Introduction to Periodontal Therapy

Paul Q. Mitchell, DVM, DAVDC

Introduction

The extent of periodontal disease you might encounter in patients can vary from patient to patient and even from tooth to tooth in the same patient. From minimal inflammation and no attachment loss in Stage 1 Periodontal Disease to the beginnings of attachment loss (up to 25%) in Stage 2, then deeper pockets (up to 50% attachment loss in Stage 3) and even compromised teeth (greater than 50% loss) in Stage 4, you must be able to tailor the treatment to the problem. Simple steps of a “prophylaxis” must sometimes be supplemented with additional periodontal management.

Stages of Periodontal disease

Stage I Periodontal disease refers to those cases with inflammation primarily in the gingiva itself, with no actual loss of attachment in the sulcus - soft or osseous. At times the pocket depth will be greater than normal, but this is due to an increased height of the gingival margin due to inflammation and edema. Once the area is thoroughly cleaned, the inflammation should resolve, returning pocket depth to normal values. As such, this is the one stage of periodontal disease that is considered reversible. Therapy consists of professional cleaning as needed, with regular home care to minimize further damage. The term “prophylaxis” to describe dental cleaning is probably accurate only at this stage, since it is true prevention; once periodontal attachment loss is realized, prevention is no longer possible, so “periodontal therapy” is a more accurate term.

Stage II Periodontal disease, or early periodontitis, is the first stage with measurable amounts of attachment loss. Amounts of loss up to 25% in this stage necessitates a thorough cleaning and evaluation, in order to adequately treat the areas and arrest any further loss. More frequent cleanings and more advanced periodontal therapy (root planing, perioceutics) can minimize any further damage, and home care to keep plaque and calculus from extensive accumulation can be vital in preserving the teeth.

Stage III Periodontal disease includes cases with up to 50% attachment loss, as determined by periodontal probing and radiographs. Some teeth in this category will start to become mobile, and if continued care cannot be given, occasionally extractions may be necessary. This can be appropriate with particular teeth (non-strategic) such as lower corner incisors or fourth premolars or upper third premolars that are adjacent to larger, more strategic teeth. If the smaller teeth continue to contribute to bone loss that could also affect their neighbors, sometimes sacrificing them to be able to maintain the larger teeth’s health. More extensive periodontal therapy, including perioceutic therapy
and even regenerative therapy may be selected to improve the prognosis on important teeth such as the canines or carnassial teeth.

Stage IV Periodontitis involves teeth that have greater than 50% attachment loss, and as such may be candidates for extraction. With such extensive loss, particularly if osseous, heroic attempts at salvaging will require more advanced periodontal therapy and owners committed to regular care, both professional and at home. Without such care, retention of such teeth will often result in the persistent presence of plaque, calculus and bacteria in the deeper pockets, putting the patient’s overall health at risk. While saving teeth is a noble cause, if extraction will improve the general health, it is sometimes the best choice.

**Equipment**

The periodontal probe/explorer has already been mentioned - it is one of the most vital tools in dealing with periodontal disease. The probe is marked in millimeters, so the depths of pockets can be accurately measured. Especially with inflamed pockets, it is important to use the probe gently, as force can push the probe tip through the fragile junctional epithelium at the bottom of a pocket. Measuring pocket depth at six points around the tooth will give a fairly accurate picture of the extent of the pocket. The explorer tip of the instrument is a thin, sharp-tipped hook that can be used as a tactile instrument in pockets (gently) to detect remaining calculus or debris. The tip can also be used to determine if the pulp canal is exposed in broken teeth, if a carious lesion is present (soft enamel), or if a resorptive lesion is present on the tooth surface.

Another vital diagnostic tool in periodontics is intraoral radiography. The ability to get detailed images without superimposition of other structures is important in order to get a clear picture of the osseous support around the teeth. Intraoral films can be used with standard radiographic units, while dental radiographic units provide significant convenience.

The ability to remove the deposits of plaque, calculus and debris is extremely important in periodontal disease. Most practices have some form of dental scaler, often an ultrasonic type. There are many units available, and you should be familiar with your particular unit. Most units can generate some heat, and so should be used with adequate water flow. Some newer units have tips with water flow that can be introduced under the gumline in shallow pockets, but for the most part this should be avoided with other models, as damage can be caused to the root surface. Sonic units (on a high-speed handpiece, air-driven unit) don’t generate as much heat, but require adequate air pressure for maximum effectiveness. Rotary burs on a highspeed handpiece can be quite damaging, especially to feline teeth, and should only be used by experienced operators, if then.

For most areas of subgingival scaling, periodontal curettes are the instrument of choice. They differ from hand periodontal scalers in that the curettes have a rounded back and toe as compared to the scalers’ sharp tip and back (triangular in cross-section). While pocket formation is not as common in cats as in dogs, it is important to clean these areas. You should choose a curette with a small, delicate working head that can be inserted gently into the pocket without causing more damage or stretching of the gingiva. The curette is introduced gently into the depth of the pocket and pulled against
the tooth with its cutting edge (regular sharpening is essential) to scrape biofilm off the tooth and root surfaces. Overlapping strokes help clean the root surface thoroughly (root planing), avoiding excessive force. Curettes can be used in closed root planing (pockets up to 5 mm – a pretty deep pocket for most cat teeth), or flaps can be elevated to open deeper pockets for adequate exposure and treatment.

Polishing should always follow a scaling procedure, to smooth the roughened tooth/root surface, but damage can be caused if it is done improperly. The rotational speed of the prophy cup should not exceed 3000 RPM (watch the speed on variable slowspeed units), and the foot of the cup should be gently splayed, with adequate amounts of prophy paste used.

**Therapy goals**

When looking at periodontal disease, therapy is determined by a number of factors, such as the stage of the disease, and the desired outcome. There are several goals to set, including removal of all debris or biofilm (plaque, calculus), keeping the maximum amount of attached gingiva, minimizing attachment loss and minimizing the pocket depth. Certainly, all foreign material, from bacteria to desquamated cells must be removed from the tooth surfaces and pockets in order to attain healing. Since the attached gingiva is the first line of defense against bacteria, a minimum of 2-3 mm is necessary to protect underlying tissues, as the looser alveolar mucosa doesn't afford that protection. The inability to halt attachment loss will eventually lead to tooth loss. Minimizing pocket depth is related to attachment loss, but is a more specific parameter, because pocket depth in itself directly affects the ability for effective home care and maintenance, and deeper pockets can harbor more virulent strains of bacteria. There are even times where excessive gingiva will be removed to decrease pocket depth (hyperplastic gingiva) or the gingiva will be sutured further down the root (apically repositioned flap) for the same effect. Attachment loss without pocket formation occurs when gingival tissue and bone is lost at the same time, exposing the roots and even furcation areas.

The ability to take intraoral radiographs is essential, in order to determine the extent and characteristics of bone loss. With recession of gingiva and bone across several roots and/or teeth, a horizontal bone loss pattern will often result in exposed roots. With a deeper osseous loss down one root surface, an infrabony pocket may result from the vertical bone loss, and specific therapy may be needed to address that specific defect. These deeper pockets are more difficult to treat and maintain, and anaerobic infections may persist.
Periodontal Weapons

Periodontal therapy initially concerns itself with removing all plaque, calculus and debris possible. This is of particular importance if there is any attachment loss or pocket formation, because the surfaces must be thoroughly cleaned to help remove the destructive action of the bacteria and moderate the host response as well. Advanced procedures must be undertaken with commitment on the part of the owner as well, because regular home care and frequent follow-up visits will be important.

Supportive Care

Additional care beyond the periodontal work is often necessary to maximize the outcome. Assistance with various antimicrobial agents can help the patient fight off the bacterial onslaught, by using everything from oral rinses and gels to medically appropriate prescriptions of systemic oral antibiotics. Even pain management must be considered, because the conditions alone can be painful, and any surgical procedures must be covered as well.

Root planing/ subgingival curettage

This is by far the most important aspect of periodontal therapy. If the debris is not thoroughly removed from the pocket depths, the disease will remain and intensify. The rounded tip of the curette, and its rounded back, makes it ideal for subgingival therapy, as opposed to the sharp tip and back of a hand scaler. Certain ultrasonic scalers are modified for subgingival treatments, but most are not. If root surfaces are exposed, or if the pocket depth is less than five mm, closed root planing and subgingival curettage may be performed. Using a curette subgingivally with overlapping strokes in horizontal, vertical and oblique directions, root planing removes calculus, debris and necrotic cementum to provide a clean, smooth surface. The curette can also be angled slightly to engage the gingival surface for removal of diseased or microorganism-infiltrated tissues. When pocket depth exceeds 5 mm, or other pathology exists, more invasive procedures are warranted.

Perioceutic therapy

In moderate pockets of up to 5 mm in depth (and generally deeper than 2 mm), once the area is debrided, placement of a local perioceutic gel containing doxycycline [Doxirobe™ gel (doxycycline hyclate)] can not only provide a direct antibacterial affect against any remaining bacteria, but the anticollagenase activity can help “rejuvenate” the soft tissue of the pocket. Doxirobe™ Gel is not for use in dogs under one year of age, because the use of tetracycline during tooth development has been associated with permanent discoloring of teeth. Do not use in pregnant bitches, as the use of the product in breeding dogs has not been evaluated. The combination of the cleaning and therapy can often help reduce the pocket depth in moderate situations.

The two-syringe system is easily used, but requires some practice. When initially mixing the compounds, make sure the syringes are secure before mixing (100 passes). Once mixed, the material should be placed in syringe A (place on end to get the most gel into syringe A before detaching), and a blunt tipped cannula placed. The tip of the cannula
is gently placed to the depth of the treated pocket, and the material is slowly inserted into
the pocket, until a small amount extrudes from underneath the gingival edge. By using light
digital pressure on top of the gum, and by gently scraping the cannula tip on the tooth
surface, the cannula can be removed without taking the gel with it.

The gel firms up on its own within a minute or two, or a drop of water can be placed
on the material to speed up the process. Once firm, the visible material should be gently
packed into the pocket, using an instrument such as a W-3, or beaver tail instrument. The
owner should be instructed not to brush for about a week in the region (gels and solutions
are recommended), nor to pick at the ridge of material that may become visible (light
yellow-brown). The material is biodegradable and does not need removal.

Open Root Planing – Gingival flap

When pocket depths exceed 4 mm but with minimal bone loss or diseased soft
tissue that needs removal, a simple flap allows access and improved visibility for open
curettage and root planing. Insert the scalpel blade into the sulcus and following the
scalloped contour severs the epithelial attachment. For large areas requiring treatment,
vertical-releasing incisions can be made at the mesial and distal ends of the initial incision
(at line angles of adjacent teeth). Using periosteal elevator, the gingiva is reflected to
expose the root surfaces. A polishing of the root surfaces and irrigation with dilute
chlorhexidine follows thorough root planing and subgingival curettage. After repositioning
the flap, sometimes further apically down the roots, it is sutured interdentally with
absorbable, interrupted sutures. While this procedure is most commonly performed on
facial and lingual surfaces, deep pockets on the palatal aspect of the maxillary cuspids
teeth can be exposed using a similar technique for treatment.

Periodontal surgery - Refining your skills

While most practitioners provide dental services to their patients, too seldom is
the gingiva actually cut to provide sufficient exposure for adequate treatment. Opening
gingival flaps takes little additional skill, just the ability to know where to make the flap
and proper tissue handling technique. In pockets less than 5mm, a periodontal curette,
with its round toe and rounded back, is very useful for closed root planing and
subgingival curettage where no flap is needed. Basically, anytime a periodontal pocket
is deeper than 5 mm, the area must be exposed for adequate cleaning. With the
periosteal elevator, an envelope flap can be made by lifting the gingiva directly over the
defect, and extending it 1-2 teeth on either side to provide enough exposure. This can
stretch the tissue out significantly if the pocket is deep, or the area is too wide.
Therefore, a the flap can be created by making diverging incisions mesially and distally
to the defect, through the attached gingiva past the mucogingival line into the alveolar
mucosa. The periosteal elevator is then used to lift the flap off the alveolar bone,
providing access to the site. Sufficient elevation should be done for adequate exposure,
but don’t expose any more bone than is necessary.

Once the site is laid open, every effort must be made to clean out all debris and
granulation tissue from the pocket, particularly in pockets that extend down the root of
the tooth, in between the tooth and alveolar bone (infrabony pocket - vertical bone loss). Once cleaned, material such as Consil™ (Nutramax Labs, Baltimore, MD) can be used to help promote osseous healing and discourage soft tissue growth into the area. This form of therapy, guided tissue regeneration, can be of particular importance with deep pockets at the palatal aspect of maxillary canines, and with deep infrabony pockets involving the lower first molar that can compromise mandibular strength. While the lower first molar defects can often be exposed using standard releasing incision flaps, the deep palatal pockets provide additional challenges. It is essential in this area to design a flap and plan sutures that will bring the gingival margins snugly against the tooth, to protect the materials in the pocket. Mesial and distal releasing incisions can be made extending out from the canine towards the adjacent teeth, on the gingival papillae. Exposure with this method can be somewhat limited, like an envelope flap, and closure involves using a sling suture technique, running the suture in a semi-circle pattern within the palatal mucosa from a mesial to distal direction, exiting distal to the canine and re-entering near the same site, reversing the semi-circle pattern to exit mesial to the tooth, and tying off the two ends, tightening the flap against the tooth. Incisions made directly into the palatal mucosa not only can cut the palatine artery, but make a flap that is more difficult to hold against the canine.

One alternate method is making a crescent-shaped flap in the palatal mucosa, extending from a point just mesial to the canine in the incisor-canine interdental space, and running medial to the canine to a point just distal to it. When the flap is elevated, there will be hemorrhage from the rostral severing of the palatine artery, but it can be tied off at that extent and preserved within the flap itself. Once elevated, good exposure allows for thorough cleaning of the infrabony pocket, though care must be taken to avoid puncturing the remaining alveolar bone separating the pocket from the nasal cavity (oronasal fistulation), else the tooth would have to be extracted. Once the pocket is cleaned and filled, simple interrupted sutures can hold the crescent flap in place. If some gaps appear, a small amount of the mesial extent of the flap can be trimmed, to bring the gingival margin closer to the tooth. Sutures can be placed to join the cut edge of the flap back to the palatal mucosa, as long as no tension is placed on the flap that would cause it to pull away from the tooth. A small gap between the cut edge of the flap and the remaining palatal mucosa will typically heal without complication.

In some areas there will be horizontal bone loss and suprabony pockets (bone loss occurs at same level of attachment loss but no defect in between the tooth and alveolar pocket). Once the area is exposed, all root surfaces areas should be thoroughly cleaned using curettes. In some cases, if the bone loss includes interdental spaces, the flap can be sutured in place so the gingival margin is actually placed further down the root than originally positioned (apically repositioned flap). This can help minimize the pocket depth, though the actual level of attachment is still the same, just more root structure is left exposed. These sites are not amenable to osseopromotive products.
References
