The recognition and treatment of feline dental and oral pathology is an important component in successful management of feline health. Dental and oral lesions in cats may have a variety of presentations and treatment options. Feline dental and oral lesions include periodontal disease, tooth resorptive lesions, fractured teeth, mandibular swelling, perialveolar osteitis, gingivostomatitis, feline oral neoplasia, mandibular fractures, and temporomandibular luxations.

**Periodontal Disease**

Periodontal disease can be divided into two categories: gingivitis and periodontitis. Gingivitis is confined to gingival tissue, while periodontitis is a more severe form of disease involving loss of bone supporting the tooth. Cats with periodontitis, in addition to having gingivitis, may have gingival recession or increased pocket depth, alveolar bone loss, exposure of roots and furcations, tooth mobility, and eventual tooth loss. A periodontal probe is used to assess the level of attachment loss and measure pocket depth.

The prevention and treatment of feline periodontal disease consists of regular dental prophylaxis every 6 to 12 months. A thorough dental prophylaxis can only be performed under general anesthesia and consists of supragingival and subgingival scaling, subgingival curettage, root planning, and polishing the teeth. Broad spectrum perioperative antibiotic therapy is recommended perioperatively.

Two abnormalities may be associated with feline periodontal disease: oral inflammatory diseases and resorptive lesions. When periodontal disease is complicated by either of these conditions, exodontia is the treatment of choice. In cats, dry-food diets, especially tartar control diets, result in improved gingival health compared to a soft-food or semi-moist diet. In addition, daily brushing to remove plaque is ideal.

**Tooth Resorptive Lesions**

Tooth resorptive lesions are common dental lesions in cats. A report reviewing 10 independent surveys of tooth resorptive lesions revealed that 20 to 67% of all cats have 1 or more lesions, with a mean of 2.3 to 4.1 lesions per affected cat. Tooth resorptive lesions are characterized by a clinically or radiographically evident defect in the enamel, dentin, and/or cementum. These lesions may be hidden from view by plaque, dental calculus, or inflamed gingival tissue. Clinically, resorptive lesions are areas in which tooth substance is missing and may be seen as actual absence of tooth substance, or the missing hard tooth tissue is covered with granulation tissue. A dental explorer is used to detect these lesions. These teeth should be radiographed to determine the full extent of the defects. Full-mouth radiographs are recommended in cats since multiple lesions are common.

In the past whole-tooth extraction was considered the treatment of choice for teeth with severe tooth resorptive lesions. Teeth with advanced lesions are weak, brittle, ankylosed and have severe root resorptive lesions, making extraction difficult, which may result in iatrogenic trauma to the patient, loss of alveolar bone, and prolonged healing of surgical defects. A study by DuPont investigated the intentional retention of part or all of nonpathologic tooth roots following amputation of the crown and reapposition of the gingiva. Utilization of the DuPont technique requires preoperative dental radiographs to rule out evidence of endodontic pathosis. Teeth with endodontic pathosis, as evidence by the presence of periapical lysis, or teeth with periodontal pocketing must be treated by extraction rather than crown amputation with intentional root retention. Also, cats affected with ulceroproliferative disease are not candidates for this technique. These cats require that all root structure and possibly the surrounding alveolar bone be completely removed. Teeth with an intact periodontal ligament space should be routinely extracted.

After radiographing feline teeth with advanced resorptive lesions and ruling out the presence of endodontic pathosis, periodontal pocketing, and confirmation of severe root resorption, a small envelope flap is created with a feline periosteal elevator. Two small interproximal gingival incisions located mesial and distal to the affected tooth are made using a 15 blade. The gingiva is minimally elevated from the marginal alveolar bone with a small feline periosteal elevator. The gingiva is retracted and protected with the end of a small flat elevator, while the crown of the tooth is amputated with a number 3 round bur on a high-speed handpiece at or slightly below the level of the alveolar crest. Sharp bony projections are smoothed with a bur, and the gingiva is closed with 5-0 Monocryl.
Fractured Teeth
Fractured canine teeth usually result in pulpal exposure in cats because of the extension of the pulp canal into the coronal tip of the canine tooth in felines. Pulpal exposure is confirmed with a fine dental explorer. Teeth with confirmed pulpal exposure should be extracted or treated endodontically. Prior to endodontic therapy, radiographs are taken to ensure that the apex is intact. Failure to treat fractured teeth with pulpal exposure may result in periapical abscessation, mucosal or cutaneous fistulation, chronic rhinitis, osteomyelitis, and ocular discharge.

Mandibular Swelling
Feline mandibular swelling is not readily recognized because of the ventral location of the mandible. Without palpation of the ventral aspect of the mandible, mandibular swelling may not be detected. Feline mandibular swelling may be benign or malignant. The most common cause of benign mandibular swelling in cats is osteomyelitis secondary to retained odontoclastic resorptive tooth roots, and less frequently, secondary to periodontal disease and endodontic disease. The most common cause of malignant feline mandibular swelling is squamous cell carcinoma, and less frequently fibrosarcoma, lymphosarcoma, and osteosarcoma. Oral examination, dental radiography, and intraoral incisional biopsy will help provide a diagnosis. Treatment of feline mandibular swelling is dependent upon an accurate diagnosis. Benign mandibular swelling associated with dental disease requires recognition of diseased teeth. Oral examination with periodontal probing and examination with a dental explorer will assist in the recognition of periodontal pockets, pulpal exposure, and retained root tips associated with resorptive lesions. Treatment of feline mandibular swelling associated with dental disease requires extraction of diseased teeth.

Feline Periangular Osteitis
A severe, firm swelling around the root of the maxillary canine tooth may occur in middle-aged and geriatric cats. This bulbous maxillary canine tooth periangular swelling often occurs bilaterally, may be associated with periodontal or endodontic disease, and should not be mistaken for neoplasia. Periodontal probing and dental examination of the affected maxillary canine teeth often reveal a deep periodontal pocket or chronic pulpal exposure. A dental radiograph may reveal loss of trabecular bone pattern around the roots of affected maxillary canine teeth, with a thin line of sclerotic bone surrounding the periradicular bone loss. Treatment includes extraction of the affected tooth, curettage, and flushing of the alveolus with sterile saline. The firm periangular swelling may partially remodel over time; however, significant chronic residual swelling may remain.

Gingivostomatitis
The use of the term gingivostomatitis is recommended when describing the general inflammation of the gingiva and oral cavity. The prevalence of gingivostomatitis has been reported, and depending on the patient population in the study, the reported incidence of gingivostomatitis is quite variable. In a survey of its members by the AVDS, 72% of respondents indicated that they saw one or more cases of gingivostomatitis per week. In another study, “gingivitis” was present in 13.1% of cats examined in private veterinary practices in the United States, but the number of cats affected by feline chronic gingivostomatitis was not recorded. In a study involving 4,858 cats visiting first opinion veterinary practices in Northwest England, 34 cats presented with physical findings consistent with gingivostomatitis, demonstrating a prevalence of 0.7%. The presenting clinical signs of cats with gingivostomatitis are symptomatic of the pain and inflammation in the mouth and may include dysphagia (sometimes anorexia), preference for soft food, weight loss, halitosis, ptyalism (sometimes blood-stained), halitosis, pawing at the mouth, and reduced grooming with a scruffy hair coat.

The patterns of distribution of feline chronic gingivostomatitis include gingivitis with stomatitis, stomatitis with gingivitis, and faucitis. Cats presenting with a pattern of distribution classified as gingivitis with stomatitis demonstrate gingival inflammation that extends past the mucogingival junction onto the buccal mucosa and less frequently onto the palatal and lingual mucosa. These lesions are usually symmetrical, and the premolar and molar regions are likely to be more inflamed than the incisor and canine regions. Cats presenting with a pattern of distribution classified as stomatitis with gingivitis demonstrate an inflammatory reaction that is more intense in the rest of the oral mucous membranes than in the actual gingiva. These cats often present with inflammation of the palatoglossal folds, but there may be extensive ulceration or granulation of the gingival and/or buccal mucosa, with the mucosa of the hard palate or tongue rarely affected. Cats affected with a pattern of distribution classified as stomatitis with gingivitis are more likely to exhibit signs of oral pain than cats with predominantly gingivitis. The term “faucitis” is considered a misnomer because by definition the “fauces” is the region medial to the palatoglossal folds, and the inflammation that is commonly called “faucitis” is largely confined to the palatoglossal folds and
regions lateral to the folds. Inflammation of the gingiva in the premolar and molar regions is almost always present in some cases. The etiology of feline chronic gingivostomatitis remains uncertain, although a number of factors including various infectious agents, dental disease, genetics, and breed factors have been implicated. The main factors that have so far been considered as playing a role are either infectious or related to a cat’s immune response. Infectious agents that have been implicated include feline calicivirus (FCV), feline immunodeficiency virus (FIV), and possibly feline leukemia virus (FeLV) or feline herpesvirus (FHV); certain anaerobic bacterial species have also been implicated. Immunological studies have found differences in cytokine expression and immunoglobulin profiles in cases compared with controls, and it has also been suggested that immunosuppression caused by an unrelated health problem may play a role. It is likely that the cause of feline chronic gingivostomatitis is multifactorial.

The diagnosis and workup for cats with chronic gingivostomatitis has been previously described. A complete workup includes testing for FIV, FeLV, CBC, chemistry, biopsy of affected tissues, dental radiographs to determine the presence of periodontal disease or odontoclastic resorptive lesions, retained roots or other lesions, and Bartonella titers. Systemic diseases including chronic renal failure and diabetes mellitus, which may predispose to severe gingival inflammation, must be excluded prior to initiation of any treatment.

The intractable nature of chronic feline gingivostomatitis, in combination with an incomplete understanding of the cause of this disease, has resulted in an empirical symptomatic approach to the treatment of chronic feline gingivostomatitis. Unfortunately there have been few well-controlled clinical studies documenting the efficacy of various treatment options. In a clinical study various treatment regimens including chlorhexidine rinses, antibiotics, corticosteroids, and gold salts were investigated over a 6-month period. In this study, over the short term methylprednisolone was shown to be the most effective treatment; however, over the long period the individual clinical responses were found to be diverse, and none of the treatment regimes demonstrated superiority. In another clinical study in which 30 cats with chronic feline gingivostomatitis were treated by extraction of most or all of the premolar and molar teeth, 24 of the 30 cats (80%) were significantly improved or clinically cured at the time of follow-up, 11–24 months following treatment. Based on the above studies, Gorrel recommends that treatment for cats with chronic gingivostomatitis include a combination of periodontal therapy and a home care regimen whereby plaque accumulation is kept to a minimum. This regimen may result in a reduction in inflammation in some cats; however, most cats will not cooperate with home care plaque reforms, and clinical signs persist. In cases in which medical management is unsuccessful, extraction of all premolars and molars or full-mouth extraction is the treatment of choice. This is facilitated by making a full-thickness gingival flap in each quadrant, using a small feline perosteal elevator to elevate the lingual and/or palatal and buccal aspects to provide adequate exposure to the underlying bone. The buccal bone is removed as needed; the teeth are sectioned and removed. The rough edges of bone are removed with a small round bur, the alveoli are curettaged, and all inflammatory tissue is debrided. The surgical site is flushed and closed without tension. Postoperatively these patients require appropriate intravenous fluid administration, antibiotic and analgesic therapy and may rarely require esophagostomy feeding tubes.

Some cats with chronic gingivostomatitis, particularly those with extensive proliferative lesions in the caudal oral cavity and pharynx, are refractory to treatment and warrant a guarded prognosis. This group of cats is somewhat small, as reported by Hennet. Sixty percent (18/30) of all cats in this study were clinically cured, 20% (6/30) had significant improvement, 13% (4/30) had little improvement, and 7% (2/30) had no improvement.

Numerous treatments options have been recommended for the management of chronic feline gingivostomatitis including: gold salts (aurothioglucose), azathioprine (Imuran), chlorambucil (Leukeran), Vincristine (Oncovin), 5-fluorouracil, Lactoferrin, antibiotics including: azithromycin, clavamox, clindamycin, metronidazole, amoxicillin, ampicillin, enrofloxacin, tetracycline, glucocorticoids, nonsteroidal anti-inflammatory drugs, sulodexide, tacrolimus topical, thalomid, zinc sulfate, lysine, colchicines, IFNα (interferon Alfa-2A), cyclosporine, hypoallergenic diets (Hills Z/D low allergen diet or IVD duck and pea diet), laser thermoablation.

Unfortunately, many of these treatments have varying degrees of toxicities, and it is important to be familiar with the side effects of these drugs when they are utilized in patients with gingivostomatitis. Currently, since the only treatment that consistently delivers 60–80% cure without the use of follow-up medications is extraction, extraction of all teeth distal to the canines and in some cases all the teeth seems justified in cats with this debilitating disease. Refractory cases in which severe inflammation persists in spite of full-mouth extraction warrant a guarded prognosis. These cases may benefit from either cyclosporine and/or laser thermoablation.
In a recent study in which oral cyclosporin was used to treat 23 cats with feline dermatoses, which included 8 cats with nonresponsive stomatitis, remission was observed in 4/8 cats, and in the other 4 cats there was a partial to fairly good improvement of clinical signs (from 40 to 70%). The dose formulation of cyclosporine used in these cats in this study included 30–50mg daily of Sandimmun® solution; mean dosage 10.3mg/kg (range 5.8–13.3mg/kg). The cyclosporine was administered 2 hours before or after meals for 4 weeks. The cyclosporine was continued every other day for 1 or 2 months until remission of the symptoms. A maintenance regimen was then installed with a twice-a-week administration of cyclosporine for an unlimited duration. Dosage adjustments may be necessary based on clinical response and given time to be effective (4–6 weeks). Serum levels can be evaluated at 4 to 6 weeks through Antech Diagnostics and IDEXX Laboratories, with dosage adjustments made based on these levels to produce trough levels in the blood >500ng/ml. Some veterinary dentists recommend dosage adjustments based on clinical response only, and some patients require adjunctive therapy with corticosteroids.

Laser thermoablation has been recommended for cytoreduction of chronic proliferation of oral mucosa in cats with chronic gingivostomatitis. This modality has been suggested as an alternative for partial- or full-mouth extraction for cats in which owners decline partial or full mouth extraction or in cats that have persistence of clinical signs following partial- or full-mouth extractions. Laser thermoablation combined with cyclosporine therapy may give good results in some cases without extraction of teeth. Multiple treatments with a carbon dioxide laser have been recommended to control proliferative tissue. The CO2 laser can be used at 2–6 watts of power, with a 0.8–1.4mm tip in continuous wave mode to vaporize inflamed tissue. The beam is defocused to “paint” the entire inflamed tissue area, which is repeated until there is minimal bleeding after the char is wiped away. Therapeutic success is achieved when there is elimination of proliferative tissue and inflammation.

**Feline Oral Neoplasia**

Oral neoplasia occurs frequently in cats. By far the most common type of feline oral neoplasia is squamous cell carcinoma. The second most common feline oral neoplasia is fibrosarcoma. Other, less common, feline oral neoplasia include lymphosarcoma, osteosarcoma, and melanoma. Treatment of feline oral neoplasia is early radical resection including mandibulectomy and maxillectomy procedures. Other potential treatment modalities include chemotherapy and radiation therapy.

**Mandibular Fractures and Temporomandibular Luxations**

Successful treatment planning in dogs and cats with maxillofacial trauma is based on accurate assessment and diagnosis of the full extent of the injuries. In a recent prospective study including 9 dogs and 15 cats with maxillofacial trauma, it was concluded that CT is superior to conventional skull radiography for identification of anatomic structures and traumatic injuries in dogs and cats. This study also found that skull radiography is useful for visualizing the mandibular body and dental occlusion.

The most common mandibular fracture in cats is the symphyseal fracture. Repair is accomplished with circumferential wiring, which involves placing a wire around the mandible to achieve stabilization.

Intercanine acrylic splinting between the mandibular and maxillary teeth can be utilized to stabilize caudal mandibular fractures and easily reduced but unstable temporomandibular luxations. Alternative techniques when possible are recommended because of the difficulty in managing patients with their mouths partially opened for a 3–4 week period. If other treatment modalities are likely to be unsuccessful in achieving stabilization, then intercanine acrylic splinting between the mandibular and maxillary canine teeth will usually provide a successful result. Placement of an esophagostomy feeding tube in these patients is often beneficial in maintaining proper nutritional intake.

**References**


