A n ulcer is a break in the skin or mucous membrane, with loss of surface tissue, disintegration, and necrosis of epithelial tissue. Oral ulceration occurs specifically on the mucous membrane of the oral cavity; bacteria populate the exposed area, leading to inflammation and pain.

Several ulcerative diseases are seen in dogs and cats; this article will review the most common ones, including etiology, presentation, diagnosis, and treatment/management.

**FELINE CAUDAL STOMATITIS**
Feline caudal stomatitis (FCS)—a clinical diagnosis of inflammation and proliferation of the gingiva and oral mucosa—is a very frustrating and poorly understood disease in cats. Specifically, inflammation associated with the mucosa of the caudal part of the mouth (mucositis) is the delineating factor between caudal stomatitis and periodontal disease.

**Etiology**
The etiology of this disease process is currently unknown. Multiple etiologies may exist that, either alone or combined, create the inflammation. Possible causative agents include an inflammatory response to plaque, viruses (particularly upper respiratory), *Bartonella henselae* infection, or altered immune status (feline immunodeficiency or leukemia viruses, FeLV or FIV). However, it appears to be an excessive, inflammatory immune response to a heretofore unknown agent.

**Clinical Features**
**History.** Owners often report a history of halitosis, dysphagia, pawing at the mouth, anorexia, crying out in pain when eating or yawning, weight loss, unkempt appearance, and drooling.

**Oral Examination.** Upon examination:
- Affected gingiva and oral mucosa have varying amounts of inflammation, proliferation, and ulceration (Figure 1). The mucosa is typically bright red, with friable tissues that bleed easily.
- Inflammation is typically, but not always, bilaterally symmetrical.

The clinical sign that differentiates caudal stomatitis from periodontal disease is the presence of caudal inflammation (distal to the teeth) in cases of caudal stomatitis (Figure 2). This presentation was previously called *faucitis*, but is now known as *caudal mucositis*. In contrast, in cases of typical periodontal disease, inflammation is associated with the gingiva surrounding the teeth, and does not extend distally into the caudal oral mucosa to any significant extent.

**Diagnosis**
Caudal stomatitis is a clinical syndrome, which does not indicate a specific etiology or diagnosis; therefore, diagnosis is made by visual inspection of the oral cavity. Additional diagnostic tests to further evaluate the patient include:
- Dental radiographs
- Complete blood count and serum biochemical profile
- Evaluation of FeLV/FIV status.

If inflammation is asymmetrical or otherwise atypical, or radiographic findings are suspicious for neoplasia, a biopsy should be submitted for histopathology.
Therapeutic Options
Ideally, the goal of therapy is total eradication of oral inflammation; however, reducing the amount of inflammation is sometimes the best degree of healing that can be achieved.1,3,9

Even intense efforts at plaque control and medical therapy rarely result in an acceptable response—in terms of decreased inflammation.13 Therefore, recommended treatment encompasses:11

• Extraction therapy is the preferred treatment for FCS and should be performed as soon as possible.
• Medical therapy should be reserved for those patients in which clients will not allow (or cannot afford) extraction therapy.
• My approach to resistant cases—after retained roots are ruled out—is as follows:
  » Feline interferon
  » Cyclosporine
  » Corticosteroids.

Surgical Therapy
Because inflammation control is the key to improvement of FCS, any tooth involved with inflammation due to any cause (ie, periodontal/endodontic disease, tooth resorption) should be extracted.9 Remaining teeth must receive strict home care and routine professional cleanings to prevent further inflammation.11

However, since the majority of patients have widespread inflammation, which makes home care challenging, the most successful long-term treatment for FCS is extraction of all premolars and molars and careful smoothing of the alveolar bone.1,12 Extraction of the rostral teeth is indicated when inflammation includes their gingiva.1,13 Therefore, I will typically perform full-mouth extractions when significant oral inflammation is present, while some veterinary dentists prefer to leave the canines and incisors intact, if possible.1,11

The vast majority of cats have an excellent response to this treatment, requiring no additional therapy (Figure 3).3,12,14

• If extraction therapy is not effective, it is usually due to the presence of retained roots (Figure 4).3,12 Postoperative dental radiographs must be exposed to document complete extraction of all tooth roots.3,12,13
• Some cats have only partial improvement and require long-term medical management, generally, though, at much lower doses than required for FCS that has not been treated surgically.
• The patients who have the least response to extraction therapy are typically those that have had long-standing, chronic inflammation that has been treated with repeated high doses of glucocorticoids.3,12

It is important to note that, in my experience, the earlier teeth are extracted, the better the outcome.3,11 Therefore, make sure clients understand that delaying extraction therapy often results in a decreased response to this therapy.

Laser Therapy
One recent case report revealed improvement of inflammation after surgical laser therapy. However, despite several laser treatments, resolution occurred only after full-mouth extractions were performed.19 Therefore, laser therapy alone did not provide an obvious benefit. In addition, I have treated numerous patients in which laser therapy has been performed, but no response to this therapy is evident. Consequently, this is not currently a recommended initial form of therapy.11

Medical Therapy
When owners are reluctant to have multiple extractions performed, medical management may be attempted, but has several disadvantages:

• Many products used are oral medications, which require daily to twice daily administration.
• Medical therapy is almost invariably a life-long process, and many products have significant side effects.
• No medical protocols have been shown to be completely effective; they only reduce the clinical signs temporarily.11,15
Antibiotics. Systemic antibiotics may decrease some oral inflammation. However, this is generally temporary at best, and most patients will relapse, even during the course of antibiotic therapy.3-5

Corticosteroids. Corticosteroids are, by far, the most commonly used and effective drugs for immune modulation, resulting in clinical improvement far more often than antibiotic therapy.3 However, long-term use may have detrimental effects, such as induction of diabetes mellitus and opportunistic infections.5,6 Chronic corticosteroid therapy should only be used as a last resort—if an owner will not allow extractions.

Immunosuppressive Treatment. Cyclosporine A has been proposed as an immunosuppressive drug for cats with caudal stomatitis,7 and some have promoted it as an alternative to extractions in order to avoid glucocorticoid use.

While there is no published information that supports the use of cyclosporine A prior to extractions, it has been shown to be effective in cases refractory to extraction therapy,11 and may provide an alternative to long-term steroid therapy. Therefore, I prefer to use cyclosporine only in patients in which medical management is necessary post extraction.11

Cyclosporine A must be used with caution in cats with hepatic or renal disease, and there are reports of fatal opportunistic infections associated with its use.11,12 The bioavailability of the 3 available forms of cyclosporine is quite variable, and dosing depends on which form is used.11 A veterinary product is available for feline atopy (Atopica, novartis.com), which may be useful for this condition.

Interferon. Feline interferon (Vibragen, virbac.com) is reported to provide both antiviral and immunomodulatory effects, restoring the normal local immune response.20 Several studies have shown efficacy in resistant cases20-22 but, as of yet, no available evidence demonstrates its efficacy as a primary treatment. While this product is not currently available in the U.S., it can be imported by completing paperwork through the U.S. Food and Drug Administration.

Feline Juvenile (Puberty) Gingivitis/Periodontitis
Definition
Juvenile periodontal disease develops when inflammation occurs shortly after permanent tooth eruption.2,25

Etiology
The cause of this condition is unknown, but an infectious etiology is theorized. In humans, a similar condition occurs due to a suspected temporary decrease in immune status during the pubertal period.2,25 A genetic predisposition toward feline juvenile periodontitis has been reported in Siamese, Somali, and Maine Coon cats.7

Clinical Features

Hyperplastic gingivitis appears as significant gingival enlargement and inflammation (Figure 5).11

This disease is often mistaken for caudal stomatitis; apart from the age of onset, the distinguishing clinical sign is lack of caudal inflammation in cats with hyperplastic gingivitis.11

• If left untreated, this disease typically progresses to periodontal disease, possibly resulting in early tooth loss.25

• As the patient matures, the inflammation may subside at approximately 2 years of age, following the same pattern as the human disease.24

If hyperplastic gingivitis is treated aggressively early on, the patient may have normal periodontal health in the future.11

Juvenile periodontitis does not involve enlargement of the gingiva, and typically leads to rapid proliferation of plaque, calculus, and periodontal inflammation (Figure 6, page 48).12 This, in turn, results in early bone loss, periodontal pocket formation, and furcation exposure.13 Bone loss is generally most severe around the mandibular first molars (Figure 7, page 48).

Diagnosis11,23

• Histopathology should be considered in order to rule out other causes of gingival inflammation.

• Dental radiographs should be performed to evaluate the quality of the alveolar bone and early tooth resorption.

• Culture and sensitivity testing is generally unrewarding.

Therapeutic Options
Early (9 months of age) and frequent professional dental cleaning (every 6–9 months), along with strict home care is critical to decrease inflammation.11,25

• Ideally, home care consists of daily brushing; alternatives and/or complementary home care therapies include chlorhexidine rinses (CET Oral Hygiene Rinse, virbac.com), plaque control diets (t/d Canine and Feline Dental Health Diets, hillsvet.com), and treats (Greenies, greenies.com).

• If gingival hyperplasia is present, gingivectomy is recommended to remove pseudopockets, decrease inflammation, and facilitate plaque control.7

• Extraction of any significantly diseased teeth is warranted.25
CHRONIC ULCERATIVE PARADENTAL STOMATITIS (KISSING LESIONS)

Definition
Chronic ulcerative paradental stomatitis (CUPS) is an ulcerative, immune-mediated reaction of the oral tissues, typically the buccal mucosa but also the tongue.25

Etiology
CUPS is believed to represent an inflammatory rather than infectious etiology. A hypersensitivity reaction is most likely triggered by gram negative bacteria (and their inflammatory antigens) associated with the periodontal disease trigger.25,26

Clinical Features
CUPS is most common in small dogs, especially white breeds; however, this condition can occur in any breed. Onset is typically during middle age.25 Presenting signs include intense oral pain, halitosis, and partial to complete anorexia:25,27

Oral examination typically reveals:25
• Significant dental plaque and calculus, with gingivitis and gingival recession
• The classic sign of severe buccal ulceration, in areas of contact between the mucosa and affected teeth (Figure 8)
• Lesions are typically most severe over the maxillary canine and carnassial teeth and in areas of gingival recession.
• Occasionally there can be involvement of the entire buccal mucosa and the lateral edges of the tongue.

Diagnosis
• Clinical signs are classic; however, histopathology should be performed.
• Dental radiographs should be exposed to evaluate periodontal status.
• Response to therapy (complete dental prophylaxis), with early relapse, is confirmatory.

Therapeutic Options
The key to managing this disease process is comprehensive plaque control, which is achieved by a combination of strict home care, regular dental cleanings, and selective to full-mouth extractions.25-27

Home Care. Tooth brushing and chlorhexidine rinses are the most effective means of plaque control at home. Dental diets or treats can be used in addition to or, in place of, brushing or rinsing. Finally, a barrier sealant (OraVet, merial.com) has shown some benefit in patients when used consistently.

An important point to consider is that, in the majority of cases:25
• Only partial recovery will occur even with the strictest home care.
• Without strict home care, conservative therapy will fail. Resolution of clinical signs may occur due to the stoic nature of dogs, but there is generally some degree of continued inflammation (and pain). Typically, these patients can only achieve complete resolution with partial to full-mouth extractions.

Surgical Therapy. During the first anesthetic event:
• A complete dental prophylaxis should be performed.
• Dental radiography should be performed.
• All periodontally diseased teeth (especially those with gingival recession) should be extracted.
• Histopathology should be obtained and submitted to a reference laboratory.

Medical Therapy. Medical therapy is generally unrewarding, but can be added to strict plaque control measures in nonresponsive patients in which the owners are particularly resistant to extractions.25

A combination of antibiotic and anti-inflammatory medications is typically used. It is important to note that patients often only have a partial response to this medical therapy, and only a transient (weeks to months) recovery following thorough dental prophylaxis.25 With either conservative modality, relapse is usually imminent and generally complete.

Prior to initiation of therapy, and at regular intervals through the course of treatment, clients must be informed about the side effects and long-term complications that may result from antibiotic and anti-inflammatory medications. Regular blood and urine testing must be performed.
Practical Dentistry  |  Feline and Canine Oral Ulcerative Disease

to ensure that untoward effects are not occurring. These factors, and the involved costs, need to be weighed against surgical therapy.

**Follow-Up.** After the diagnosis is confirmed, remind the owner of the long-term and consistent commitment required for treating this disease process.

- In addition to home care, regular dental cleanings (several times a year) are necessary to control clinical signs in most patients.
- If this is a concern, or home care is impossible, extraction of the maxillary canine and carnassial teeth (as well as any other teeth involved) should be performed.25
- Consequently, full-mouth extractions are not unusual in these cases. This therapy, while extreme, is curative in the vast majority of cases.25

  When full-mouth extractions are performed, it is not uncommon for clients to report that their dogs are “acting like a puppy again.”

**EOSINOPHILIC GRANULOMA COMPLEX**

**Etiology**

Etiology of this condition is unknown. However, a local accumulation of eosinophils is thought to initiate inflammation and necrosis,28 which may result from local (food) or systemic allergies, although, these lesions have been seen in patients in which allergic disease has been ruled out.29,30 Additional causes include a response to irritation, such as chronic grooming or traumatic malocclusion,23,26 or a genetic predisposition.32

While these lesions have been reported in dogs,33 they are much more common in cats. Therefore, the discussion in this section will relate to cats, although, the disease process is similar in both species.34

**Clinical Features**

- Indolent ulcers are the most common oral manifestation, and present as brownish-red lesions on the upper lip or around the maxillary canine teeth (Figure 9).35
- Linear granulomas can be single or multiple; the most commonly affected sites are the lips, gingiva, palate, and tongue (Figure 10).35 They are generally nonpainful, but may develop secondary infections.
- The typical presentation is a raised, lobulated yellow-pink mass; however, it can also appear ulcerative. These lesions may lead to severe periodontal loss, pathologic fractures, or oronasal fistulas.34,56–57

**Diagnosis**

- Histopathology should be performed to confirm the diagnosis.36
- Following diagnosis confirmation, a thorough allergy evaluation should be conducted, including food trial, flea treatment, +/- allergy testing.25

**Therapeutic Options**

The acute disease process is best treated with systemic corticosteroids, and a typical initial protocol is prednisone, 2 mg/kg Q 12 H for 3 to 4 weeks.28,38 Additional options include intralesional triamcinolone (3 mg/week) or methylprednisolone injections.39

Antibiotic therapy is occasionally required to induce remission and/or treat secondary infection. There are also some patients that appear to respond to antibiotic therapy alone.40 Therefore, we initially treat mild cases with antibiotics alone and more severe cases with a combination of antibiotics and corticosteroids.

If an allergy component is identified, it should be addressed (eg, flea control, hyposensitization, food trial).41 However, many cases remain idiopathic, requiring lifelong therapy. Cyclosporine has been shown to be effective in treating this condition, with fewer side effects demonstrated compared to steroids.42,43

CUPS = chronic ulcerative paradental stomatitis; FCS = feline caudal stomatitis; FeLV = feline leukemia virus; FIV = feline immunodeficiency virus

To view the references for this article, go to todaysveterinarypractice.com/resources.asp#resources.
References

2. AVDC accepted nomenclature; available at avdc.org.
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