

## **SHOULD THIS TOOTH BE EXTRACTED?**

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During an oral examination extraction decisions must be made based on the information available.

Deciding if an extraction is warranted must be based on periodontal indices, endodontic and orthodontic health, but also the likelihood that homecare can and will be provided, the general health of the pet, and such things as an owner's interest in future professional care and the veterinarian's own skill set.

### **Periodontal Disease**

The vast majority of extractions in veterinary dentistry are due to periodontal disease. An understanding of periodontal indices will make extraction decisions easier. Indices of value include the gingivitis index (GI), periodontal pocket depth (PP), gingival recession (GR), bone loss (BL), furcation exposure index (F), and mobility index (M) all of which are indicators for loss of attached gingiva. Every tooth needs an intact collar of attached gingiva and if this collar becomes compromised the tooth may need to be extracted.

Gingivitis tends to precede periodontal disease, but unlike periodontal disease, gingivitis alone is (usually) a reversible condition. The presence of gingivitis, in the absence of periodontal disease, is only an indication for extraction in unrelenting cases of stomatitis. Gingivitis is often graded on a scale from zero to three, with three indicating severe inflammation, spontaneous bleeding, etc.. In non-stomatitis patients the value in noting gingivitis is that it is often an indicator for coexisting periodontal disease.

In animals suffering from stomatitis (also called chronic ulcerative paradental stomatitis (CUPS) in dogs), the inflammation can extend throughout the oral cavity. In the majority of affected dogs and cats a hyper-reactivity to plaque is a component of this disease. If the owner is unable or unwilling to provide scrupulous homecare and at least annual professional treatments, then aggressive extraction recommendations should be made.

Loss of attachment and/or loss of the support tissues from around each tooth is what determines if a tooth has reached end-stage periodontal disease. Periodontal pocket depth, gingival recession, bone loss, furcation exposure and mobility are all inter-related and therefore must be considered not just individually but also together when determining severity of attachment loss, and for staging periodontal disease.

Numbers oft repeated are that normal probing depths in a cat are 0 – 1 mm, and in an average dog they're 2-3 mm. These numbers are not rigid, however, as vast variation in patient size must be considered and therefore probing depths must be interpreted as an indication of percentage of bone loss. Bone must cover at least 50% of the root length in order for the tooth to be salvageable with basic hygiene procedures. Bone recession between 50 - 75% requires advanced periodontal procedures and bone grafting before reasonable odds of survival are achieved and any tooth with more than 75% of its root(s) not anchored in bone is a lost cause. Bone recession without gingival recession results in periodontal pockets. Conversely bone recession accompanied with gingival recession may result in relatively normal probing depths, but attachment loss has still occurred, and support lost. In advanced cases mobility may be present. The tooth may be as compromised as if it had deep periodontal pockets. This is why depending on just the numbers generated by probing is not enough. Deep pockets are a problem. Shallow probing depths are not necessarily normal.

The protective collar of attached gingiva around each tooth must be at least 2 mm wide in order to provide a sufficient barrier to pathogenic bacterial ingress. Gingival recession combined with a periodontal pocket may compromise this protection. If a gingival cleft or generalized recession has reduced the apparent width to 2 mm, but a 3 mm pocket exists, then the pocket is extending apical to the mucogingival line and below the (unprotective) alveolar mucosa. Without advanced flap therapy this tooth requires extraction. If the recession is located between two teeth then extract the least healthy, or least important tooth. This should optimize the chances of healing for the remaining tooth.

Furcation exposure allows for plaque and calculus accumulation, which will hasten the return of disease. Some animals have a furcal anatomical variation that involves vascular channels into the tooth in this area. Disease in

this area can therefore also compromise the endodontic health of the tooth. Other animals may have an extra root in this area which impedes proper attachment of the gingiva. Immaculate calculus removal and root planing may result in reattachment of the gingival soft tissues to the tooth with a decrease in pocket depth, but bone implant is needed to restore actual bone height. Any advanced furcal exposure requires extraction to optimize the health of the mouth.

The presence of mobility is almost always a cause for concern. A lack of mobility, however, is not a guarantee of health. A multi-rooted tooth with at least one healthy root may not show motion even in the face of severe disease affecting the other root(s). Any tooth that has lateral movement greater than 1 mm, or can be intruded into the socket, is a candidate for extraction.

Other factors to consider when attempting to decide if a tooth is salvageable include the location of the periodontal disease. The more caudal, and/or lingual/palatal in the mouth that the diseased area is, the harder it is to monitor and provide care. If the animal is physiologically unstable and cannot mount an adequate immune response the oral disease will likely progress regardless of treatment. If the patient is unlikely to have another anesthetic, either due to health or owner concerns, or if the owner is unable to provide homecare then in these situations it may be best to tend towards extraction rather than trying to maintain the tooth.

### **Preventing Future Periodontal Disease**

Crowding, abnormal positioning, incomplete eruption, missing occlusal counterparts, supernumerary teeth, and retention of deciduous teeth may all contribute to the development of periodontal disease. Removing these inciting agents may prevent future disease, or the aggravation of existing pathology.

Crowding reduces the space between teeth which may lead to loss of the gingival collar (tooth-to-tooth contact). Food entrapment is aggravated and normal cleansing mechanisms compromised.

An abnormal position, such as rotation which causes crowding, or which results in a tooth having a root outside of the alveolar ridge (e.g. rooted on the palate), may lead to rapid pocket development.

Incomplete eruption may cause a portion of the crown to exist below the gingival margin. Periodontal ligament fibers cannot attach to enamel so a pocket within the gingiva will exist. This area will entrap food etc. and disease (pericoronitis) will develop.

Missing an opposing tooth may result in the loss of natural chewing abrasion and this cleansing mechanism. The counterpart to a missing tooth will often experience heavy calculus accumulation which may progress to periodontal disease.

Retained deciduous teeth can cause displacement of their adult counterparts, and will cause crowding with resulting debris accumulation. Given their fragile structure deciduous teeth are also prone to fracture and should be removed as soon as the permanent tooth has erupted.

### **Health of the Tooth**

Tooth resorption (TR) is almost always an indication for extraction. By the time a lesion is visible grossly, or on radiograph can be seen to be approaching likely exposure, it has advanced to the point of discomfort and therefore extraction. Root resorption tends to occur in advance of visible crown lesions with accompanying ankylosis. Extraction tends to be difficult. Radiography is vital to distinguishing the commonly encountered odontoclastic resorption from the less common peripheral inflammatory, and/or external, root resorption. If radiographs indicate that ankylosis is not present and the root structure is intact the tooth must be removed in total. Crown amputation/intentional root retention is not appropriate for these latter cases.

True carious lesions tend to be very rare in cats, and uncommon in dogs. Caries (“cavities”) develop from bacterial breakdown of carbohydrates to an acid. This acid pools on the surfaces of teeth and degrades the enamel and dentin. Caries can be repaired if found early. Deeper lesions that expose the pulp tissues require

endodontic therapy. Large caries cause loss of crown contours. Prosthodontics (metal alloy or porcelain crowns) may be required to return these teeth to service.

Fractures, concussion, avulsion, caries, resorptive lesions, and anatomical defects can all cause compromise of the endodontic system. Brown/black remnants in the pulp chamber area, exposed bleeding pulp tissues, discoloured teeth, obvious structural lesions in the teeth, draining fistulas, facial swelling, fetid breath, nasal discharge, reverse sneezing, pain and inappetence can all be symptoms of endodontic disease. Enamel folding defects and severe periodontal disease may also compromise the endodontic system. Radiography is the main method for definitively diagnosing this problem pre-extraction. Any non-vital tooth needs treatment. If endodontic therapy such as a root canal is not possible, then the tooth should be extracted. Infection, with or without visible swelling, can develop slowly over a prolonged period, or appear suddenly. Regardless of its pathway, it is a painful process. Many animals mask their pain so an apparent lack of symptoms is not proof the tooth is not painful, or that it won't become painful in the near future.

A severely worn tooth may not need treatment. A vital tooth is able to make dentin throughout its lifetime. If wear is slow the pulp tissues can lay down reparative dentin on the inner surfaces of the worn area so that the pulp is protected from the oral environment. Once this reparative dentin comes into wear it may be noted as a milk chocolate brown spot in the center of the tooth. The area is smooth and a probe will not enter the pulp chamber. These teeth are likely healthy, but radiographs are indicated.

### **Orthodontic Issues**

Retained deciduous teeth are commonly encountered and in the majority of cases should be removed. These teeth tend to push the adult counterparts into improper position, cause crowding which can lead to periodontal disease, and are fragile and may fracture necessitating extraction at a future date.

Interceptive orthodontics involves removing a normal tooth to correct a problem arising from an abnormal occlusion problem. Extraction may provide space for another tooth to occlude unhindered, or may relieve a dental interlock in a growing animal with jaw length discrepancy. By removing the involved teeth from the jaw that's trying to grow, compensatory growth may occur and a more normal occlusion might be attained.

Any tooth which is causing significant soft tissue trauma needs to be addressed. Lingually displaced or "base narrow" canines should never be left untreated. If orthodontic movement, or crown amputation with endodontic treatment is not an option, then the offending canine teeth should be extracted. Mesially tipped or "lance" maxillary canine teeth may lead to trauma to the lips, periodontal disease, and displacement and possible concussive injury to the mandibular canine, if left untreated. In lieu of orthodontic movement, extraction of the maxillary canine(s) is needed.

Gingival trauma to the attached gingiva on the buccal side of the mandibular first molar in cats can arise from contact from the major cusp of the maxillary fourth premolar. The gingiva and bone can be pushed off of the buccal surface of the root(s) and the molar compromised. If the compromise is significant the molar will need to be removed. If the damage has not progressed to this point yet, but soft tissue injury is evident, then the maxillary fourth premolar needs to be extracted.

### **Surgery Issues**

Non-erupted teeth need to be found and removed, or risk the development of a dentigerous cyst.

Masses historically referred to as "epulides" in veterinary medicine are more correctly identified as peripheral odontogenic fibromas. These masses develop from the subcutaneous tissues within the gingiva and the periodontal ligament. Complete removal of these masses requires a small margin to ensure all germinal tissues are excised, but if acquiring the margin compromises the periodontal integrity of the tooth the tooth may also need to be removed. Acanthomatous ameloblastomas require larger margins and the tooth is usually included in these "en bloc" or "rim" excisions. This is a locally aggressive tumour and should not be "monitored".

Advanced surgery for cancers, cleft palates, etc. may require tooth removal for closure of the surgical site.

Teeth located within the fracture lines of mandibular or maxillary fractures should be removed in cases of trauma, and MUST be removed if the fracture is secondary to chronic periodontal disease. A periodontal fracture will not heal if the tooth, i.e. the nidus of infection, is not removed.

### **Behavioural Issues**

Treatment of aggression must involve behavioural modification, and often drugs. Some owners, however, may request “disarming” of their pets while attempting to modify the behaviour. If crown amputation and endodontic therapy isn't an option then complete extraction of the teeth is needed. These dogs are still dangerous and can still inflict severe damage so “disarming” should never be presented to the owner as a means of making these animals “safe”.

### **Owner Issues**

Depending on the function of the dog, extractions may not be desirable. Working dogs such as police/military/protection dogs, assistance dogs for the visually impaired or physically challenged, and some breeds of show dogs need their complete dentition to compete in the ring.

Cost may be an impediment for some owners. Pet insurance, payment schedules, a large number of extractions divided over several procedures, credit extension, and owner education as to the necessity of removing diseased teeth may all help overcome this obstacle.

Fear of an anesthetic-related accident is a big impediment for some owners. Advanced age, a compromised pet, a negative previous experience, etc. may all scare an owner into avoiding necessary care. Sufficient pre-anesthetic diagnostics, appropriate monitoring devices and staff, or referral to a specialty center may help assure a nervous owner. Client education regarding the importance of subgingival assessment and care, (and the futility of non-anesthetic crown scaling or “tooth grooming”, especially as provided by a groomer or even a professional member in an examination room), may help the client accept that anesthesia is necessary.

Fear of their pet having discomfort after extractions may be compounded by a negative personal experience. Discuss use of local anesthetics, pre, intra and post-operative analgesics, and what can be done at home will comfort these fears.

The owner may not perceive that there is a problem. A discussion about pain, the effect on the body (cause of distant disease, etc.), and the quality of life for their pet is needed. An animal that is eating can still have significant oral discomfort. It has no other choice but to eat (assuming it doesn't want to starve), but that doesn't mean is discomfort-free.

The owner may express concern that the pet won't be able to eat. In the wild, losing functionally important teeth may be life threatening, but our pets have their food presented to them in a bowl, ready for consumption. Even most kibbles don't need maceration in order to be digested. As a colleague is known to say, “The food is dead and on the plate.”.

**Whenever an owner expresses hesitation to do a necessary procedure ask them what their concerns are. Identifying and understanding the root of that resistance, combined with compassion, will often overcome those roadblocks to care. Remember, our pets don't need teeth to survive. They do need to be disease free and pain free.**