

An updated approach to chronic feline gingivitis stomatitis syndrome

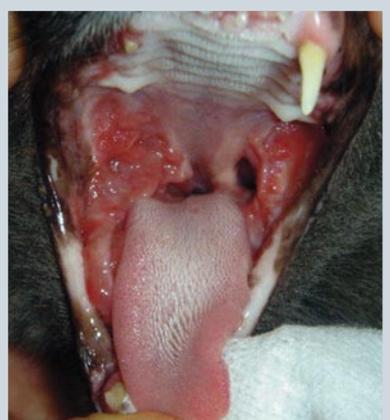


Figure 1.

THE condition currently, and most commonly, known as Feline Chronic Gingivitis-Stomatitis (FCGS) is a relatively common and frustrating problem to the small animal practitioner. In a study of nearly 5,000 cats by 12 practices, the prevalence of FCGS was 0.7% (Healey, 2007).

Many cases prove to be extremely frustrating with a confusing number of

different treatments in current use. The purpose of this article is to bring together a logical method of investigation and treatment for these cases based on the known evidence base where possible.

The syndrome is characterised by persistent and severe inflammation and ulceration of the oral soft tissues. Many times this includes the tissues lateral to the palatoglossal folds (Figure 1) in addition to the gingiva, pharyngeal and lingual mucosa.

Stomatitis is defined by the American Veterinary Dental College

(www.avdc.org) as: "Inflammation of the mucous lining of any of the structures in the mouth; in clinical use the term should be reserved to describe widespread oral inflammation (beyond gingivitis and periodontitis) that may also extend into sub-mucosal tissues (e.g. marked caudal mucositis extending into sub-mucosal tissues may be termed caudal stomatitis)."

Paradoxically, the condition is often present in the absence of significant accumulation of calculus on the teeth.

The syndrome can be seen at three distinct times in a cat's life. Firstly, around the time of kitten vaccinations, oral inflammation can occasionally be seen. Whether this is an immune response to vaccinal elements or the eruption of deciduous dentition and consequential increased levels in dental plaque is not known.

A second period to see an increase in oral inflammation levels is when the

tooth surface and elsewhere in the mouth.

Not all cases of FCGS present in the same manner. A wide range of severity of initial signs does commonly occur. Some cats respond well to routine periodontal therapy and improved hygiene alone while others will respond poorly to any treatment.

The implication is that some cats have a very low threshold to the trigger factors(s) whilst others have a higher threshold approaching the level for normal cats. Most intractable cases (87%) improve with elective tooth extraction and a few cases (13%) do not respond to any treatment (Hennet, 1997; Girard and Hennet, 2005; Hennet, 2010).

Clinical signs

Many, but not all, cats present with dysphagia and pain due to extensive oral inflammation and ulceration of soft tissues. In some cases it can be hard to understand how the individual eats or functions normally with such extensive oral inflammation.

Inflammatory lesions may involve some or all of the oral soft tissues. Most cases present with inflammation and ulceration of the tissues lateral to the palatoglossal folds in addition to the gingiva and mucosa overlying the cheek teeth. Other oral tissues such as the pharynx, tongue and the mandibular molar salivary glands can also be affected in severe cases.

Commonly reported signs include:

- anorexia and/or dysphagia;
- severe halitosis;
- weight loss – chronic or acute;
- lack of (or an inability to) groom;
- a reluctance to eat hard food;
- submandibular lymphadenomegaly – nodes often dramatically increased in size and painful when palpated;
- variable, sometimes minimal, accumulation of plaque and calculus;
- teeth may be missing, affected by TRs or suffering from furcation exposure and excessive mobility after recession of the periodontal tissues.

Aetiology

This is a complex multifactorial condition and there is no simple aetiological agent for the syndrome. Certain factors are thought to have an effect but the most commonly held view is that these cats suffer from an immunological over-reaction to low levels of oral antigens – dental plaque mainly. Factors involved are:

- **Breed.** Mixed breed cats make up the majority of cases seen in the author's

practice by a factor of 2:1. In the same case survey, the Maine Coon and Siamese breeds do appear to have more affected individuals than any other.

In a survey of nearly 5,000 cats in 12 practices over a 12 week period, 34 cases of chronic FCGS were identified and no breed bias was identified (Healey, 2007).

• **Environmental factors.** Colony cats or those in multi-cat households appear to be more commonly affected early in life. Increased stress levels plus the close proximity of other cats allowing transmission of viruses and other micro-organisms are held to be significant factors.

• **Plaque bacteria.** The oral bacteria present in dental plaque matrix drives the inflammatory response in normal individuals. Cats that appear to be plaque intolerant show a variable threshold to the bacterial load of the mouth displaying an abnormal and non-specific level of inflammation.

Specific bacteria, as seen in periodontal disease, have been reported in these cats and *Pasteurella* and *Prevotella* species are more highly represented than others. Around half the cats seen by the author harvested pure cultures of *Pasteurella multocida* (Dolieslager, 2011).

Viruses

• **Feline Calici Virus.** Many papers report a level above 70% of chronically affected individuals with signs for over six months showing positive testing to virus isolation following oropharyngeal swabbing for Feline Calici Virus (Knowles, 1989; Thomson, 1984; Harbour, 1991). The significance of this within the syndrome is not known.

It is possible that the virus damages cell membranes allowing easier antigenic penetration by other agents. However, other co-factors are required before this virus can cause disease as FCV carriage in the cat population is around 20-30% (Knowles, 1989; Zicola, 2009).

One research study (Hennet and Boucraut-Baralon, 2005) considered that chronic palatoglossitis lesions, as opposed to buccostomatitis lesions, to be more specifically associated with calicivirus carriage.

• **Feline Immunodeficiency Virus (FIV)** infection may have a role in producing oral lesions by predisposing the cat to secondary infections. Both FIV and FeLV may contribute to an aberrant immune response to oral antigens but

NORMAN JOHNSTON outlines a logical method of investigation and treatment of this relatively common and frequently frustrating problem - based on the known evidence base



permanent teeth erupt. Lastly, and most commonly, FCGS is seen later in life with a mean age of seven years.

This syndrome must be considered as part of a full oral cavity examination. The presence of other problems concurrently, such as tooth resorption lesions (TRs), frequently adds to and confuses the picture.

It has been known for some time that carriage of Feline Calici Virus (FCV) is a co-factor in the induction or progression of the complex. The relationship between calici infection and FCGS appears strong with 70-90% of chronic stomatitis cats testing positive compared with 20% of general population cats (Knowles, 1989; Harbour, 1991).

It has also been reported that the relationship between FCV and FIV appears strong but the association between the two has never been established for FCGS cats (Knowles, 1989 and 1991).

Many cats also present with a hypergammaglobulinaemia (Harley, 1999; Harley, 2003). This implies B lymphocyte proliferation and therefore no humoral immune response depression. It is probable that affected cats are intolerant to even small quantities of bacterial plaque on the

Norman Johnston, BVM&S, DipEVDC, DipAVDC, MRCVS, RCVS Recognised Specialist in Veterinary Dentistry, graduated from Edinburgh in 1976 and owns a dedicated referral dental and oral surgical practice near Edinburgh. He is a diplomate of both the American and European Veterinary Dental Colleges and a Fellow of the Academy of Veterinary Dentistry. He has been a registered RCVS Specialist in Veterinary Dentistry since 2002. He is a past president of the European Veterinary Dental College, the British Veterinary Dental Association and also a past chair of VETTrust, an educational veterinary charity based in Scotland.

a recent study (Dolieslager, 2011) showed a group of FCGS cats to have 4% prevalence for positive FIV and FeLV which is similar to the UK cat population as a whole. However, this is not the hyperimmune response that characterises the main syndrome.

• **Dental disease.** The presence of any concurrent dental disease is important. Either periodontal disease, TRs or both can have an exacerbating effect on the syndrome.

Diagnostic testing

A standard diagnostic approach is advocated for all cats affected. Some of this can be considered optional in some cases and some are essential. These tests are marked appropriately as “O” or “E”.

- Full general and dental history; including recent and past treatments for the mouth (E).
- General health assessment (E).
- Full examination of head and neck (E).
- Scoring the oral soft tissues using the Stomatitis Disease Activity Index (SDAI) sheet (Figure 2). Scoring the mouth at each visit allows the clinician and the owner to establish the severity of clinical signs and assign them a score from that day. It takes only a few minutes but provides very useful prognostic information.
- Routine Haematology (O) and Biochemistry (E) screening for underlying systemic disease. One study (Hennet, 1997) reported 10% of affected cats with chronic renal failure. Any underlying systemic disease may significantly affect the prognosis or the safety of anaesthetic protocols and other drugs (e.g. long term NSAIDs).
- Virus testing: for FIV, FeLV; oral swab for FCV (E).

• Bacteriology (O): for both aerobic and anaerobic bacteria – a high proportion of cats tested show pure cultures of *Pasteurella multocida* (Dolieslager, 2011).

• Biopsy (O) of affected areas – necessary to eliminate neoplasms (e.g. squamous cell carcinoma, Lymphoma, etc.) and other immunopathologies; very important if lesions not symmetrical.

• Dental chart and full mouth dental radiographic survey (E) to assess periodontal status of teeth, bone quality and locate broken root tips or those with resorptive lesions.

Management and treatment

The main aim for the clinician is to restore the balance between the immune response and the oral antigen burden. In effect this means zero tolerance of both existing dental disease and of bacterial plaque.

First-line treatment - all cats

First-line treatment is for all affected cats and must be performed first. The aim is to reduce the antigen burden and assess if the oral soft issues are able to return to a normal state using normal or enhanced hygiene measures with the emphasis on regular and on-going plaque reduction.

Pre-op antibiotics – possibly advisable for some cases pre-operatively to control excessive inflammation and improve the soft tissue before and after surgery.

These antibiotics should preferably have a good spectrum of activity for *Pasteurella* species.

It should be noted that many cats appear to be clindamycin resistant (Dolieslager, 2011).

assessment of information by the owner regarding appetite, grooming, comfort and activity. The remaining eight criteria require the clinician to score separate areas of soft tissues from zero to 3.

Zero signifies normal tissue. One is for mild inflammation or ulceration, two for moderate and three for severe. Severe inflammation or ulceration shows spontaneous bleeding while moderately inflamed tissue will bleed if gently stimulated with a cotton bud. The mouth is given a score out of 30.

Repeat scoring at each recheck (Figure 4) provides valuable information with regard to success of treatment and acts as a powerful motivator for often demoralised owners.

• **Scale and polish teeth.** Every case starts by improving basic hygiene. The first principle of reducing the oral antigen burden requires this step to be taken first.

• **Dental radiographs.** Full mouth dental radiographs provide very useful information with regard to the health status of teeth and surrounding bones. Missing teeth may actually have retained roots and would be significant in the context of this condition.

• **Treat diseased teeth.** In almost all cases, this means extraction. Teeth affected by advanced periodontal disease due to recession of gingiva and bone are best removed. Similarly, teeth affected by TRs (tooth resorption lesions) should be removed at this stage using a technique suitable for

resorptive type. Teeth affected by type 1 resorption should be removed conventionally. Teeth affected by type 2 or type 3 lesions may be suitable for crown amputation depending on radiographic diagnosis.

• **Initiate chlorhexidine.** Chlorhexidine use twice daily will provide excellent post-op plaque control. Finding a suitable product for cats can be a problem. One suitable product is Bright Bark & Meow from Keystone Industries (www.krpetvet.com). This paste should be wiped inside lips twice daily or brushed if the cat will allow it. Oral disinfection with a suitable chlorhexidine product twice daily is one of the most important and effective measures available.

• **Re-assess case in 7-10 days.**
1. *If better:* continue chlorhexidine twice daily and review in four weeks and subsequently as required. Note that more frequent scaling and

FELINE DENTAL CHART Pfizer Animal Health

DATE: _____

ANIMAL'S NAME: _____ AGE: _____

OWNER'S NAME: _____ SEX: _____

BREED: _____ NUMBER: _____

MAXILLA

Buccal R: 109 108 107 106

Palatal: 104 103 102 101 201 202 203 204

L: 206 207 208 209

CI: [] [] [] [] [] [] [] []

GI: [] [] [] [] [] [] [] []

Other: [] [] [] [] [] [] [] []

MANDIBLE

Buccal R: 409 408 407

Lingual: 404 403 402 401 301 302 303 304

L: 207 208 209

CI: [] [] [] [] [] [] [] []

GI: [] [] [] [] [] [] [] []

Other: [] [] [] [] [] [] [] []

Treatment: _____

Recommendations: _____

Legend:

- 0 - Normal
- 1 - Mild
- 2 - Moderate
- 3 - Severe

SDAI Legend:

- 0 - Normal
- 1 - Mild
- 2 - Moderate
- 3 - Severe

SDAI Legend:

- 0 - None
- 1 - Mild
- 2 - Moderate
- 3 - Severe

Figure 3.

Dentistry

• **Dental chart and Stomatitis Disease Activity Index (SDAI) score sheet.** A dental chart is an essential record (Figure 3) of the mouth. Use of a chart discourages shortcutting of examination.

The SDAI score sheet (Figure 2) requires an objective assessment of eight different areas of soft tissue and provides a numerical score for the case. This is very useful in providing a prognosis and motivating owners.

The top two criteria signify an average of

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INITIAL EVALUATION FORM: STOMATITIS DISEASE ACTIVITY INDEX

PATIENT: _____

DATE: _____ WEIGHT TODAY: _____

DIET: _____

CLIENT REPORT: Please evaluate the following (circle one number for each of the following criteria):

- Appetite:** 3 = eats only pureed food, or only when hand fed 2 = eats wet food on his/her own; cannot eat dry food 1 = eating wet and dry food, but less than normal amount. 0 = eating normally
- Activity level:** 3 = no interest in people or other pets, spends most of time sleeping 2 = low activity level, but will play occasionally when engaged by people or other pets 1 = plays spontaneously, but not frequently 0 = normal activity level (playful and active)
- Grooming behavior:** 3 = will not groom 2 = grooms occasionally but not at 'pre-illness' level 1 = grooming excessively 0 = grooming normally
- Perceived comfort:** On a scale of 0-3, with 0 being most comfortable and 3 being most painful, rank your cat's present comfort level: _____

VET EVALUATION:

STOMATITIS DISEASE ACTIVITY INDEX	0	1	2	3
Owner's evaluation (average appetite/activity/grooming)				
Owner's evaluation perceived comfort				
Maxillary buccal mucosal inflammation				
Mandibular buccal mucosal inflammation				
Maxillary attached gingival inflammation				
Mandibular attached gingival inflammation				
Inflammation lateral to palatoglossal folds				
Molar salivary gland inflammation				
Oropharyngeal inflammation				
Lingual and/or sublingual inflammation				
TOTAL SCORE (max = 30)				

Owner evaluation: average of the circled values above for 1, 2 and 3.

Inflammation of oral cavity sites: 0 = none 1 = mild 2 = moderate 3 = severe

Figure 2.

RECHECK EVALUATION FORM: STOMATITIS DISEASE ACTIVITY INDEX

PATIENT: _____

RECHECK DATE: _____ LAST VISIT: _____

STOMATITIS DISEASE ACTIVITY INDEX	0	1	2	3
Owner evaluation appetite/activity/grooming				
Owner evaluation comfort				
Maxillary buccal mucosal inflammation				
Mandibular buccal mucosal inflammation				
Maxillary attached gingival inflammation				
Mandibular attached gingival inflammation				
Molar salivary gland inflammation				
Inflammation of areas lateral to palatoglossal folds				
Oropharyngeal inflammation				
Lingual and/or sublingual inflammation				
TOTAL SCORE (maximum = 30)				

WEIGHT TODAY: _____

Figure 4.

polishing intervals will probably be necessary – perhaps 3-4 per annum. The need for professional dental cleaning is signalled when the daily use of chlorhexidine is failing to control the inflammation adequately.

Use of a disclosing solution (www.drshipp.com – product code 429) at each visit helps demonstrate the location and quantity of dental plaque. Given that dental plaque is invisible unless stained, disclosing solution is a powerful motivator in establishing excellent dental hygiene.

2. *If no better*: move to elective extraction of cheek teeth as soon as possible. Studies over the last 15 years (Bellei, 2008; Hennet, 1997; Girard, 2005) consistently show the benefit of this procedure with 50% of cases requiring no further treatment to resolve their signs and a further 37% needing low levels of inflammation support but are markedly better than before.

• **Repeat scale/polish**. For juvenile patients it is important to avoid permanent anatomic changes in the first two years of life. If the immune system is substandard in the early months, the provision of excellent hygiene can help considerably. Although little calculus may be visible, continued inflammatory changes in either the whole of the gingiva or the marginal gingiva is an indication to repeat the surgical cleaning – especially hand curettage subgingivally. This may mean professional scaling and polishing every three months.

Second-line treatments

Elective extraction of teeth

This is now firmly established, by both peer-reviewed publication and dental specialists, as the logical option to take if first-line treatment (see above) alone is insufficient to provide resolution of the inflammation (Bellei, 2008; Hennet, 1997; Girard, 2005). If the tissues fail to respond by reduction of inflammation and improvement in comfort to the best hygiene we can provide within 2-4 weeks, elective surgical extraction of all the cheek teeth should follow without delay. Owners and many veterinary surgeons are often reluctant to take this step.

Elective surgical extraction of whole cheek teeth quadrants should not be undertaken lightly as there are several complications that may be associated with it.

1. The underlying bone may be sclerotic and poorly vascularised.
2. The roots may be ankylosed to the alveolar bone.
3. Teeth already affected by TRs (type 2) may have roots in an advanced state of destruction with no true morphology. For type 1 TRs the teeth may be fragile and hard to extract without flaps.

Consideration should be made as to whether surgery should or could be performed in one session. If teeth are excessively mobile, or otherwise easy to extract, one session is preferable. On the contrary, if the surgery is challenging, it may be best to utilise two sessions from consideration of both patient comfort and recovery and also operator fatigue.

Operative management of elective extractions

Multiple extractions require planning with regard to technique, instrumentation, analgesics, antibiotics and nutrition pre- and post-op. Some cats may benefit from being hospitalised for 2-3 days if owners are unwilling or unable to administer medication per os.

• **Analgesia**. Morphine is a very powerful premedication for severe pain at 0.1mg to 0.2mg/kg im or sc every 6-8 hours. Beware of dysphoria in cats (and also hyperthermia post-op) when high levels are used. Regional analgesia using lidocaine, mepivacaine or bupivacaine is also effective in a multi-modal regime.

Some authors advocate a combination of these agents – for example, a 1:3 ratio of lidocaine and bupivacaine. Carprofen or meloxicam is useful in addition to, but not instead of, opiates.

Buprenorphine is considered good for moderate to severe pain in cats at 1ml per 15kg every six hours. Owners can administer this analgesic very easily by mouth if dispensed in prefilled 1ml syringes for up to five days post-op. An alternative regime in the hospital would be to use an injectable opiate or a Fentanyl patch.

• **Antibiotics**. As the primary condition is a hyperimmune reaction to mixed oral antigen, antibiotics by themselves give minimal success. In the peri-operative period, they will guard against opportunist infection and are often best started pre-operatively. The selected drug should have good activity in bone and on anaerobic bacteria.

Clindamycin and/or potentiated amoxicillin are the drugs of choice in most cases. Many *Pasteurella* species are resistant to clindamycin but post-extraction it is a good choice as bone has been exposed.

• **Feeding**. Nutritional assistance may be necessary short or medium term. In very severe cases it may be necessary to consider pharyngostomy feeding in some cases and assisted oral feeding in hospital in others. If fluid intake is sub-optimal, this should be addressed also.

Most cats do better at home if the owner is able to provide active help. Favourite soft foods (pilchards in tomato sauce) are necessary for three

to five days post-op. In some circumstances it may be necessary to use a convalescence diet immediately post-op such as Hill's a/d, Royal Canin Feline Recovery RS Diet or Nutri-Plus gel (Virbac).

Other anti-inflammatory or immunomodulation therapies

Many drug therapies and combinations have been advocated previously for this condition. This is probably due to the consistent lack of success with most of them. *Most of these regimes have no proven efficacy*.

Some of these treatment regimens are based on very low number case reports, anecdote or small uncontrolled studies. Given that some of these drugs are highly toxic in cats, familiarity with the drugs and their side effects is vital.

The internet also provides many owners with information which may or may not carry any reasonable validity. Beware of this and apply good science to any proposals that sound as if they are too good to be true.

Feline recombinant interferon omega (Virbagen, Virbac)

A number of studies have reported using interferon and long-term follow-up appears to indicate that it exceeds the potential of other treatments for this condition (Southerden, 2006; Camy, 2010; Gracis, 2010).

Results in a recent study of 39 cats indicate that feline recombinant interferon is an effective treatment particularly in the group of cats which are FCV positive and are non-responders to elective extraction (Hennet, 2011).

A consensus statement written by a group of European specialists reported to the 19th European Congress of Veterinary Dentistry in 2010. The statement discussed the lack

of an evidence base for many treatments used for this condition and also agreed that feline recombinant interferon omega is most effectively used in the group of cats which are FCV positive and are long-term non-responders to extraction. This consensus statement remains under review and is intended for publication in due course.

Our own studies over five years indicate that not only is interferon very helpful in reducing inflammation and improving comfort levels, it often also allows practices to drop other less effective treatment regimes.

• **Transmucosal oral use**. Interferon given per os is believed to work by initiating a cytokine cascade when it comes into contact with mucosal cells to provide an immunomodulatory effect over a long period of time. The cascade then has distant effects.

A 10mu vial is reconstituted and injected into a 100ml bag of sterile saline. Ten fractions of 10ml are withdrawn into individual bottles, which are then frozen. When frozen they have a reported shelf life of one year. The first 10ml fraction is used to give a dose of 1ml per os per cat per day resulting in a daily dose of 100,000 units of interferon.

This fraction can be refrigerated normally and will have a shelf life of three weeks. The owner continues to give 1ml per day *using alternate sides of the mouth* until all the fractions are used. Ideally, treatment lasts for 100 days but longer may be required in some cases.

After three months, the progress should be reassessed using the Stomatitis Disease Activity Index (SDAI) scoring system (Figure 2). Cats can be re-swabbed for calicivirus carriage in the oropharynx at this time. A cat that was previously positive requires three consecutive negative

Preliminary results of an interferon therapy in a long-term study of 29 cats (2009 to 2012)

- Breed: cats presented with FCGS were CDSH 62% and pedigree 38%.
- Age: mean age at presentation was 6 years 7 months with 60% male/n and 40% female/n.
- Calici: 69% of cats tested positive for FCV on first presentation (virus isolation on oral swab).

• Of those cats FCV positive, only 13.8% became FCV negative after INF treatment

Success rates were measured using the SDAI score sheets.

- A successful outcome was considered to be an SDAI score of 5 or less at revisit.
- A cure was defined as an SDAI score of 2 or less.
- Improvement was defined as a 50% reduction in initial SDAI score. (Bear in mind that a "normal" cat with moderate gingivitis would score around 4 on an SDAI sheet).
- **FCV negative cats (n=9)**: 100% scored <5 (successful outcome) at 3 month revisit; 6 cats (66%) in this group scored less than 2 at 3 months revisit.
- **FCV positive cats (n=20)**: 15 cats (75%) scored less than 5 at 3 month revisit; in this group 8 cats scored <2; 5 cats (25%) improved but did not score <5. Their SDAI scores were less than half at 3 month recheck from original presentation.

results with virus isolation techniques to be considered truly negative.

• **Initial intralesional use.** The consensus statement from 2010 and a subsequent study (Hennet, 2011) indicated that intralesional treatment is not necessary to initiate therapy.

• **Subcutaneous injections.** This method of administration has been described previously (Southerden, 2006) but according to subsequent research it appears to be substantially less effective, and markedly more expensive, than transmucosal administration for treatment of FCGS.

Corticosteroids

These drugs are used, by some practitioners, principally to control inflammation in refractive cases which have had elective cheek teeth extraction and are not sufficiently controlled by feline recombinant interferon.

If their use is justified on welfare grounds (often described as rescue therapy), the overriding principle must always be to use the minimum effective dose rate.

This means using a short-acting molecule (prednisolone) at the lowest effective dose rate such as 5mg twice weekly or 2mg every other day tapering downwards. They can be used in conjunction with feline recombinant interferon omega.

NSAIDs

If used, the first choice option appears to be meloxicam. Any NSAID needs to be prescribed with due regard to the appropriate guidelines for use of long-term NSAIDs in cats (Sparkes, 2010). Some new molecules such as robenacoxib may show promise.

Cyclosporine

There is currently insufficient data from published papers to recommend the use of cyclosporine in the management of FCGS syndrome.

Some data have been published on this molecule, as part of a dermatology study, suggesting four out of eight cats treated responded and could be maintained on every second day dosing. However, other studies have been equivocal about the benefits and a placebo-controlled trial in a small number of cats did not show a significant difference from placebo only.

Some suggestions for use have been provided but monitoring of blood levels to avoid toxicity is deemed essential due to erratic absorption differences. In general, the currently available data are not sufficient to support a recommendation to use this drug, according to the consensus study group.

Azathioprine/chlorambucil/low dose doxycycline/gold salts

There are insufficient data to

recommend the use of any of these agents in the management of FCGS syndrome. The potential side effects can be significant and excessive use of immunosuppressive doses can be a problem long term.

CO₂ laser surgery

There are insufficient data to recommend the use of CO₂ laser use routinely in the management of FCGS syndrome. The consensus group felt it may have a possible role with adjunctive pain control.

One single cat case study concluded that the use of a CO₂ laser assisted recovery of soft tissues after extraction therapy but would not have been as useful as a monotherapy (Lewis, 2007).

Additive-free foods and additional nutritional support

It is necessary to ensure good quality nutritional support to encourage an effective immunological response and post-extraction healing process.

Various diets and supplements have been suggested, including vitamin preparations and omega-3 EFAs, but there is no study which has data to prove a recommendation for any specific product. There is anecdotal evidence that use of diets or supplements high in omega 3 EFAs affects platelet function and can result in excessive haemorrhage during extraction surgery.

The beneficial effect of a recovery food post-surgery has been demonstrated in cats with FCGS syndrome (Thyse, 2003).

Additive-free and hypoallergenic foods have also been suggested but the results are anecdotal at best with no known study proving efficacy.

Summary

Feline Chronic Gingivitis Stomatitis Syndrome is a poorly defined syndrome of unknown aetiology characterised by focal or diffuse chronic inflammatory response involving the gingiva, oral mucosa, and often the pharynx, tongue and other oral soft tissues.

Commonly described clinical findings include elevated serum globulins and a sub-mucosal infiltrate of plasma cells, lymphocytes, neutrophils, and macrophages. Potentially various viral agents and bacterial species are involved.

It is considered that atypical hyperimmune responses are the basis of the syndrome. Multiple mechanisms appear to be acting concurrently.

Successful management of this complex requires a logical diagnostic approach. The need for first-line information gathered before treatment alters the host response cannot be over-stated.

Definition of oral and oropharyngeal Inflammation

Source: American Veterinary Dental College Nomenclature Committee (www.avdc.org/nomenclature.html)

Oral and oropharyngeal inflammation is classified by location as:

Gingivitis: inflammation of gingiva

Periodontitis: inflammation of non-gingival periodontal tissues (i.e. the periodontal ligament and alveolar bone)

Alveolar mucositis: inflammation of alveolar mucosa (i.e. mucosa overlying the alveolar process and extending from the mucogingival junction without obvious demarcation to the vestibular sulcus and to the floor of the mouth)

Sublingual mucositis: inflammation of mucosa on the floor of the mouth

Labial/buccal mucositis: inflammation of lip/cheek mucosa

Caudal mucositis: inflammation of mucosa of the caudal oral cavity, bordered medially by the palatoglossal folds and fauces, dorsally by the hard and soft palate, and rostrally by alveolar and buccal mucosa

Contact mucositis and contact mucosal ulceration: lesions in susceptible individuals that are secondary to mucosal contact with a tooth surface bearing the responsible irritant, allergen, or antigen. They have also been called "contact ulcers" and "kissing ulcers"

Palatitis: inflammation of mucosa covering the hard and/or soft palate

Glossitis: inflammation of mucosa of the dorsal and/or ventral tongue surface

Cheilitis: inflammation of the lip (including the mucocutaneous junction area and skin of the lip)

Osteomyelitis: inflammation of the bone and bone marrow

Stomatitis: inflammation of the mucous lining of any of the structures in the mouth; in clinical use the term should be reserved to describe wide-spread oral inflammation (beyond gingivitis and periodontitis) that may also extend into submucosal tissues (e.g. marked caudal mucositis extending into submucosal tissues may be termed caudal stomatitis)

Tonsillitis: inflammation of the palatine tonsil

Pharyngitis: inflammation of the pharynx

Once this information is available, a treatment plan and prognosis can be considered.

The role of bacterial plaque is crucial, whatever the state of the host immune response. Diligent professional scaling, polishing and subgingival debridement and attention to existing dental disease underpins any treatment in tandem with aggressive home-care by the owner.

Cases failing to respond to simple plaque control should be considered for elective cheek teeth extraction and adjunctive treatments at an early date. Those cases still non-responsive but FCV positive may be helped by interferon therapy.

It is important that the owner is involved at an early stage with discussions as to aetiology, treatment plans and help with home-care. A highly-motivated owner is a strong ally in the provision of successful treatment.

Selected references and further reading

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Case study

Signalment: “Jambo”, Main Coon, six years, male neuter, 6.65kg
Initially referred following 30 months of a number of unsuccessful treatments. He presented bright and responsive, eating soft foods well but reluctant to eat hard foods. Halitosis was marked. The submandibular lymph glands were markedly swollen and a caudal mucositis plus maxillary gingivitis and alveolar mucositis was also present (Figures 5 and 6).

Pre-op testing for viruses was negative for FIV, FeLV and FHV. Feline calicivirus was isolated on an oropharyngeal swab. Routine haematology and biochemistry was unremarkable. Bacteriology showed a moderate mixed culture with *Pasteurella* species dominant.

Initial Stomatitis Disease Activity Index (SDAI) score was 15 out of 30. Dental charting showed high levels of dental calculus and gingivitis for the caudal maxillary cheek teeth.

Histopathology confirmed the

lesions to be a chronic, active stomatitis.

Initial treatment consisted of scaling and polishing all teeth followed by full-mouth dental radiographs (Figures 7 and 8) and elective surgical extraction of the right side cheek teeth (premolars and molars) via wide based mucogingival flaps for access.

In those cases where extraction proves difficult, time-consuming and traumatic, it is often sensible to delay surgery to the other side for a short period.

Treatment to the left side cheek teeth followed four weeks later. Oral inflammation levels tend not to improve markedly until all cheek teeth are removed (Figures 9 and 10). His SDAI score for this second visit was 14/30.

Daily interferon treatment was initiated following the second visit in addition to analgesics and twice daily chlorhexidine application.

At his three-month recheck, his SDAI score had improved to 3/30 (Figures 11 and 12). This score comprised mild maxillary gingivitis and



Figures 5 and 6. Severe ulceration and inflammation of tissues lateral to palatoglossal folds plus maxillary gingivitis and alveolar mucositis both sides.



Figures 7 and 8. Many cases of FCGS exhibit normal periodontal attachment levels. However, radiographs of all teeth perioperatively will provide advance warning of feline tooth resorption lesions, root ankylosis or periodontal disease.

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Figure 9. Note palatoglossal folds bordering tongue laterally caudal to lower molars. For many FCGS cases the most severely inflamed tissues are located lateral to these folds where antigen laden saliva pools. This is termed caudal mucositis.



Figure 10. Two weeks post-extraction RHS cheek teeth only; note no improvement to tissues either side despite elective extraction cheek teeth.

moderate inflammation of the tissues lateral to the palatoglossal folds.

Feline calicivirus testing proved negative at the three-month recheck and interferon therapy ceased at this time. Daily chlorhexidine treatment continued as reduction of dental plaque is still a mainstay of the regime.



Figures 11 and 12. Three months post-op. Note the marked improvement in all soft tissues.



Figure 13 (left). Note improvement in tissues lateral to palatoglossal folds following elective extraction of cheek teeth and interferon therapy. Figure 14 (right). Same image after application of plaque disclosing solution. Elective extraction reduces the level of dental plaque in the mouth but does not eliminate it.

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