carnassial (and surrounding) teeth. A combination of active and passive homecare is therefore ideal.

Active Homecare

Products
Active homecare has long been deemed the “gold standard” of home dental care. It consistently decreases periodontal bacterial levels in dogs. The good news for clients is that the only required piece of equipment is a toothbrush. Numerous veterinary brushes are available, and even human soft-bristled (typically child’s) brushes can be used. There are also many varieties of veterinary toothpaste. While mechanical removal of plaque by the movement of the brush is the mainstay of plaque control, a recent study has shown that the paste also has beneficial effects.

Available antimicrobial preparations improve plaque and gingivitis control compared with standard pastes when used during brushing (or on their own). Chlorhexidine has been shown in several studies to decrease gingivitis if applied consistently over time. Another effective oral antiseptic option is soluble zinc salts. A veterinary-labeled oral zinc ascorbate gel has been shown to decrease plaque and gingivitis. The fact that it is tasteless may increase its acceptance by the patient (especially cats).

Performance
While toothbrushing is the simplest, least expensive, most effective way to decrease gingivitis and progression of periodontal disease, it is also the least likely to be performed by clients. Daily homecare is always recommended, as this frequency is necessary to stay ahead of plaque formation. Three days a week has been shown to be the minimum frequency for patients without active disease. Brushing once a week is insufficient for plaque control, but it is better than nothing.

Best practices to help clients be most successful with toothbrushing revolve around client education, early intervention, and positive training and low-stress handling techniques. The younger the pet is, the more approachable it will be to this type of handling, so clients should be educated from day 1 on the importance of dental homecare and taught how to do it in a gentle and approachable manner, with lots of positive reinforcement training for the pet, as early in the pet’s life as possible. For example, at a first healthy puppy visit, showing clients how to gently introduce the pet to facial handling, oral manipulation and examination, and early toothbrushing habits (perhaps with just some toothpaste on a finger) without biting or resistance will help make a lifetime of oral homecare possible.

Passive Homecare
Passive homecare for periodontal disease is achieved with special diets, chews, and treats. Since it requires no effort by the client other than selecting the product, it is more likely to be regularly used. Compliance is especially important, since long-term consistency is a crucial aspect of home dental care. Sadly, daily toothbrushing with highly motivated pet owners is only around 50% after 6 months, and one study suggested that passive homecare is superior to active homecare simply because it is performed. However, it should not be inferred that passive care is actually more effective. The truth is that the average client is typically noncompliant with toothbrushing.

Some passive homecare methods are effective, but many are not. Practitioners should perform their own research using peer-reviewed published studies and the Veterinary Oral Health Council (VOHC*) website (vohc.com) to form proper client recommendations rather than relying on marketing statements.

Diets for Dental Care
Traditional dry dog foods have been thought to be helpful in controlling gum disease, and one study supports these claims. However, another study found
that dry food does not perform better than moist food in regards to oral health. Therefore, a specific dental diet that has been proven to decrease tartar and plaque accumulation should be selected.

Several diets have received the VOHC seal as effective against both plaque and calculus reduction. A smaller number of diets have received VOHC approval for calculus reduction only. Although these products may decrease plaque and calculus, they are typically only effective on the cusp tips and do not clean along the gingival margin. Of all the available diets, only one has been proven to decrease gingivitis.

**Plaque and/or Calculus Control Treats**

Several edible treats are available for passive homecare; however, their effectiveness varies, and practitioners are again encouraged to consult the VOHC website in their search for effective products. The most common are the rask-type chews (products composed of compressed wheat, cellulose, or rawhide). A few products have been shown to decrease gingivitis.

In addition, a few products have received VOHC approval for plaque and/or calculus control. A product containing the brown algae *Ascorphysium nodosum* has been shown to improve oral health status. Plain baked biscuit treats and chew toys (e.g., rope toys) are not effective in the prevention of periodontitis.

Many “dental treats” or chew toys are very hard, which can result in tooth fracture. As a rule of thumb, clients can be advised that if they cannot make an indentation in the product with their fingernail, it is too hard.

**CONCLUSION**

Lifelong periodontal care benefits the patient, the client, and the practice. Performing regular (and early) professional dental cleanings, training staff in the proper performance of periodontal care, and establishing the value of homecare early in a pet’s life through client education allow the maximal benefit of this lifelong effort to be achieved. Also, as proper cleaning can only be performed within the clinic, periodontal therapy makes the dental department a critical area of medical care, as well as a significant financial center. Avoiding periodontal disease must be the goal, for once it is established, damage is typically irreversible and more invasive care, including surgery and, eventually, tooth extraction, will be necessary.

**References**

HEARTGARD Plus is recommended for dogs 6 weeks of age and older. For dogs over 10 lb use the appropriate combination of these chewables. HEARTGARD Plus is not effective for microfilariae clearance. A mild hypersensitivity-type reaction, presumably due to dead or dying microfilariae and particularly involving a transient diarrhea, has been observed in clinical trials with HEARTGARD Plus alone after treatment of some dogs that have circulating microfilariae. Administration: Remove only one chewable at a time from the foil-backed blister card. Return the card with the remaining chewables to its box to protect the product from light. Because most dogs find HEARTGARD Plus palatable, the product can be offered to the dog by hand. Alternatively, it may be added to a small amount of dog food. The chewable should be administered in a manner that encourages the dog to chew, rather than to swallow without chewing. Chewables may be broken into pieces and fed to dogs that normally swallow treats whole. Care should be taken that the dog consumes the complete dose, and treated animals should be observed for a few minutes after administration to ensure that part of the dose is not lost or rejected. If it is suspected that any of the dose has been lost, redosing is recommended.

HEARTGARD Plus should be given at monthly intervals during the period of the year when mosquitoes (ectoparasites), potentially carrying infective heartworm larvae, are active. The initial dose must be given within a month (30 days) after the dog’s first exposure to mosquitoes. The final dose must be given within a month (30 days) after the dog’s last exposure to mosquitoes. When replacing another heartworm preventive product in a heartworm disease preventive program, the first dose of HEARTGARD Plus must be given within a month (30 days) of the last dose of the former medication. If the interval between doses exceeds a month (30 days), the efficacy of ivermectin can be reduced. Therefore, for optimal performance, the chewable must be given once a month on or about the same day of the month. If treatment is delayed, whether by a few days or many, immediate treatment with HEARTGARD Plus and resumption of the recommended dosing regimen will minimize the opportunity for the development of adult heartworms. Monthly treatment with HEARTGARD Plus also provides effective treatment and control of ascariids (F. caninum, T. leonina) and hookworms (A. caninum, U. stenocephala, A. braziliense). Clients should be advised of measures to be taken to prevent reinfestation with intestinal parasites.

EFFICACY: HEARTGARD Plus Chewables, given orally using the recommended dose and regimen, are effective against the tissue larval stage of D. immitis for a month (30 days) after infection and, as a result, prevent the development of the adult stage. HEARTGARD Plus Chewables are also effective against canine ascarids (F. caninum, T. leonina) and hookworms (A. caninum, U. stenocephala, A. braziliense). ACCEPTABILITY: In acceptability and field trials, HEARTGARD Plus was shown to be an acceptable oral dosage form that was consumed at first offering by the majority of dogs. PRECAUTIONS: All dogs should be tested for existing heartworm infection before starting treatment with HEARTGARD Plus which is not effective against adult D. immitis. Infected dogs must be treated to remove adult heartworms and microfilariae before initiating a program with HEARTGARD Plus. While some microfilariae may be killed by the ivermectin in HEARTGARD Plus at the recommended dose level, HEARTGARD Plus is not effective for microfilariae clearance. A mild hypersensitivity-type reaction, presumably due to dead or dying microfilariae and particularly involving a transient diarrhea, has been observed in clinical trials with microfilariae alone after treatment of some dogs that have circulating microfilariae. Keep this and all drugs out of the reach of children. In case of ingestion by humans, clients should be advised to contact a physician immediately. Physicians may contact a Keep this and all drugs out of the reach of children.