Recognition of Oral Pathology
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Our patients are affected by the same types of oral conditions that we encounter. Malocclusions, gingivitis, bone loss, impacted teeth, tooth fractures, cavities, and oral tumors are common in dogs and cats. Early recognition is the key to successful treatment.

Each pet should receive an annual oral examination and their medical record should reflect their periodontal status and the veterinarians treatment recommendations. Acceptance of the recommendations or “compliance” usually requires a visual illustration of their pet’s condition. Therefore, each exam room should have a dental model, folder or documents with photos of common oral pathology. (please consider printing pages 4-8 and laminating them). Some hospitals will take intra-oral photographs with an I phone or I pad to share their findings with the pet-owner.

Before we discuss common oral conditions or oral pathology we need to be familiar with normal anatomy so we can recognize the abnormal.

Normal Occlusion: The normal occlusal relationship for dogs and cats, as it is in people, is a scissor incisal occlusion. The normal line of teeth is a smooth curve, not broken by rotated or misplaced teeth. The head and dentition should be symmetrical. This is not the definition for many of the breed standards, but all other relationships, must be considered to be in malocclusion to a greater or lesser degree and dental problems may result, secondary to occlusal trauma and inflammation.

The labial (lip) surface of the mandibular incisors should fit behind but be touching the palatal surface of the maxillary incisors, and the maxillary incisors should overlap the mandibular incisors. The Dental Interlock is the next important landmark to examine when determining genetically sound jaw relationships. Three teeth define the interlock. The mandibular canine should be seen between, equidistant to, and not touching the upper lateral (third) incisor or the upper canine tooth.

The premolars are immediately behind the canines. In a healthy mouth the mandibular premolars are ½ tooth in front of their mandibular counterparts, with their large pointed central cusp (tip) directed exactly between their maxillary counterpart and the tooth rostral to it; For example the mandibular 4th premolar will point upward directly between the maxillary 4th and 3rd premolars. They should appear in a “saw toothed” or interdigitated orientation, when viewed from the side. The carnassial teeth (maxillary 4th...
premolar and mandibular 1st molar) should be in orthognathic relationship. The maxillary premolars should be outside of (lateral to) the mandibular premolars and in close relationship in order to serve the intended shearing function found in the carnivore. The mandibular fist molar should be concealed by the maxillary 4th premolar when the mouth is closed.

**Malocclusions** are relatively common in the dog (less so in the cat) and many times affect the periodontal health, comfort, and well-being of our pets.

- Class 1 malocclusions are when both jaws are a proper length and an individual tooth or multiple teeth are misaligned, crowded or rotated.
- Class 2 malocclusions or “overbite” is a condition in which the maxillary teeth are markedly in front of the mandibular counterparts.
- Class 3 malocclusions or “underbite” is when some or all of the maxillary teeth are located behind the mandibular incisors or canine teeth. In brachycephalic breeds (Boxer, Shih tzu, Pug…), a Class 3 malocclusion is called a reverse scissor bite and is considered normal for these breeds.

**Class 2**

**Class 3**

**Basic Tooth Anatomy:** The tooth is comprised of an **enamel** covering, a structurally strong dentinal wall beneath, and the centrally located pulp. The crown is the portion of the tooth visible above the normal gingival margin. It is covered with enamel, the hardest and most impervious tissue in the body. The cervical portion of the tooth is the neck, located where the crown meets the root is referred to as the **cementoenamel junction**. This is also where the enamel joins the covering of the root, the **cementum**. The structurally strong wall of the tooth is **dentin** and extends the entire vertical length of the tooth. The end of the root is referred to as the apex. The root is attached to the alveolar bone by the periodontal ligament.
The tooth crown (portion above the gingiva) consist of three layers:
1. Outer layer – enamel (0.4-0.8 mm thick)
2. Middle layer – dentin (progressively thicker over time)
3. Inner layer – pulp tissue (blood vessels and nerves)

Periodontal Anatomy: The periodontum is comprised of four (4) tissues that support the tooth. They include the gingiva, alveolar bone, periodontal ligament and cementum. The gingiva protects the other three tissues. The alveolar bone acts as the foundation of attachment and serves to nourish the other tissues. The periodontal ligament is comprised of collagen fibers that attach the tooth via the cementum to the alveolar bone.

In the dog, the free gingival margin ranges from 1-3 mm and lies coronal to the cemento- enamel junction (CEJ). In the cat the free gingival margin is 0.5 mm-1 mm coronal to the CEJ. The attached gingiva is the visible gum tissue apical to the gingival margin tightly attached to the alveolar crest and periosteum of the alveolar bone. The width of this gingiva varies within the oral cavity and plays a vital role in the protection and support of individual teeth. The alveolar mucosa is the loosely attached gingival tissue apical to the mucogingival line (demarcation of the attached gingiva) serves primarily to nourish the gingiva and offers very little protection to the forces of chewing.

The alveolar bone is the bony process that encases individual teeth of the mandible and maxilla. The crestal bone is the tip of the alveolar crest closest to the crown and visible bone between teeth on a dental radiograph. It is protected by the attached gingiva and is the critical area in the development of periodontitis.

The periodontal ligament is comprised of collagen fibers in a specific orientation that attach the tooth to the alveolar bone. The PDL fibers suspend the tooth within the alveolus and provides a “shock absorber” effect to prevent fracture of teeth during forceful occlusal action. The cementum is an acellular substance that covers the root of a tooth. It serves as the tissue of attachment for the PDL and seals the dentin of the root.

Let’s look at some common oral conditions from pediatric visits to adult!
Oral Conditions and Solutions

Fractured deciduous tooth is a painful condition and quickly becomes infected. This infection may cause a draining tract, facial swelling, bone infection, or damage to the developing permanent tooth.
Treatment: Immediate extraction with dental X-rays as well as monitoring of the permanent tooth as it erupts.

Class 1 malocclusion is when both jaws are a proper length and do not result in an over or underbite. Individual or multiple teeth may strike other teeth or soft tissue (palate) causing pain.
Treatment: Involves relieving pain by extraction of the mal-positioned tooth.

Class 2 malocclusion: A condition in which the maxillary teeth are markedly in front of the mandibular counterparts. Ideally diagnosed at the puppy’s first or second visit.
Treatment: These young patients benefit from Selective Extraction Therapy. The lower incisors and canine teeth are carefully extracted to alleviate pain and allow the jaw (mandible) to grow to its genetic potential.

Class 3 malocclusion is when some or all of the maxillary teeth are located behind the mandibular incisors or canine teeth. This malocclusion can result in gum trauma and tooth-to-tooth contact. Fortunately, few of these pets require therapy. In brachycephalic breeds (Boxer, Shih-Tzu), a Class 3 malocclusion is normal.
Treatment: None or may require an extraction of the least functionally important tooth (lateral incisor). Relieve tooth to tooth or tooth to soft tissue trauma.

Persistent deciduous teeth are very common. The "Two Tooth Rule" states that if the crown of the permanent tooth is visible above the gum line, the primary tooth should be gone. If the primary tooth is still present then it has directed the permanent tooth into an abnormal position.
Treatment: Dental X-rays and timely extraction(s) are important to allow for the permanent teeth to erupt & move into a normal position. Re-examination in 2 weeks.
Missing tooth or teeth: Remember dogs have 42 teeth and cats have 30 teeth. If a pet over 6 months of age is missing 1 or more permanent teeth, a dental x-ray of the area should be taken.

Treatment: Dental X-ray(s), impacted teeth receive: a gingival incision or surgical extraction depending on age.

Rostrally erupted canine tooth can occur in any breed of dog, although it is more common in the Shetland Sheepdog. These teeth are prone to developing gingivitis, bone loss and the tooth-to-tooth contact is painful.

Treatment: Dental X-rays, orthodontic therapy or extraction therapy.

Base narrow mandibular canine teeth result in a painful condition in which the lower canine strikes the roof of the mouth or palate. Therapy depends on the age of the pet and severity of the malocclusion.

Treatment: Orthodontic therapy (Temporary Crown Extensions or Incline Plane Therapy), crown reduction/pulp capping or extraction therapy.

Delayed eruption is considered when permanent teeth are not all present by 7 months of age. The premolar or molar teeth seem to be more commonly affected as well as it is seen in Tibetan terriers and Wheaton terriers. Treatment: Dental X-rays, excision of overlying gingiva and or bone to allow eruption.

Enamel hypoplasia is a condition in which one or more teeth have abnormal or pitted enamel. This will appear as a rough and yellow stained surface of the affected tooth.

Treatment: Dental X-rays and restorative therapy with composite resins will protect and seal the tooth while they develop. Regular brushing of these teeth is important to control plaque and tartar that easily accumulates on them.
Grade 1 Periodontal Disease: may show variable amount of dental calculus and mild gingivitis. Treatment: Ultrasonic scaling and polishing, probing, dental X-rays and periodontal therapy if bone loss is present.

Grade 2 Periodontal Disease: will show a variable amount of dental calculus and gingivitis. Gingivitis is an infection of the gum tissue and is painful. These patients will have bad breath and may have periodontal pockets. Treatment: Ultrasonic scaling and polishing, dental X-rays periodontal treatment as needed (root planing, antibiotic or bone graft).

Grade 3-4 Periodontal Disease: will show a variable amount of dental calculus and moderate gingivitis. These patients may have gum recession, bone loss, mobile teeth and are susceptible to blood-borne infection. Treatment: Ultrasonic scaling and polishing, dental X-rays periodontal treatment as needed, local nerve blocks, extractions and oral surgery.

Root exposure is a condition in which gum tissue and bone loss is present. Bone loss is progressive and requires immediate treatment. Treatment: Ultrasonic scaling and polishing, dental X-rays, periodontal therapy and extraction therapy.

Gum recession is a severe inflammatory/destructive condition. This occurs secondary to dental plaque (calculus and bacterial) and a pet’s individual immune response. Treatment: Ultrasonic scaling and polishing, dental x-rays depending on the severity of the recession, periodontal therapy or oral surgery/extraction.

Gingival hyperplasia is an overgrowth of gum tissue that may occur in any breed. This condition traps tartar and bacteria under the gums and may result in bone loss if left untreated. (may occur due to Cyclosporine or amlodipine therapy) Treatment: Ultrasonic scaling and polishing, dental x-rays regional nerve blocks and radiosurgery resection of the excessive tissue.
**Abrasive/Attrition:** Gradual tooth loss removes enamel (<1mm thick) and exposes dentin (which is somewhat porous). These teeth are evaluated for pulp exposure, root resorption and periapical lucency (root-end bone infection).

Treatment: Ultrasonic scaling and polishing, probing, dental X-rays of affected tooth/teeth, and removal of object causing excessive tooth wear.

Counsel owners on appropriate chew objects (ones they can dent with their fingernail) or address their separation anxiety or cage chewing.

**Crown fracture w/o pulp exposure** refers to a fracture involving the dentin but not the pulp. This condition is painful and depending on the depth can allow bacteria to access or infect the pulp.

Treatment: Ultrasonic scaling and polishing, probing, dental X-rays and if the fracture is recent (within 2 months) a composite restoration can be used to seal the tooth surface.

**Crown fracture with pulp exposure** refers to a tooth fracture that exposes the pulp (vessels and nerve of the tooth). This is painful and over months bacteria will travel to the bone and cause an infection.

Treatment: Based on the pet’s lifestyle and functional importance of the tooth we recommend either root canal therapy or extraction.

**Oral Mass** refers to any abnormal growth of tissue in the oral cavity. There are many types of masses: inflammatory, benign, malignant or cystic.

Treatment: Dental X-rays, CT & biopsy to determine tumor type. Staging (lymph node assessment/chest X-rays) is performed for malignant tumors. The preferred therapy is surgical resection with tumor free surgical margins and reconstruction.
Grade 1-2 Periodontal Disease patients will show variable amounts of dental calculus and gingivitis. Gingivitis is an infection of the gum tissue and is painful. Treatment: Ultrasonic scaling and polishing, probing, dental X-rays and periodontal therapy if needed.

Tooth resorptive lesions occur in 50% of cats over 5 years of age. The cause of these erosive, “cavity” like lesions is unknown. Few cats show signs but these lesions are painful. Treatment: Ultrasonic scaling and polishing, probing, dental X-rays and extraction or crown amputation therapy.

Super-eruption of canine teeth may appear as gingival recession but in cats an affected canine tooth will become extruded from a bone infection. Treatment: Ultrasonic scaling and polishing, dental x-rays, root planning or extraction therapy.

Stomatitis is a severe inflammation of the whole oral cavity. This is most commonly due to an abnormal immune response to dental plaque (bacteria and food proteins). Treatment: Pre-anesthetic blood profile, ultrasonic scaling and polishing, biopsy of oral tissues, dental X-rays, and surgical extraction therapy of all teeth. Response: 60% cure, 20% significantly improved, & 20% refractory (but 75% will now respond to medical management)

Tooth fracture of the canine teeth in cats of any depth will expose the pulp. This is initially painful and over months bacteria will travel to the bone and potentially the bloodstream. Treatment: Root canal therapy is preferred on the canine teeth to retain function and prevent lip trauma post extraction or surgical extraction therapy should be performed to prevent a painful infection.