Normal
In the beginning, things were very simple in the oral cavity of the dog and cat. This was before dogs and cats were bred for specific purposes or to look a certain way, by man. The dog had 42 permanent teeth, an almost perfect set, only missing the upper third molar teeth. The cat had 30 permanent teeth, missing quite a few from the “perfect” 44 found in rats, swine, and a few other species.

The “original design” model dog and cat had few teeth touching each other. These cone-shaped teeth were, for the most part, very self-cleaning. While eating a natural diet of small mammals and some other small or large delicacies, the teeth encountered skin, muscle, tendon, and various organs, which removed plaque, brushed, flossed, polished, and otherwise kept the “pearlies” white.

The normal occlusion is becoming far from the norm, in my experience. The upper incisors are slightly in front of the lower incisors in the normal occlusion. The lower canine tooth should sit centered in the space between the upper canine and upper third incisor tooth. Also, the first premolar tooth behind the lower canine tooth should be the lower first premolar. The cusp of the upper first premolar should point to the interdental space between the lower first and second premolars. That is the beginning of a normal occlusion. The scissors bite should continue to the upper fourth level. The space between the upper and lower arch should be consistent, that is, no bowing of the mandible.

The gums, or gingival, were invigorated by this natural diet. The periodontal ligaments, which hold the teeth to the alveolar bone, remained strong and healthy because of the exercise. The bone did not resorb from the alveolus because of disuse atrophy. As we know, bone is laid down along the lines of force or stress. The teeth were being used to pull and tear and shear “dinner.” By observing carcasses that have been nibbled in the wild, I have seen that the predators—coyotes, wolves, wild dogs, mountain lions, etc.—eat the flesh and organs. They may nibble at the cartilage or soft rib bones, but seldom gnaw a leg bone! Do they understand that if they gnaw a leg bone they could break an essential carnassial tooth? Do they know if they break a tooth they will likely not do as well feeding? Perhaps this is intrinsic in wild animals and has been lost to our domesticated pets?

The teeth that are supposed to touch in the normal, permanent occlusion of the dog are the upper fourth premolar, upper first molar, and upper second molar teeth. Those are the only teeth in the maxilla that touch in the normal occlusion. In the mandible, only the lower first, second, and third molar teeth should touch. In the cat, none of the teeth in the maxilla or the mandible was designed to touch the other. The mandible of the cat is also smaller and designed to fit well inside the maxilla. In the normal occlusion of the dog, the maxilla is only slightly larger than the mandible.

As a dog ages, the center of the tooth, which houses the nerves, blood vessels, and lymph system, decreases in size as the dentin continues to be laid down from the outside of the pulp chamber/root canal inward. This assures the animal that with normal wear, the pulp chamber will not become exposed. As a tooth wears, a darker, secondary and tertiary dentin appears.

The buccal and sublingual tissues are normally smooth and moist. The tongue serves to taste, groom, drink, and help cool the body.

Not Normal: Deciduous Teeth
Puppies and kittens may have deciduous dental interlock of canine or incisor teeth. Deciduous canine dental interlock is caused when one or both lower canine teeth are located caudal to the upper deciduous canine teeth. The mandible is “locked” in an abnormal position and cannot grow unless the interlocking teeth are removed. The teeth to be removed include the lower canine and incisor teeth. Extraction does not change the genetic potential; it simply removes an impediment to forward growth of the mandible, if present. Surgical extraction should be performed as soon as the condition is observed. The upper deciduous incisor teeth may erupt slightly caudal to the deciduous lower canine teeth. The upper deciduous incisor teeth should be extracted. The general rule of thumb is to extract the teeth in the arch that needs to grow forward.
Fractured deciduous canine teeth occur most commonly in puppies. This, in my opinion, is a dental emergency. The permanent mandibular canine tooth bud lies slightly medial to the lower deciduous canine tooth, and the permanent maxillary tooth bud lies just rostral to the upper deciduous canine tooth. The area is prime for infection, with a huge open pulp chamber and root canal just waiting for pathogens to arrive. The fractured deciduous tooth should be extracted as soon as possible, and the patient should be on antibiotics, in my opinion. Because there is no way to determine if the permanent tooth bud has been infected prior to extraction, the client should be aware that the permanent tooth buds are easy to scratch or deflect during extraction of any deciduous tooth. The client should sign a statement that this has been brought to her attention prior to this or any other procedure in our litigious society.

Seven months is the age by which most deciduous teeth have been replaced by permanent teeth. It is the perfect time to schedule a dental check-up for puppies and kittens. Retained deciduous teeth (RDT) are a predisposing factor to periodontal disease. They can also cause malocclusions of other teeth. The most common RDT in puppies are canine teeth but can include any and all. Kittens can have RDT, also. I have seen retained canine and upper fourth premolar RDT in kittens.

**Not Normal: Permanent Teeth**

**Anterior crossbite (AC)** occurs when one or more upper incisors are positioned slightly caudal to the lower incisors. If the lower canine teeth sit centered in the space between the upper canine and upper third incisor teeth, this is a true AC. Orthodontic correction is possible.

An anterior crossbite without a normal canine tooth relationship is not a true AC. If the lower canine tooth is drifting forward, the relationship of the premolars should be evaluated as stated above. This is a dog with an undershot occlusion or mandibular prognathism. The teeth can still be corrected by orthodontia, but the dog should not be bred. An anterior crossbite or a level occlusion can cause rapid attrition and open pulp chambers leading to tooth death.

When the breed standard calls for an undershot mandible (a brachycephalic breed), the occlusion is still NOT NORMAL. Crowding and rotation of the upper cheek teeth is common. Extraction of one or more teeth may be needed to prevent or treat periodontal disease. The upper canine teeth may impinge on the mandibular frenula, causing pain. The frenula can be incised and the buccal portion sutured. Looking for abnormal tooth position and soft tissue trauma is essential.

**Overshot occlusion** (maxilla too long or mandible too short) is not a breed standard, but is found nevertheless. In some cases orthodontic correction of the lower canines may be needed to reposition the base-narrow lower canine teeth.

**Overcrowding of the upper canine tooth and the upper third incisor** can be a predisposing factor to periodontal disease. Periodontal pockets can form between them and not be easily detected visually. The lower canine tooth may be kept in a lingual or palatal position and traumatize the tissues of the hard palate. Extraction of the upper third incisor with alveolectomy and surgical closure may be sufficient to allow the lower canine tooth to move into an atraumatic occlusion.

**Base-narrow occlusion (BN)** can be a stand-alone condition. BN occurs when the mandible is a bit too narrow or too short. The lower canine teeth erupt and can cause soft and hard tissue damage to the hard palate. This can be severe enough to cause the formation of oronasal fistulas. If discovered in a young dog, the owner may be able to correct this by playing with the dog using a ball. Keeping the ball in the mouth while pulling on it forces the lower canine teeth into an atraumatic position. I personally have not found this to be extremely successful. A simple palatal shoe appliance applied to the upper arch to tip the lower canine teeth laterally has worked well for my patients. Palatal shoe appliances are well described in veterinary dental texts.

**Caries** are found occasionally. They are round, scooped grey lesions. Caries occur most commonly on the occlusal surface of the molar teeth. Dental radiology will reveal if the pulp chamber has been penetrated. If not, the area can be restored. In my experience the lesions have usually progressed into the pulp chamber and the tooth is extracted.

**Slab fracture of the upper fourth premolar tooth (carnassial)** occurs commonly. The slab may be still in place. There may be more calculus on the side with the fracture because the dog does not chew on the painful side. Slab fractures
usually lead to infraorbital swelling, indicating a periapical abscess. Dental radiographs will diagnose which root is affected. Endodontic therapy or surgical extraction is needed to treat this tooth.

Infraorbital swelling may indicate a severe periodontic/endodontic lesion (perio-endo lesion). The infection can be extreme. Occasionally the tooth may be salvageable by hemi section and endodontic treatment of the remaining roots.

Sublingual abnormalities, such as an abrasion, usually are caused by rough enamel from a fractured tooth. It may be a chip that can be smoothed and an unfilled resin applied, or it may be a more severe fracture situation. Making the patient comfortable is imperative.

Gum chewer lesions (unintentional, self-inflicted oral trauma) are found in many dogs. They occur in several locations. Buccal lesions are found along the bite plane, on the inside of the cheeks (buccal gum chewers). The tight face tissue of, say, a poodle pulls the tissue inward when the dog pants, barks, or plays. The cheek tissue is bitten over and over and becomes hyperplastic. It is painful and can be removed with laser or tissue scissors.

Sublingual gum chewers occur from the level of the lower first molar to about the level of the lower second premolar. These lesions form when the thin sublingual tissue is stretched as the dog pants. The tissue begins to lie over the cusps of the lower cheek teeth and is bitten when the mouth is closed. This tissue also becomes hyperplastic. These lesions may also occur under the front lip and the mandibular frenula in brachycephalic dogs. Gum chewer lesions are occasionally found in cats. The lesions are painful and can be removed with laser or tissue scissors. These must be closed. I use soft absorbable suture (5-0) with a reverse cutting needle, SC pattern.

Supernumerary teeth often occur in the incisor area. If they cause overcrowding, then extraction is the solution. There is a useful technique for moving a permanent tooth into a normal position after extracting the supernumerary tooth. If the tooth root of the extracted tooth is intact, it can be shaped using a high speed dental bur. The root is shaped into a wedge. This wedge is placed against the tooth to be moved and forced into place after the crown has been removed. The lever root will stay in place for several days and may move the tooth into proper occlusion. This is a useful technique for moving BN lower canine teeth that have RDT keeping them lingual.

Supernumerary teeth in the cats I have seen have usually been a lower fourth premolar or upper canine teeth.

When looking in the oral cavity, normal anatomy should be considered. There are many other abnormal conditions that can be found. This paper covers some of the more common abnormalities.

Thank you for caring for pets’ teeth!

**Suggested Reading**
