



# **Difficult Tooth Extractions Mini Series**

**Session Two: Extraction techniques in cats  
including local anaesthetic techniques**

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## Feline Oral Diseases

### Tooth Resorption

Tooth Resorption has been known by several different names historically, including 'Neck Lesions', 'Cervical Lesions', '(Feline) Odontoclastic Resorptive Lesions', or '(F)ORL'. The current AVDC terminology is Tooth Resorption, which is broken down into Types 1, 2 and 3.

### The Pathology

The pathological process of Tooth Resorption is still largely unknown. It is caused by the abnormal activity of Odontoclast Cell on the root surface, and these cells are responsible for the destruction of normal dental hard tissues (enamel, dentine and cementum) which is then replaced with granulation tissue. Odontoclastic activity is stimulated by inflammation, which explains the high prevalence of lesions around the cemento-enamel junction. There are varying reports of the incidence of Tooth Resorption, but it is likely to be present in **25-40% of all domestic cats** and in up to **80% of cats presented for dental treatment**. Therefore, for feline cases presented for dental treatment, our aim is to exclude the presence of Tooth Resorption rather than to diagnose it. Prevalence increases with the age of the cat, as does the number of lesions found per cat.

### Types of Tooth Resorption

- **Type 1 – Associated with inflammation, present at the cemento-enamel junction, root often unaffected**
- **Type 2 – Replacement resorption, cellular activity on the root surface**
- **Type 3 – a combination of type 1 and 2**

### Appearance and Diagnosis

The key feature of the diagnosis of Tooth Resorption is radiographic assessment. Some lesions may be identified by dental examination, with the use of the explorer probe running over the enamel, which will identify lesions and defects within the enamel. Radiography will however greatly increase the number of lesions found, will allow the classification of the lesion, and will determine the most suitable treatment choice for that tooth.

### Treatment

The choice of treatment is entirely governed by the appearance of the lesion on a dental radiograph:

- Type 1 Lesions – these teeth must be completely extracted in full.
- Type 2 Lesions - Where periodontal ligament and pulp are still present, the preferred treatment options is to extract the root, as leaving these structures behind may result in their post-operative pain and infection. However, if there is extensive Type 2 Resorption, and there are no vital structures remaining, then crown amputation (coronectomy) can be performed. Owners must be informed however that tooth substance has been intentionally retained, and that radiographic follow up to these lesions may be required. Coronectomy should not be performed without a radiographic diagnosis of Type 2 Resorption

### Feline Chronic Gingivostomatitis – Options for Management

#### Abstract

Feline Chronic Gingivostomatitis (FCGS) is a well-recognised but still relatively poorly understood condition that affects many domestic cats. Studies have put the incidence of FCGS as about 0.7% within the general cat population (*Healey et al., 2007*), although the term encompasses a wide range of clinical scenarios and severities. The aetiology and pathology are still under investigation and that means management of the condition is perhaps a better description than treatment.

*Key words: Gingivostomatitis, FCGS, Calicivirus, Stomatitis*

#### The Pathology

It is still unclear as to the pathological mechanism of this "inappropriate" inflammatory response. There are a number of factors that are important to recognise to fully understand how the condition is best managed.

#### Plaque

Plaque seems to be the most important stimulus in the genesis of the inflammation. Plaque is a biofilm that builds readily in all species, and is a matrix of protein and bacteria. In our animal patients where daily brushing is rare, plaque will then go on to calcify to form the brown, malodorous material *calculus* that we

frequently recognise in a large proportion of our patients. Plaque and calculus cause the development of periodontal disease which is a progression of gingivitis to periodontitis, without intervention.

In cats with FCGS, the plaque is responsible, along with other factors, for the florid and excessive oral inflammation that goes well beyond the normal progression of periodontal disease (see *Figs 1-4*). Indeed, cats affected by FCGS will often have very little calculus in the early stages. However, by the time of presentation, significant periodontal disease is often present as well (*Hennet, 1997*).

### **Viruses**

We know that high numbers of the cats affected by FCGS are concurrently infected or carriers of Feline Calicivirus (*Knowles et al., 1989*). Estimation of the prevalence of Calicivirus are usually about 20% of the general cat population, and so one cannot say that the reciprocal is true. It is unclear currently how Calicivirus is linked to the inappropriate inflammatory response to plaque, but it is likely to be of significance in the pathogenesis of the disease (*Knowles et al., 1991*).

Other viruses again have been linked historically, including Feline Immunodeficiency Virus and Feline Herpes Virus along with others, however it is again unclear as to whether these have a pathological significance or whether their presence in cats with FCGS is more coincidental.

### **Tooth Resorption**

Tooth resorption can often be present in cats with FCGS (two thirds in a study by *P. Hennet, 1997*), which in part may just be an overlap of these two populations of cats, but in many cases is also likely to be linked to the severity of gingival inflammation. In particular, type 1 tooth resorption is very common in cats with FCGS in areas where periodontal inflammation is severe. Tooth resorption represents a significant complication in the management of FCGS as it dramatically affects tooth extraction in cats owing to ankylosis of roots and/or weakening of the cervical root area.

### **Other diseases**

There are a number of other disease that may present in a similar way or may exacerbate the clinical signs seen with FCGS. Those worthy of mention include chronic renal disease and diabetes mellitus. These may be present along with FCGS due to overlapping of the cat populations, or may possibly contribute to the disease process through the induction of oral inflammation and the compromise of the immune response. They are also likely to affect some of the treatment options due to the requirement of sometimes lengthy general anaesthesia and the use of some drugs.

### **Treatment**

There are a number of treatment options that are available for the treatment of FCGS and different regimes are appropriate for different patients dependent on both patient and client factors.

### **Treatment of underlying factors**

Treatment of periodontal disease and tooth resorption represents a challenge in general practice without the use of dental radiography. Dental radiography is essential in the assessment of the loss of attachment due to periodontitis and the assessment and treatment of tooth resorption.

All teeth affected by periodontitis and tooth resorption must be critically assessed and then treated accordingly.

For periodontitis, extraction is required, with post-operative radiographs to ensure no root remnants are left behind. Surgical extraction is often preferred for this, whereby mucoperiosteal flaps are raised and bone is removed to facilitate extraction. One must always remember however that the oral tissues are likely to be highly friable given the amount and chronicity of the inflammation.

For tooth resorption, careful and thorough radiographic assessment is required to best decide on the treatment options. The preferred treatment, especially in cases of FCGS, should always be complete extraction. However, when radiography indicates extensive type 2 replacement resorption then crown amputation may be considered. One should always expect some degree of persistence of inflammation when this treatment option is employed.

### **Elective tooth extraction**

It is now generally accepted that elective extraction of teeth has proven efficacy in the treatment of FCGS (*Hennet, 1997; Girard and Hennet, 2005*). The argument for this treatment is for the elimination of plaque retentive surfaces within the mouth. The main decision here is which teeth should be extracted and again this should be governed by not only the clinical appearance but also by patient and owner factors.

Regional extraction is often performed for areas of the mouth that are presented with significant mucositis. This may be the maxillary teeth, the mandibular teeth, all the teeth caudal to the canine teeth or all of the teeth remaining in the mouth for example. Again, one must remember the challenges of performing this successfully may be high and so full mouth radiography and meticulous surgical technique are essential for the expectation of a favourable outcome.

### **Improvement of oral hygiene**

Improvement of oral hygiene should be implemented at all stages of treatment. This should consist of daily brushing with chlorhexidine toothpaste and the use of chlorhexidine oral rinses. The aim of these are twofold: firstly they will reduce the level of plaque accumulation which is the most significant predisposing factor for FCGS; secondly they will help reduce the opportunistic infection of the inflamed and compromised oral soft tissues with bacteria that are normally present in the oral cavity.

With the improvement of oral hygiene one must again be conscious of both patient and owner factors that are likely to affect the outcome. This again must be considered in the management of FCGS.

## **Medical Treatments**

### **NSAIDs**

NSAIDs are effective in two ways for treating FCGS; by reducing inflammation and by providing analgesia. Their use may however be limited, as their effects may be inadequate at controlling both inflammation and pain in severe cases. They must also be used with great care when used chronically or in cats who are severely debilitated at presentation.

### **Corticosteroids**

It is the author's opinion that corticosteroids do have a place in the therapy of FCGS cases, but that they must be used carefully and in specific cases. Corticosteroids should be seen only as a rescue treatment. Their efficacy has been shown to be reduced with use over time and so they should ideally only be used for short periods, to 'regain control' of acute flare ups. They should however not be used as an alternative to good surgical treatment, and their use should be avoided in the perioperative period.

### **Antibiotics**

Antibiotics are again useful when used in the correct manner in FCGS cases. As previously discussed, FCGS cats have a reduced oral immune-competence due to compromise of the oral soft tissues and changes in the humoral immune response. Therefore, effective antibiotics are useful again in helping to 'regain control' during acute flare ups and in the perioperative period to prevent opportunistic infection of surgical sites. Their use however should be limited to recommended therapeutic periods and long term use should be avoided as this is likely to induce bacterial resistance.

### **Feline Recombinant Interferon Omega**

Studies have demonstrated the efficacy of Feline Recombinant Interferon Omega which may be used by subcutaneous or intra-lesional injection, or by oral (transmucosal) administration (*Southerden, 2006; Hennet, 2011*). Its usefulness has been demonstrated after prophylactic dental extractions most convincingly using transmucosal administration, which is often more cost effective for owners. It has been shown to reduce inflammation and increase comfort and its use will often allow the reduction in other medical treatments. The current recommendation is to administer 0.1MU Feline Recombinant Interferon Omega daily by oral (transmucosal) administration (*Hennet, 2011*)

### **Cyclosporine**

Cyclosporine has yet to be demonstrated using commercially available products, but has been assessed in a study of 16 cats (*Lommer, 2013*) using formulation produced by a pharmacy. It is the author's opinion that the use of this drug may become more significant with time, but further work still needs to be conducted.

### **Nutritional support**

Nutritional support is of great significance in managing FCGS cases as they often present in poor body condition. No study has effectively demonstrated a benefit in using vitamins or Omega-3 polyunsaturated fatty acids but they may have a place in case management.

### **Management of Feline Chronic Gingivostomatitis**

It is the author's opinion that it is the way FCGS cases that are managed that will markedly affect their outcome. In addition to the clinical treatment, educating clients and managing their expectations along with

ensuring their compliance with treatment is the only way to ensure success. This is how the author approaches a FCGS case:

### **Conscious assessment and client discussion**

This stage cannot be underestimated in its importance as it sets the stage for what sometimes can be a protracted and frustrating treatment course. Conscious examination can sometimes be limited by patient discomfort, and so gentle handling is required. But, it is important to demonstrate to the owner the severity and extent of the disease.

The client discussion should cover a number of aspects: their ability to handle the cat and administer oral treatments; their expectations regarding the number of anaesthetics, procedures and regular conscious monitoring for disease progression; their budget for treatment; the possibility that a successful outcome may not be achievable.

If clients are forewarned about the requirement for their involvement in a case, it is always easier to broach that as the treatment progresses. Treatment may result in a rapidly successful outcome, however, occasional cases will result in disappointing responses to what can be invasive treatments.

Blood sampling for full biochemistry and haematology should be carried out at this stage, as well as assessment of viral status for the major associated viral infections. Although they may not affect the treatment protocol, they may help as a prognostic indicator.

### **General anaesthetic and initial assessment**

General anaesthesia is essential for effective oral examination in animals. Dental charting is required to provide the framework for that examination. It ensures that all teeth and the oral soft tissues are assessed, and the pathology recorded. This will aid the monitoring of disease progression. Oral photographs can be useful here too.

Full mouth radiographs are mandatory for dental treatment in cats and in particular FCGS cases. Full mouth radiographs in cats have been demonstrated to provide information on disease processes that oral examination alone will not reveal (*Verstraete, 1998*). Radiographs are essential for diagnosing all dental pathologies for treatment (periodontitis, tooth resorption, pulp necrosis and peri-apical pathology, and retained root remnants) and these must be eliminated in FCGS as they are all potential causes for persistent inflammation. In addition, assessment of root morphology is useful for elective extraction of teeth, as retention of root remnants will almost certainly result in the failure of the treatment.

### **Tooth extraction**

#### **1) Diseased teeth**

The author's preferred next stage is the extraction of all diseased teeth however, following discussions with the owner, one may consider to miss this stage and proceed immediately to elective extraction of teeth.

#### **2) Elective extraction of teeth**

This is the extraction of teeth in those regions with there is significant mucositis and may or may not include extraction of the canine and incisor teeth.

The author prefers surgical extractions of teeth via mucoperiosteal flap as the soft tissues can be closed over the extraction sites and aid healing, but whichever technique is used, tissue handling must be gentle as the soft tissues are often very friable and complete extraction with no root remnants is essential. Aseptic technique is mandatory to minimise complications, and this should include preparation of the oral cavity, surgical equipment and surgeon. Post extraction radiographs are again mandatory to ensure no root material has been retained, which will serves as a source of ongoing inflammation.

Peri-operative analgesia is essential, as surgery in an area of active inflammation is likely to result in significant post-operative pain. Systemic opioids and NSAIDs and regional local anaesthesia should all be considered in the management of post-operative pain.

Post-operative hospitalisation should be continued until adequate oral feeding has been achieved. Assisted feeding or possibly oesophagostomy tube feeding may be required, but the author often finds that patients can be more comfortable post-operatively.

Post-operative oral hygiene should also be maintained using chlorhexidine oral rinses initially twice daily to reduce opportunistic bacterial infection.

**Follow up**

The author prefers to review FCGS cases at 2 days post-operatively to ensure adequate analgesia and then at 7 days to monitor mucosal healing. Cases are then reviewed every 2 weeks until successful resolution has been achieved. If resolution has not been achieved, then monitoring at this frequency will allow early intervention with further medical or surgical treatment.

**Medical intervention**

This will normally be considered after full mouth extractions caudal to the canine teeth. Broad spectrum antibiotics are always prescribed peri-operatively for the reasons discussed above. Interferon Omega can be commenced soon after surgery, and the author has found that this can help with post-operative pain and inflammation. NSAIDs can be continued post-operatively until inflammation and signs of pain resolve. Corticosteroids should be used only as a 'rescue' treatment.

This article has aimed to provide a treatment regime for the management of Feline Chronic Gingivostomatitis. The most important steps to remember are good client communication and the use of dental radiography to ensure a good clinical outcome.

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