Performing a complete dental prophylaxis entails much more than removing plaque and calculus from the teeth. A thorough dental prophylaxis consists of educating the client, an oral examination, charting disease process, pathology and anomalies, radiographs, both supra and sub-gingival plaque and calculus removal, hand scaling, polishing, irrigation and home care instructions.

**Education**

There are many ways in which to educate the client on the importance of dental health. It is important to explain the disease progression from the formation of dental plaque to dental calculus or tartar and then gingivitis and to the destruction of the periodontal tissues including the loss of the bone supporting the tooth and tooth loss.

A picture is worth a thousand words. Visual aids such as posters in the treatment rooms showing the progression of oral disease and the impact on the internal organs can be used to gain the client’s interest. Pictures of healthy mouths versus diseased mouths are another useful tool. The use of plastic models that have a healthy side and a diseased side is a hands-on way to show disease. These are all helpful in the educational element of dental prophylaxis.

Using a diagnostic test strip to detect the presence of pathogenic bacteria in the mouth is a great way to demonstrate the need for a professional dental cleaning to the owner. This 10 second strip takes the need for a dental cleaning from your opinion to a positive test that infection is present.

**Preventive Antibiotic Therapy**

Questions are often asked about the use of preventive antibiotic therapy in patients who present for a dental prophylaxis. The main objective of preventive antibiotic therapy is to prevent treatment induced bacteremia. Bacteremia will typically clear in approximately 20 minutes. The use of preventive antibiotics should only be necessary in patients that are not able to cope with this treatment induced bacteremia. Geriatric or debilitated animals, patients with a pre-existing heart or system disease or immunocompromised patients should receive preventive antibiotic therapy.

Preventive antibiotic therapy will also aid in controlling wound infections. Therefore animals with gross infections (marked swelling, pus formation, fever, lymphadenopathy, and elevated WBC count) chronic stomatitis, multiple extractions, may also benefit from receiving antibiotics prior to treatment. Clinical judgment should be used in diagnosis of the infection and the use of antibiotic therapy.

The choice of antibiotic and protocol for delivery is controversial. The antibiotic chosen must be active against Gram-positive and Gram-negative aerobes and anaerobes. Just as important as the choice of antibiotic is the timing of delivery. The generally accepted protocol should have antibiotics administered within two hours of the surgery and not continued for more than four hours after the procedure. In addition, antibiotics must be delivered at a dose
high enough to reach a tissue level of four times higher than the MIC of the causative organisms.

In addition to preventive antibiotic therapy, antiseptics have a role in veterinary dental prophylaxis and oral surgery. Antiseptics help to reduce the number of bacteria in the oral cavity prior and during procedures. Chlorhexidine gluconate is the antiseptic of choice for use in animals. Rinsing the oral cavity with an antiseptic prior to procedures gives a cleaner environment to work in and can reduce bacteremia induced by dental procedures. It will also reduce the number of bacteria that are aerosolized by dental equipment such as ultrasonic scalers. This will benefit the persons involved in the procedure. Bacteria may still be present in the operatory for up to 12 hours post treatment. Remember to always wear eye protection, masks and gloves.

**Oral Examination**

An oral examination on a conscious patient is important but often limited to a visual inspection and digital palpation. The examination involves more than just the oral cavity. Palpation of the facial bones and zygomatic arch, temporomandibular joint, salivary glands and lymph nodes are also important. Dental occlusion should also be evaluated. This can be done by gently retracting the lips to look at the soft tissue, the bite and the buccal aspects of the teeth.

Once the animal is anesthetized, a thorough oral examination can be completed. All the structures of the oral cavity must be evaluated to include the oropharynx, lips and cheeks, mucous membranes, hard palate, floor of the mouth and tongue as well as the teeth. The periodontium (gingival, periodontal ligament, cementum and alveolar bone) of each tooth needs to be evaluated. In animals with large amounts of calculus on the teeth, it may be necessary to remove these deposits to accurately access the periodontium. The use of a calculus removal forceps is a recommended method to remove supragingival calculus. Use care when using this instrument to ensure that the gingivia and tooth crown are not damaged.

When evaluating the periodontium a periodontal probe, a dental explorer and a dental mirror are used. The following indices should be evaluated for each tooth; gingivitis, periodontal probe depth, gingival recession, furcation involvement, mobility and periodontal attachment levels. Details of these indexes will be covered in other presentations.

**Charting and Recording**

The information gathered during the oral examination and subsequent treatment needs to be recorded. Because periodontal disease is a progressive disease, charting is an important aid for follow-up visits. A basic dental record consists of written notes, diagnostics, radiographs and a dental chart. There are numerous types of dental charts available. A dental chart will have a diagram of the oral cavity on which notations can be made, along with either fill in or check off formats to provide convenient recording. Color coding the different indices will make reading the chart easier. A simplified version of the chart can be made and given to the client indicating problem areas, treatment and home care instructions.

Charting should be done in the initial stages of the dental prophylaxis procedure. A final charting completed as a last step in the procedure involves a review of the previously performed diagnostic and periodontal charting. This final charting should include any additional treatment performed.

It is important to be able to identify oral pathology and anomalies. It is equally important to correctly record the pathology on dental charts. A thorough dental examination includes both conscious and
anesthetized examinations as well as charting disease processes, pathology and anomalies, and treatment plans.

When evaluating the periodontium a periodontal probe, a dental explorer and a dental mirror are used. The following indices should be evaluated for each tooth; gingivitis, periodontal probe depth, gingival recession, furcation involvement, mobility and periodontal attachment levels.

The amount of plaque observed on the teeth prior to cleaning should be recorded. Because plaque is the soft, gelatinous matrix of bacteria and bacterial by-products that lead to gingival irritation and gingivitis it may be necessary to use a disclosing agent to visualize.

Calculus (tartar) is calcified plaque. The amount of calculus should be recorded as light, moderate or heavy. Calculus can only be removed by either hand scaling or power scalers.

**Gingivitis Index (GI):**
The gingival index (GI) is a measurement of gingival health. The assessments of gingival changes are scored using the following criteria.

0 - normal healthy gingiva
1 - moderate inflammation, moderate redness, not bleeding on probing, edema
2 - moderate inflammation, moderate to severe redness, edema, bleeding upon probing
3 - severe inflammation, severe redness, edema, ulceration, spontaneous bleeding

Each tooth is given the most severe score.

**Probe Depth (PD):**
Probe depth (PD) is a measure of the depth the periodontal pockets often found in periodontal disease. The probe depth is measured at multiple sites of the tooth. A periodontal probe with millimeter markings is gently placed between the free gingival and the tooth surface, and carefully advanced until soft tissue resistance is felt. The tip of the probe should be parallel to the long axis of the tooth. The pocket depth is recorded as the distance in mm from the free gingival margin to the bottom of the pocket. The probe may be glided or walked along the tooth to measure the varying pocket depths. A normal gingival sulcus depth is 1-3 mm in dogs and 0.5 to 1mm in cats. Measurements in excess of these values should be recorded in the appropriate location on the dental chart.

**Gingival Recession:**
Gingival recession is also measured with the periodontal probe. It is the distance from the cemento-enamel junction to the margin of the free gingiva. At sites with gingival recession the probe depth may be normal despite the loss of alveolar bone. Areas of gingival recession should be noted on the dental chart.

**Furcation Index (FI):**
The furcation index (FI) measures the loss of bone support in multi-rooted teeth. A periodontal probe is placed perpendicular to the long axis of the tooth and slid along the free marginal groove to the furcation site. The following criteria are used to assign a numerical score.

0 - no loss of bone support
1 - horizontal loss of supporting tissues not exceeding one-third of the width of the tooth
2 - horizontal loss of supporting tissues exceeding one-third of the width of the tooth but no encompassing the total width of the furcation area.
3 - horizontal through and through loss of supporting tissue.

A furcation index of 1-3 should be noted on the dental chart.

**Mobility Index (MI):**
The mobility index (MI) measures the loss of bone support by indicating the amount of movement of the tooth. The length of the periodontal probe is placed on the buccal surface of crown of the tooth and gentle pressure is applied to the tooth. The following criteria are used to assign a numerical score.

0 - no mobility
1 - perceptible mobility but less than 1 mm buccolingually
2 - definite mobility between 1-2 mm
3 - gross mobility exceeding 2 mm buccolingually and/or vertical mobility
A mobility index of 1-3 should be noted on the dental chart.

Periodontal Attachment Level (PAL):
This measurement is similar to the Probe depth measurement. In the PAL the pocket depth is measured from the base or apex of the pocket to the cemento-enamel junction. This is a more accurate assessment of tissue loss in periodontitis. PAL can be directly measured or it can be calculated as the sum of PD plus gingival recession.

Stage of Periodontal Disease:
The stages of periodontal disease can be used to help price your periodontal therapies but also need to be recorded so that the progression of disease can be determined. These stages are determined by either measuring clinical attachment level or radiographically.

- Stage 1 - Gingivitis only with attachment loss.
- Stage 2 - Less than 25% attachment loss. Grade 1 furcations present.
- Stage 3 - 25 to 50% attachment loss. Grade 2 furcations present
- Stage 4 - Over 50 % attachment loss. Grade 3 furcations present.

Stomatitis:
Lymphoplasmacytic Stomatitis (LPS) is a chronic, painful condition that can be very difficult to diagnose and treat. Multiple tests are needed to rule out other problems. Make sure the animal is FeLV/FIV negative, you may want to consider Bartonella testing. Most treatments are ineffective; to date the best treatment is a complete dental extraction including the removal of all dentin. This treatment is usually effective in about 80% of the cases.

Tooth Resorption (TR):
Tooth resorption can be difficult to classify. There are five stages of TR’s that are determined by the amount of crown involved in the lesion.

- Stage 1  
  o Lesions extend only into the cementum. This stage occurs only subgingivally. – Very difficult to detect
- Stage 2  
  o Lesions progress through the cementum into the dentin of the root or crown but the pulp is not exposed. Hyperplastic gingiva may cover these defects.
- Stage 3  
  o Lesions progress into the pulp chamber. Bleeding on probing and spontaneous fractures of the crown may occur.
- Stage 4  
  o Lesions destroy a significant amount of the crown.
- Stage 5  
  o Lesions have significant root replacement resorption with healing of the gingiva. There will not be any clinically apparent tooth tissue.

In addition to the stages of TR’s, they can be classified based on radiographic appearance of the periodontal ligament space:

- Type 1 – Lesions are caused by inflammation. The root appears normal, and the periodontal ligament space is still observable.
- Type 2 – The affected tooth is ankylosed to the alveolus. This type of lesion is not associated with periodontal disease.
Discolored Teeth:
Discolored teeth should be thoroughly evaluated to determine if the discoloration is due to extrinsic or intrinsic staining. Extrinsic staining comes from accumulations on the surface. Intrinsic stains are secondary to endogenous factors that discolor the underlying dentin. Transillumination with a fiberoptic light can assist in distinguishing between vital and necrotic pulp. Radiographs of affected teeth can be very useful in identifying pathology associated with discolored teeth.

Malocclusions:
As stated earlier, malocclusions need to be charted. Any variation from the standard occlusion is considered a malocclusion. A normal occlusion is called a scissor-incisor bite. The lower canine teeth fit evenly between the upper canine and the third incisor. Premolars are in a pinking-shears configuration where the cusps of the mandibular premolars point direction the interdigital spaces of the maxillary premolars with the cusps overlapping in a horizontal plane. There are four classifications of malocclusions:

- Class 1
  - Neutroclusion - The jaws are in perfect proportion with each other with the malposition of one or more teeth. i.e. Wrybite, anterior crossbite
- Class 2
  - Overbite – Mandibular distoclusion
- Class 3
  - Underbite, Mandibular mesioclusion

Along with malocclusion, tooth crowding, rotated, supernumary or missing teeth and attrition or the wear of teeth due to an improper bite is important to record. Retained deciduous teeth also need to be noted.

Fractured, Missing & Extracted Teeth:
Fractured, missing, extracted teeth should also be recorded on the chart. There are many other abnormalities that should be recorded on the chart. Fractured teeth and the type of fracture are critical to record.

Oral and Gingival Masses:
Oral masses need to drawn onto the chart and noted. This includes epuli and gingival hyperplasia. Epulides arise from the periodontal ligament. This is important to note these in order to have a record of the mass and be able to note changes in future examinations as well as gingivectomies or the removal of excess gingival tissues.

Gum-Chewers lesions are caused by self-inflicted trauma as a result of the animal chewing on the inside of the cheek to the tongue. These lesions cause the proliferative, granulomatous hyperplasia to occur. The lesions can be mild to serious that involve large amounts of tissue than can cause regular hemorrhages and be painful.

All surfaces of the tongue should be observed and even palpated. Sublingual tissues should be examined or abnormalities or foreign bodies. Inflammation of the tongue or glossitis can be present due to viral infections, immune-mediated problems such as LPS or auto-immune, and toxicity from irritative substances or objects. Lesions of unknown origin should be biopsied for further diagnostic workup.

Squamous Cell Carcinoma is the most common malignancy in the oral cavity of cats followed by fibrosarcoma and melanosarcoma. In dogs, the three most common tumors are melanomas, fibrosarcomas and squamous cell carcinomas. The only way to confirm diagnosis is by biopsy.

Oronasal Fistulas (ONF):
In maxillary teeth, the width of the alveolar bone between the teeth and nasal cavity or sinus can often be very thin, especially in long, narrow-nosed dogs such as dachshunds. These fistulas can go undetected because they are most commonly located on the palatal surface of the canines. Oronasal fistulas require surgical repair.

Previous dental treatments such as; restorative, pulp capping, root canals and orthodontic appliances should documented as well as procedures performed the day of the charting such as open or closed root planing.

The importance of radiographs is another lecture, however it is necessary to document problems found on these x-rays. Bone loss, retained root tips and periapical lesions are just a few. These lesions can lead to draining tracts and oronasal fistulas. These fistulas are tracts that are formed by the infection and usually are visual externally by a wound on the muzzle below the eye.

The pathology listed in this text is some of the most common oral pathology you will encounter.

Dental Radiographs

The most beneficial diagnostic tool in the veterinary dentistry is the dental x-ray machine. Even teeth that appear to be normal may have conditions that are not clinically visible. Studies have shown that almost 42% of pathology in animals’ mouth is found by radiography.

It is important to take full survey radiographs of periodontal patients prior to every professional periodontal treatment.

Supragingival Plaque and Calculus Removal

As stated earlier, gross calculus can be removed by using a calculus removal forceps. Ultrasonic or sonic scalers are useful to remove the remainder of the supragingival calculus deposits. There are three types of ultrasonic scalers available, magnetostrictive stacked, magnetostrictive with Ferrite rod and piezo, all of which work in a similar manner. The ultrasonic scalers vibrate in the range of 18,000 to 45,000 cycles per second. When used properly, the vibration breaks up or pulverizes the calculus on the tooth surface. These instruments can damage the teeth by mechanical etching and thermal injuries if not used properly. Supragingival scaling uses steady, generous supply of water to aid in the prevention of overheating the tooth along with a high power setting. When using the smaller, perio tip designed for sub-gingival scaling less water is needed and the power settings should be decreased.

The instrument should be grasped lightly in a modified pen grasp. The hand piece is balanced on the index or middle finger. The instrument, not the hand, must be allowed to do the work, the hand is merely a guide. The hand piece should be used with a light touch with minimal pressure, keeping the tip moving on the tooth. Stopping in any one area can cause damage.

The side of the wide tip (beaver tail) should be used for cleaning and held parallel to the tooth long axis of the tooth. Never hold the tip at a 90° angle to the tooth surface as this can damage the tooth and provides less of a cleaning surface, thus being less effective. The ultrasonic scalers can create a tremendous amount of heat. It is important to only spend a short time (~ 10 seconds or less) on each tooth. If you need more time to remove calculus from a tooth, scale the remaining teeth and return to the tooth after it has had time to cool off.

In addition to the ultrasonic scalers, sonic and rotary scalers are available. The sonic scaler requires the use of compressed air to operate. It produces less heat thereby reducing the chance of thermal damage. The sonic scalers are an excellent choice for the removal of supra-gingival calculus however their inability to effectively scale sub-gingivally is due to the
lack of desirable range of motion. The use of the rotary scaler is taboo. This instrument demands careful use by an experienced and skilled operator. Extreme etching can occur as the six-sided burr rotates at 300,000 rpm. If contact is made with the enamel, traumatic injury will occur.

**Subgingival Calculus Removal**

A curette or a specific ultrasonic scaler tip should be used to remove subgingival calculus. Several companies make scaler tips that are specifically designed for this procedure. The removal of this subgingival calculus is vital to the success of the treatment. If not removed, bacteria will continue to destroy the periodontium and further bone loss and eventual tooth loss.

**Hand Instrument Technique**

Hand scaling of the root to remove subgingival calculus deposits can be done if a peri tip is not available. A curette is used for this procedure. The curette has a sharp side and a rounded side. The sharp side is toward the tooth surface and the round side toward the gingival tissue. The curette should adapt to the curvature of tooth surface. If it does not, the opposite end should be used. The curette is inserted into the pocket with the face, or sharp side, facing the root surface. The instrument is moved over the calculus and positioned so that the cutting surface is under the calculus. A rocking pull stroke is used to remove the calculus from the root surface. This procedure is repeated until all calculus is removed.

**Check for Missed Plaque or Calculus**

An explorer can be used to check the tooth surface for remaining calculus. The crown can be inspected for missed plaque by the application of a disclosing solution or for missed calculus by air drying which will make the calculus appear chalky white. Disclosing solutions should be applied then gently rinsed with water to observe any remaining plaque or calculus. This technique must be used with care as it may cause staining of the hair around the patient’s mouth. It is, however, more reliable than the air drying technique.

**Polishing**

Polishing with a prophy cup and paste applied with an electrical or air powered polisher is an important step. This step will remove any missed plaque and smooth out the minute scratches on the tooth surface. When etching occurs, it gives the plaque bacteria more surface area to attach to the tooth. The prophy cup on a low speed hand piece moves at approximately 3,000 to 8,000 rpm. Disposable prophy cups are available and are inexpensive. The advantage is they don’t need to be cleaned after each use.

An inexpensive prophy paste can be made by mixing flour pumice with glycerin. There are many commercially available prophy pastes on the market that are more convenient to use. These prophy pastes range in grit and hardness from fine to extra course.

**Irrigation**

Irrigation of the mouth following calculus removal and polishing is vital. All pieces of calculus and prophy paste must be removed from the mouth to avoid aspiration upon recovery. This can be done with a spray bottle filled with water or chlorhexidine gluconate. The gingival sulcus should be irrigated to remove debris and help oxygenate the intrasucular tissues. Saline, stannous fluoride or diluted chlorhexidine gluconate (0.12%) can be used. The advantage of chlorhexidine is its substantivity, or its ability to adhere to oral tissues and release its agents slowly.

There is some controversy as to whether fluoride is necessary for veterinary dental health.
Home Care Instructions

A client who understands the importance of oral care and is willing to perform the home care to ensure that their pet’s mouth heals and remains healthy will be a happier client. Education will help to develop a strong relationship between client and clinic. Explaining to the client why home care is important and demonstrating how to administer the care is critical to gaining compliance.

Handouts can be individualized for the patient is another way of showing the client the importance of dental health. This handout should include a simplified dental chart for making notations, such as probe depth, furcation formation or tooth loss. The prescribed treatment plan should be included on this handout so the client can then take it home with them as a reminder of the treatment necessary for their pets.

Conclusion

A complete dental prophylaxis for a periodontal patient involves many steps. Each and every step is vital to the success of the procedure. The success of the procedure is not determined when the animal recovers and leaves the hospital. Ensuring compliance of home care instructions and follow up examinations are critical to the overall success.

References: Available upon request