

Feline Chronic Gingivo-Stomatitis (FCGS)

Introduction



The condition currently, and most commonly, known as *Feline Chronic Gingivo-Stomatitis (FCGS)* is a relatively common and frustrating problem to the small animal practitioner. A number of synonyms are found in the literature for the same conditions. Examples are “Feline Lymphocytic Plasmacytic Stomatitis”, Plasma Cell Stomatitis”. The reported incidence varies with severity but a figure of 3% of all feline dental conditions for the most intractable cases may be considered reasonable. Many cases prove to be extremely frustrating with a number of different combination treatments in current use.

The syndrome is characterised by persistent and severe inflammation and ulceration of the oral soft tissues. Many times this includes the pharyngeal and lingual mucosa.

The two most common sites are:

- *Tissues lateral to the palatoglossal folds (palatoglossitis)*
- *Tissues (gingiva and mucosa) overlying the cheek teeth (buccostomatitis).*

The condition is often present in the absence of significant accumulation of calculus on the teeth. Inflammation in these areas occurs commonly around the time of kitten vaccination or when temporary teeth eruption, when permanent teeth erupt or, most commonly, much later in life.

Purebred cats have long been considered to be more susceptible. There is also an inverse relationship between the age of onset of disease and the number of cats in the household and this may implicate social stress or increased exposure to infectious agents as predisposing factors.

This syndrome is best considered as part of a full oral cavity examination and the presence of Tooth Resorption (TR's) lesions frequently adds to and confuses the picture. Additionally, it is clear that carriage of calici virus is a co-factor in the induction or progression of the complex. Although the relationship between calici infection and FCGS appears strong, there is also a reported incidence of 50% of cats infected with FIV also having FCGS. Another source indicates that around 15% of cats with FCGS are positive for FeLV/FIV. (*Knowles 1989*)

One consistent feature of all cases is a hypergammaglobulinaemia. 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 tooth surface and elsewhere in the mouth. The main problem is that not all FCGS cases are alike. Some respond to routine periodontal therapy and improved hygiene while others will respond poorly to any treatment. The implication is that some cats have a very low threshold to the trigger factor(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 & Hennet 2005*)

Clinical Signs

The main sign in all cats is dysphagia and pain due to extensive oral inflammation and ulceration of soft tissues.

Inflammatory lesions can be focal or diffuse and may involve all oral tissues - most commonly the tissues lateral to the palatoglossal folds, gingiva and mucosa overlying the cheek teeth. Other tissues in the pharynx, tongue and the mandibular molar salivary glands are also affected in severe cases.

Other reported signs are:

- *Severe halitosis.*
- *Weight loss - chronic or acute*
- *Lack of (or an inability) to groom.*
- *A reluctance to eat hard food is common.*
- *Submandibular lymphadenomegaly – often dramatically increased in size and painful when palpated.*
- *Variable, sometimes minimal, accumulation of plaque and calculus.*
- *Teeth may be missing, affected by “tooth resorption” or suffering from furcation exposure and excessive mobility after recession of the periodontal tissues.*

Aetiology

There is no simple aetiological agent for this syndrome. Certain factors are known 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: Some breeds may appear to have more affected individuals. Purebred cats are anecdotally more often affected with Siamese, Burmese, Abyssinian, Persians, Tonkinese, and Main Coons all over represented.

Environmental Factors: Colony cats or those in multi-cat households appear to be more commonly affected. *Stress* is considered the main factor with also the close proximity of animals allowing transmission of microorganisms also being significant.

Plaque bacteria: The oral bacteria present in the plaque matrix drive the abnormal non-specific inflammatory response. Although individuals are thought to be plaque intolerant, there is a variable threshold to the bacterial load among these individuals. Specific bacteria as seen in periodontal disease have been reported in these cats and pure cultures of *Pasteurella multocida* are common in the authors' experience. *Bartonella henselae* has been implicated, albeit controversially, in the USA.

Feline Calici Virus: Many clinicians, including the author, find a level approaching 100% of chronically affected individuals (> 6months) showing positive testing to virus isolation following oropharyngeal swabbing for Feline Calici Virus. 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 30% (*Zicola 2009*). One research study (*Hennet & Boucrault-Baralon 2005*) considered that chronic palatoglossitis lesions, as opposed to buccostomatitis lesions, to be calicivirus associated. FIV particularly 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. 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 or Tooth Resorption lesions (TR's) or both can have an exacerbating effect on the syndrome.

Diagnostic Testing

A standard diagnostic approach is advocated for all cats affected. This should comprise:

- **Virus testing** for FIV, FeLV. Oral swab for FCV and FHV
- **Routine Haematology and Biochemistry** 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 NSAID's)
- **Biopsy** of affected areas - necessary to eliminate neoplasms (e.g. Sq. Cell Carcinoma, Lymphoma etc) and other immunopathologies. Very important if lesions not symmetrical.
- **Dental chart and full mouth dental radiographic survey** to assess periodontal status of teeth, bone quality and locate broken root tips or tooth resorption lesions.

Treatment

The main aim is zero tolerance of both existing dental disease and of bacterial plaque. There are three underlying principles underpin treatment with the aim to *reduce the oral antigen burden*.

- **Control plaque**
- **Control existing dental disease – periodontal disease and tooth resorptive lesions mainly**
- **Control inflammation**

All affected individuals should be treated in the same manner. The ultimate aim is to improve the overall hygiene of the oral cavity and reduce the antigen burden by, (initially) a thorough dental scaling, periodontal debridement and polishing followed by aggressive home care with 0.12% chlorhexidine gluconate gel twice daily. (Parodongyl™: Virbac).

Base-line Treatment - all cases

Antibiotics - often necessary pre-operatively to control excessive inflammation and improve quality of soft tissue before and after surgery. The following drugs have been described for use.

Metronidazole at 10mg/kg bid
Clindamycin (Antirobe: Pfizer) at 11mg/kg sid,
Doxycycline (Ronaxan: Merial) at 0.2mg/kg bid,

Use pre-op as required to improve tissues and post-op for a minimum 8-10 days. Ensure owner can comply with treatment. This may mean using an antibiotic in an acceptable form. Metronidazole and Clindamycin can be hidden in frozen butterballs or in pilchards with tomato sauce.

Dentistry

- **Dental chart:** a dental chart is an essential record of the mouth. Discourage shortcutting of exam.
- **Scale & polish:** every case starts by improving basic hygiene.
- **Treat diseased teeth:** in almost all cases, this means extraction.
- **Initiate chlorhexidine:** twice daily application of chlorhexidine (Parodontyl: Virbac) wiped inside lips twice daily or brushed if cat will allow it.

Additional Treatment - Selected Cases

Gingivectomy

Necessary in cases where hyperplastic gingiva has created a pseudo-pocket deeper than the normal sulcus depth of 0.5-1.0 mm. Use a #11 scalpel and a bevelled cut 120° to the long axis of the tooth or an electrosurgery machine on cut/coagulation mode or a high-speed tissue bur.

These methods require extreme care not to damage tooth surface. It is necessary to “scallop” the gingiva at the inter-dental area. Remember that up to 1mm may slough at the margin of an electrosurgery incision.

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 the hand curettage subgingivally. This may mean surgery every three months.

Elective Tooth Extraction

This is now firmly established; by both peer reviewed publication and dental specialists, as the logical option to take if base line treatment (see above) alone is insufficient to provide resolution of the inflammation. In the author's opinion, if the tissues fail to respond to the best hygiene you can provide within 2-4 weeks, by reduction of inflammation and improvement in comfort, elective surgical extraction of all the cheek teeth should follow without delay. Owners and many veterinary surgeons are often reluctant to take this step. The prognosis for this procedure can broadly be estimated that 50% of all cases will resolve without further need for treatment, 37% will improve but will require less medication than before but varying degrees of continuing anti-inflammatory treatment and 13% will not improve (*Girard, 2005*).

Elective surgical extraction of whole cheek teeth quadrants should not be undertaken lightly as there are several complications that may 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 affected by Tooth Resorption lesions (type 2) may have roots in an advanced state of destruction with no true morphology. For type 1 TR lesions the teeth may be fragile and hard to extract without flaps.***

Extraction Techniques

1. Conventional Extraction Technique – Normal teeth

A mucogingival flap with vertical releasing incisions will provide superior visualisation of tooth and the buccal bone plate. The vertical releasing incisions should be made slightly off the target root(s) using a #11 scalpel blade along the dorsal/ventral axis of the mandible/maxilla and divergent to the long axis of the tooth. Make a gingival flap using a sharp periosteotome or periosteal elevator (Molt P2/4) to create good access to the target area.

Using a small round bur (#1) the buccal bone can be carefully removed to show the surface of the roots and the furcation point where they meet. Splitting the tooth into component roots can now take place. Further limited widening of the periodontal space can take place with the small bur before careful luxation of the roots with small luxators designed for this task. *See box below for recommended cat luxators.*

Once roots are removed the bone surface is smoothed with a rasp or rongeurs and flushed with sterile saline (10ml syringe/21g needle) before closure of flap with 5/0 Monocryl (*W 3203*).

Atomisation of cat teeth with a high-speed bur is not acceptable. This method of destroying the root does not give sufficient control and, in many cases, tissues beyond the root may be destroyed. Given that there is a sensory nerve beyond almost all teeth – infraorbital for maxilla or inferior alveolar nerve for the mandible; – it makes little sense to use this method. In normal circumstances, there is no substitute for careful elevation and removal of the whole root.

2. Crown Amputation Technique (Type 2 Tooth Resorption Lesions)

In the case of Type 2 lesions only, a technique of crown amputation is permissible (*Du Pont 2002a: Du Pont 2002*).

A limited envelope flap reflecting gingiva from the tooth surface using a periosteotome may be sufficient. If not, releasing incisions may occasionally need to be made if an envelope flap provides insufficient visualisation.

The crown is removed with a small (#1) round bur perpendicular to the long axis of the crown to remove all tooth structure to just below the level of the alveolar bone crest.

A fine round diamond or bone rasp should be used to create a smooth surface of bone before saline flushing and closure with single interrupted suture(s) of 5/0 Monocryl.

Dental Luxators for Cats

- Feline Luxator – EX5 (2mm)
- Feline Luxator – EX5S (2mm serrated)
- Feline Luxator – EX5H (2mm notched)
- Feline Luxator – 100C (2mm gentle back curved)
- Feline Root Tip Pick – WA1

Source: www.drshipp.com (current cost 2010: \$37.95 each)

Post-Op management of elective extractions

Multiple extractions require consideration as to analgesics, antibiotics and nutrition post-op. Some cats may be best hospitalised for 2-3 days if owners are unwilling or unable to administer medication per os.

Analgesia: Buprenorphine (Vetergesic™: Alstoe) is considered good for moderate to severe pain in cats at 1ml per 15kg every 6 hours. *This can be used either parenterally or per os/sublingual.* Owners can administer this analgesic very easily. An alternative regime in the hospital would be to use a selective μ -agonist opioid such as morphine. Morphine is very useful for severe pain at 0.1mg to 0.2mg/kg im or sc every 6-8hrs. Carprofen or meloxicam is useful in addition to, but not instead of, opiates.

Antibiotics: Although the primary condition is a hyperimmune reaction to mixed oral antigen, antibiotics by themselves give minimal success. In the perioperative period, they will guard against opportunist infection and should be started pre-operatively. The selected drug should have good activity in bone and on anaerobic bacteria. Metronidazole (10mg/kg bid) and/or Clindamycin (11mg/kg sid) are the drugs of choice.

Feeding: Nutritional assistance may be necessary short or medium term. It may be necessary to consider pharyngostomy feeding in extreme cases and assisted oral feeding in hospital in others. If fluid intake is suboptimal, this should be addressed also.

Most cats do better at home if the owner is able to provide active help. 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™, Waltham Feline Concentration Diet™ or Nutrigel™ (Virbac).

Other Anti-inflammatory or Immunomodulation Therapies

Interferon

A number of veterinary dentists report using Interferon but, at this time, there are still few published long-term studies available. However, literature has started to appear indicating the circumstances in which it is likely to help. At this time (2010) the most effective regime and route of administration has not been established.

Preliminary (two year) results of a number of studies, including our own, indicate that Interferon may be most effectively used in the group of cats, which are FCV positive and are non-responders to elective extraction. This conclusion has been confirmed in a case study on one cat (*Southerden P 2007*).

Our current regime is described below and is a mixture of intralesional and oral. This protocol, with assessment sheets that allow the condition to be scored, are available as downloads from our website <http://www.dentalvets.co.uk/referral/feline.html>

Intralesional use: A single treatment total dose of 5 MU injected locally into the junction between healthy gum and diseased tissue provides a strong antiviral effect. This treatment can be given immediately post-surgery when the cat is anaesthetised.

Initially, using a 10MU vial, half the volume is drawn into an insulin syringe. Draw enough saline or sterile water into the syringe to provide a reasonable volume for use. The contents can be administered in fractions of 0.1ml to 0.2ml depending on the number of sites that require treatment. The remaining 5MU from the vial can be used as an immunomodulatory dose per os once daily – see below in “Oral Use”. This is a daily dose of 50,000 units of interferon. Improvement in visible inflammation may take up to three months.

Oral use: Interferon given per os is believed to work by initiating a cytokine cascade when it is exposed to cells. The cascade then has distant effects. This regimen of administration best follows a single dose of 5MU injected intralesionally as described in the previous paragraph. A 5MU dose is initially diluted into a 100ml bag of sterile saline and ten fractions of 10ml created which are 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. This fraction can be refrigerated normally and will have a shelf life of three weeks. The owner continues to give 1ml per day until all the fractions are used. Ideally, treatment lasts for six to eight weeks but longer may be required. After three months, the treatment should be reassessed and cats swabbed again for calici virus carriage in the oropharynx.

Subcutaneous injections: This method of administration is described but appears to be less effective than submucosal administration for oral carriage of FCV and is not used by the author.

Antibiotic therapy

Antibiotic therapy can be used either long term or in pulse form but, following elective extraction of cheek teeth, *has minimal beneficial effect in many cases*. There are reports of the use of a low dose Doxycycline regime (*Preshaw 2004*). Dose quoted is 0.2mg/kg bid although other sources quote as high as 2mg/kg bid. The low dose is submicrobial and is used long term between professional cleaning. It has anti-collagenase properties at this dose and has not been shown to cause antibiotic resistance. Metronidazole has also proved useful at a dose of 10mg/kg bid. This drug is not easy to give in cats. The tablet can be powdered and placed in butterballs and given frozen or paediatric syrup can be used with an acceptable flavour.

Other treatments

Many drug therapies are advocated for this condition and most *have no proven efficacy*. Some of these are based on case reports, anecdote or small uncontrolled studies. Given that some of these drugs are highly toxic in cats, familiarity with the drugs is recommended (*Lyon KF 2005*). The internet also provides many owners with information, which may or may not carry any reasonable validity.

Corticosteroids: In general, the use of corticosteroids is not recommended for cats that are virus positive for FeLV, FIV or FCV.

They are used, by some practitioners, principally to control inflammation in a hyperimmune response in cats in which their use is not contraindicated. This is indicated by hypergammaglobulinaemia and/or plasma cell infiltrate in tissue. Many authors consider their use contraindicated totally.

Cyclosporine is an agent that has been extensively used in North America (*Lyon KF 2005*) with varying success rates, although it is not licensed for cats. It mainly blocks T-helper cells but may also suppress T-suppressor cells and inhibit release of various lymphokines such as interleukin 2 and T cell growth factor. Doses in current use vary but 2mg/kg bid is used by many clinicians. Absorption is erratic but Neoral (Novartis) seems to get the best reported absorption. To that end, blood levels are checked 4-6 weeks later and adjusted as required to avoid toxicity and ensure that trough levels are maintained at adequate levels of 250-500ng/m. Over 750-1000 ng/m approaches toxic levels. Once the cat responds, the dose can be reduced but lifetime use and monitoring is necessary for most. Known side effects are hepatic dysfunction, renal dysfunction and anaemia. Labs, which perform this test, are Antech (www.antechdiagnostics.com/index.htm) and Idexx.

Chlorambucil (Leukeran™) has also been used for this condition and for eosinophilic granuloma in the mouths of cats. Reported doses are 2mg per cat once or twice a week.

Laser Thermoablation

The use of CO₂ and Nd: YAG lasers have been described with no clear recommendations available yet. To date, no reliable data exists to commend their use on a regular basis. Anecdotal reports do indicate good responses in some cats. The main problem is the expense involved in purchase of the units.

Laser thermoablation creates scar tissue, which has less blood supply and therefore reacts less in a hyperimmune response. In addition it enhances bacterial reduction. Removal of proliferative soft tissue where bacteria has been sequestered is thought to assist the healing process.

Food

Food *may* be an important feature in managing this condition. Some affected cats improved on a balanced, additive free food such as Butcher's Classic Cat Food. Information is generally anecdotal and not proven scientifically. In addition, after dentistry, cats fed on Hills a/d diet gained more weight and had smaller lesions than those fed on a control diet (*Theyse et al, 2003*).

Vaccine

A multi-site placebo controlled trial is taking place to evaluate the effects of their T-Cell Receptor (TCR) peptides for feline stomatitis. The TCR Peptides are immune modulating biologics which have been shown to modulate T-helper cell function and Th1/Th2 cytokine profiles. T-helper cells appear to play a central role in feline stomatitis, causing inflammation and inappropriate immune reactions. Preliminary studies in cats have shown significant results in advanced, refractory feline stomatitis. Preliminary results were due to be reported in late 2009.

Summary

This 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 and tongue.

Commonly described clinical findings include elevated serum globulins and a submucosal infiltrate of plasma cells, lymphocytes, neutrophils, and macrophages. Potentially various viral agents and bacterial species are involved. There is no doubt that atypical hyperimmune responses are the basis of the problem. Multiple mechanisms will be acting concurrently.

Successful management of this complex requires a logical approach. The need for base-line data before treatment alters the host response cannot be over-stated. Once this data 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 - zero tolerance to any dental disease - underpins any treatment in tandem with aggressive homecare 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 homecare. A highly motivated owner is a strong ally in the provision of successful treatment.

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