

Let's Talk Stomatitis



VETERINARY PRACTICE BOARD
WESTERN AUSTRALIA



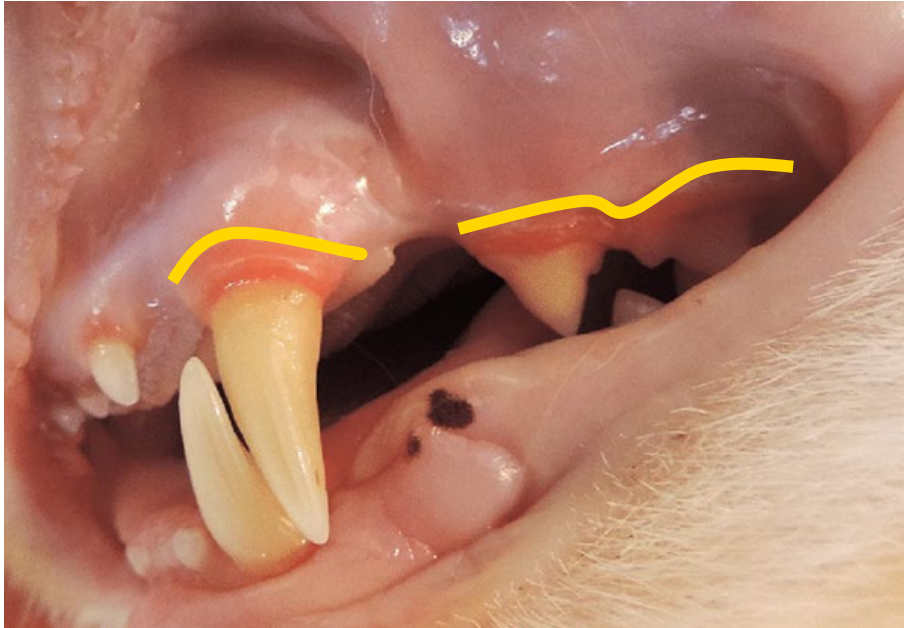
Dr Rebecca Nilsen BSc BVMS (Hons) MANZCVS (Small Animal Dentistry And Oral Surgery)



What is Feline Chronic Gingivostomatitis (FCGS)?

- PAINFUL debilitating disease
- Chronic immune-mediated, inflammatory mucosal disease
- Prevalence: 10% of feline population
- Aetiology is unknown and likely multifactorial
- Inflammation that extends across the mucogingival junction

Gingivitis vs Gingivostomatitis



Clinical Signs

- Halitosis
- Dysphagia
- Pawing at the mouth
- Reluctance to eat/Anorexia
- Weight loss
- Growling/crying
- Drooling/blood-tinged saliva
- Lack of grooming
- Reduced socialisation



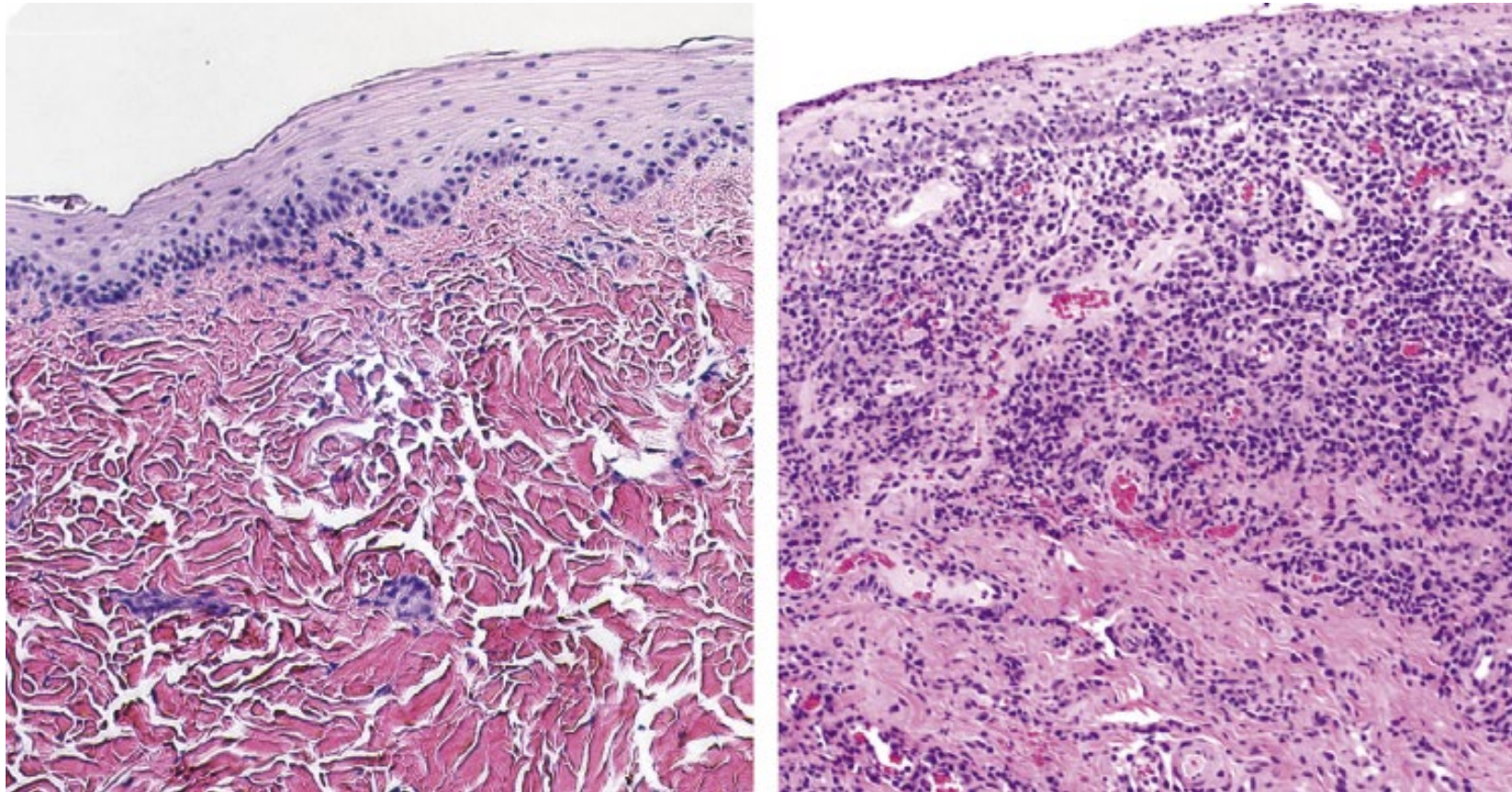
ULCERATIVE



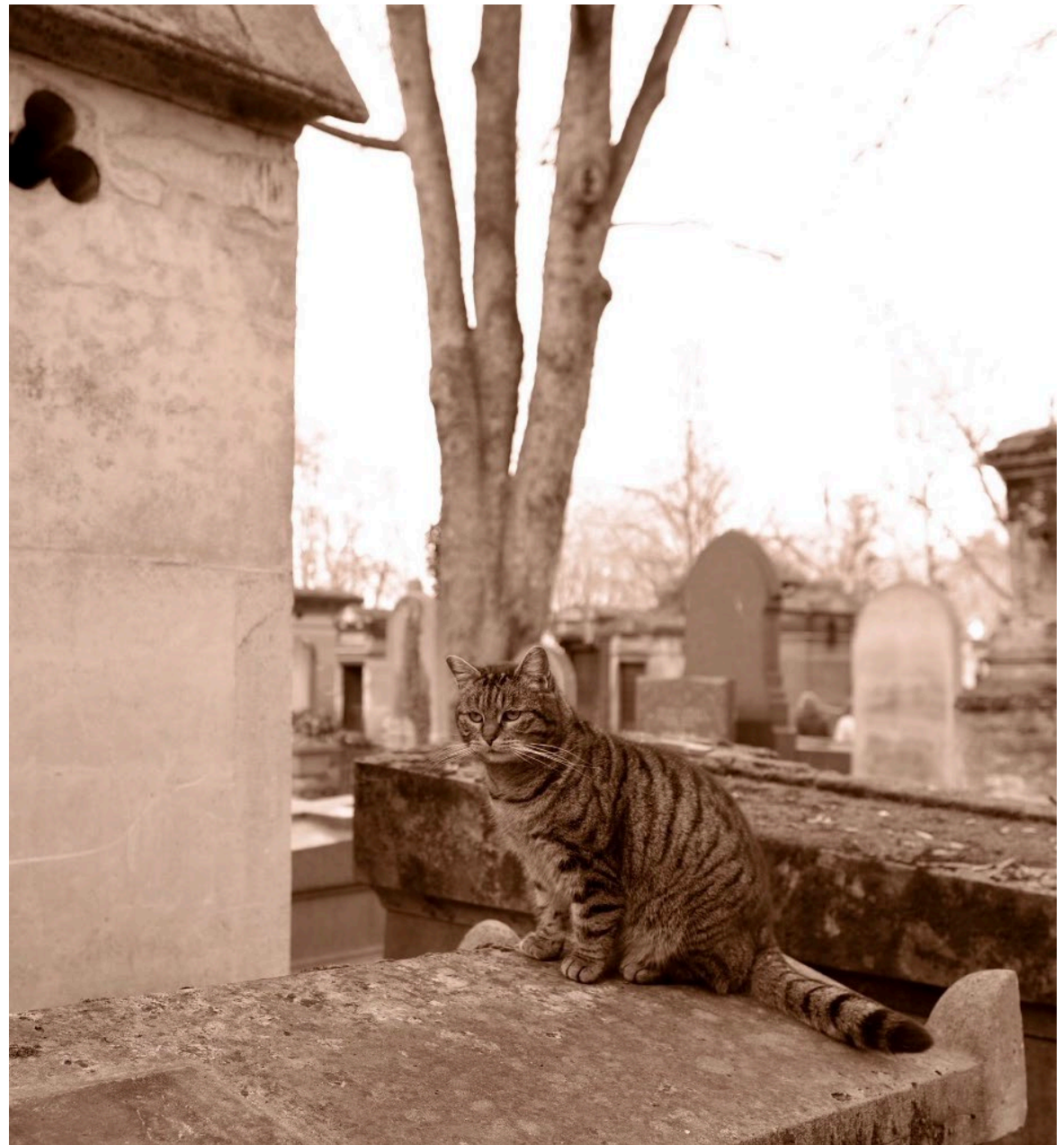
PROLIFERATIVE



Lymphoplasmacytic mucosal inflammation



So what do the recent studies tell us?



Viral + Bacterial Involvement



Immunohistochemical characterization of oral mucosal lesions in cats with chronic gingivostomatitis

R Harley¹, T J Gruffydd-Jones, M J Day J Comp Pathol. 2011 May;144(4):239-50.

Relative to equivalent oral mucosal samples from healthy cats, the number of cells labelled for CD3, CD4, CD8, CD79a, IgG, IgM, IgA or L1, and the number of mast cells, within the lamina propria/submucosa were significantly increased. Limited analysis of the epithelial compartment also found more CD3+ T cells compared with healthy cats. These findings indicate that the glossopalatine mucosal lesions in FCGS represent a complex, chronic and destructive inflammatory process affecting the epithelium and lamina propria, with frequent extension into submucosal tissues. The predominance of CD8+ cells over CD4+ cells suggests the induction of an underlying cytotoxic cell-mediated immune response, which could be consistent with a viral aetiology.

Cessation of feline calicivirus shedding coincident with resolution of chronic gingivostomatitis in a cat

D. D. ADDIE, A. RADFORD*, P. S. YAM
AND D. J. TAYLOR

Journal of Small Animal Practice (2003)
44, 172-176

Feline calicivirus (FCV) shedding and oral bacterial flora were monitored over a period of 22 months in a case of feline gingivostomatitis (FGS). The cat was treated daily with 50 mg thalidomide capsules by mouth, and 200 mg lactoferrin powder was applied directly to the lesions. Clinical signs began to resolve after 11 months when, in addition to treatment, the diet had been changed to an additive-free cat food supplemented with antioxidant vitamins A, D₃ and E. Resolution of clinical signs of FGS coincided with the cessation of FCV shedding, and this is the first report documenting such an association. Which part of the treatment, if any, contributed to the cure requires further investigation.

Relationship between *Feline calicivirus* Load, Oral Lesions, and Outcome in Feline Chronic Gingivostomatitis (Caudal Stomatitis): Retrospective Study in 104 Cats

Isabelle Druet ¹, Philippe Hennet ¹ Front Vet Sci. 2017 Dec 5:4:209.

Conclusion: The results of this study did not support the hypothesis that FCV oral load is correlated with the severity of oral lesions or with the outcome following dental extractions. In addition, the severity of caudal inflammation was not correlated with healing time or achievement of cure.

Use of unbiased metagenomic and transcriptomic analyses to investigate the association between feline calicivirus and feline chronic gingivostomatitis in domestic cats

William A Fried, Maria Soltero-Rivera, Akshaya Ramesh, Milinda J Lommer, Boaz Arzi, Joseph L DeRisi, Jeremy A Horst

Am J Vet Res. 2021 May;82(5):381-394.

Results: The only microbe strongly associated with FCGS was FCV, which was detected in 21 of 23 FCGS-affected cats but no control cats. Problematic base pair mismatches were identified between the assembled FCV genomes and RT-PCR primers. Puma feline foamy virus was detected in 9 of 13 FCGS-affected cats that were refractory to treatment and 5 healthy cats but was not detected in FCGS-affected cats that responded to tooth extractions. The most differentially expressed genes in FCGS-affected cats were those associated with antiviral activity.

Conclusions and clinical relevance: Results suggested that FCGS pathogenesis has a viral component. Many FCV strains may yield false-negative results on RT-PCR-based assays. Coinfection of FCGS-affected cats with FCV and puma feline foamy virus may adversely affect response to treatment.

A Case Series Analysis of Dental Extractions' Outcome in Cats with Chronic Gingivostomatitis Carrying Retroviral Disease

Marta Silva ¹, Marta Fernandes ², Mónica Fialho ³, Lisa Mestrinho ¹ *Animals (Basel)*. 2021 Nov 19;11(11):3306.

This study aims to evaluate and compare the clinical outcome after dental extractions of cats with FCGS infected with feline immunodeficiency virus (FIV) and feline leukaemia virus (FeLV). A retrospective case series included cats with diagnosis of FCGS, availability of detailed clinical records, full-mouth dental radiographs, and retroviral disease test results. Effectiveness of surgical treatment (EOT) was registered. Three groups were defined: control, FIV and FeLV. In this study, 111 cats were included: 60 controls, 29 FIV- and 22 FeLV-positive cats. When compared with control cases, FeLV-positive cats had significantly less proliferative stomatitis lesions, and they tended to have more lingual ulcers. Concurrently, FeLV-positive cats had significantly less tooth resorptive lesions. No other significant differences in FCGS clinical signs were found between groups. FeLV-positive cats had a significantly worse outcome after dental extractions compared to the other groups. In fact, FeLV-positive cats had 7.5 times more chances of having no improvement after dental extractions. This study concludes that the response to dental extractions in FeLV-positive cats is significantly worse, when comparing to cats that do not carry retroviral disease. Therefore, it is important to acknowledge the effect of FeLV status on the prognosis of these cats.

The subgingival microbial community of feline periodontitis and gingivostomatitis: characterization and comparison between diseased and healthy cats

[Marjory Xavier Rodrigues](#), [Rodrigo Carvalho Bicalho](#), [Nadine Fiani](#), [Svetlana Ferreira Lima](#) & [Santiago](#)

[Peralta](#) 

[Scientific Reports](#) **9**, Article number: 12340 (2019)

In summary, our study corroborates findings in the literature regarding the complexity of the subgingival microbiome of the domestic cat and demonstrates differences and/or similarities based on periodontal status. We found higher bacterial diversity in the microbiomes of diseased sites compared to healthy sites, highlighting the important role played by bacterial biofilms in ecologically unstable tissue environments. Also, a high prevalence and significance of bacteria previously described as pathogens was demonstrated in disease groups.

Environmental Stressors



Feline chronic gingivostomatitis is more prevalent in shared households and its risk correlates with the number of cohabiting cats

Santiago Peralta¹, Patrick C Carney¹ J Feline Med Surg. 2019 Dec;21(12):1165-1171.

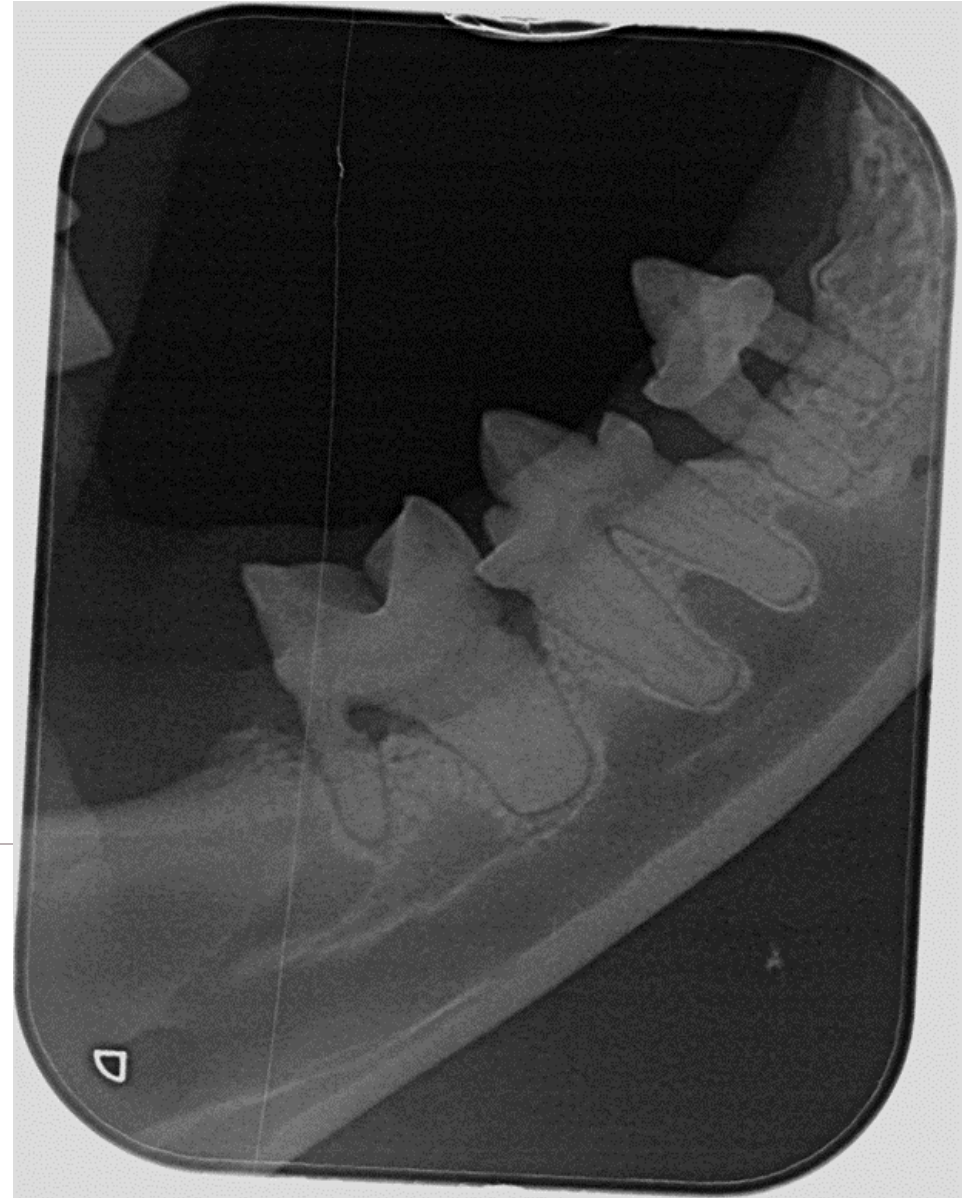
Results

Seventy-six cats were included, of which 36 (47%) had FCGS and 40 (53%) served as controls. Bivariate analysis showed that cats with FCGS were significantly more likely to come from shared households, and had significantly more total cats per household compared with controls. Multivariate analysis also showed that cats in shared households had a significantly increased odds of FCGS compared with those from single-cat households. Historical signs of upper respiratory disease and outdoor access among cats within the same household were not associated with FCGS. The number of cohabiting cats was not associated with surgical outcome.

Conclusions and relevance

Cats with FCGS are more likely to live in shared households. The risk of FCGS correlates with the number of cohabiting cats. The epidemiological features of FCGS may support an infectious etiology. The number of cohabiting cats within a household is not a useful prognostic indicator for standard surgical treatment of FCGS.

FCGS and Periodontitis



Dental radiographic findings in cats with chronic gingivostomatitis (2002-2012)

Nicodin Farcas¹, Milinda J Lommer, Philip H Kass, Frank J M Verstraete J Am Vet Med Assoc. 2014 Feb 1;244(3):339-45.

Objective: To compare dental radiographic findings in cats with and without feline chronic gingivostomatitis (FCGS).

Design: Retrospective case-control study.

Animals: 101 cats with FCGS (cases) and 101 cats with other oral diseases (controls).

Conclusions and clinical relevance: Results suggested that FCGS was associated with more widely distributed and severe periodontitis, with a higher prevalence of external inflammatory root resorption and retained roots than other oral diseases. Full-mouth radiographic views are indicated for cats with FCGS to diagnose the extent of associated periodontitis, reveal external inflammatory root resorption, and identify retained roots.

FCGS and Oesophagitis



Chronic Gingivostomatitis with Esophagitis in Cats

[M.I. Kouki](#), ¹ [S.A. Papadimitriou](#), ¹ [D. Psalla](#), ² [A. Kolokotronis](#), ³ and [T.S. Rallis](#) ⁴

[J Vet Intern Med.](#) 2017 Nov-Dec; 31(6): 1673–1679.

Results: The majority of cats with clinical signs of FCG exhibited some degree of esophagitis especially in the proximal (44/58) and distal (53/58) parts ($P < 0.001$) with or without columnar metaplasia, compared to controls. All cats lacked signs related to gastrointestinal disease. Salivary and esophageal lumen pH were not statistically different compared to controls.

Conclusions and clinical importance: Feline chronic gingivostomatitis seems to occur concurrently with esophagitis. Esophagitis also should be managed in cats with chronic gingivostomatitis because it may aggravate the existing condition.



So what do we
do in-clinic?

Clinical Management Goals

- Decrease or eliminate antigenic stimulation
- Modulate the abnormal immune response



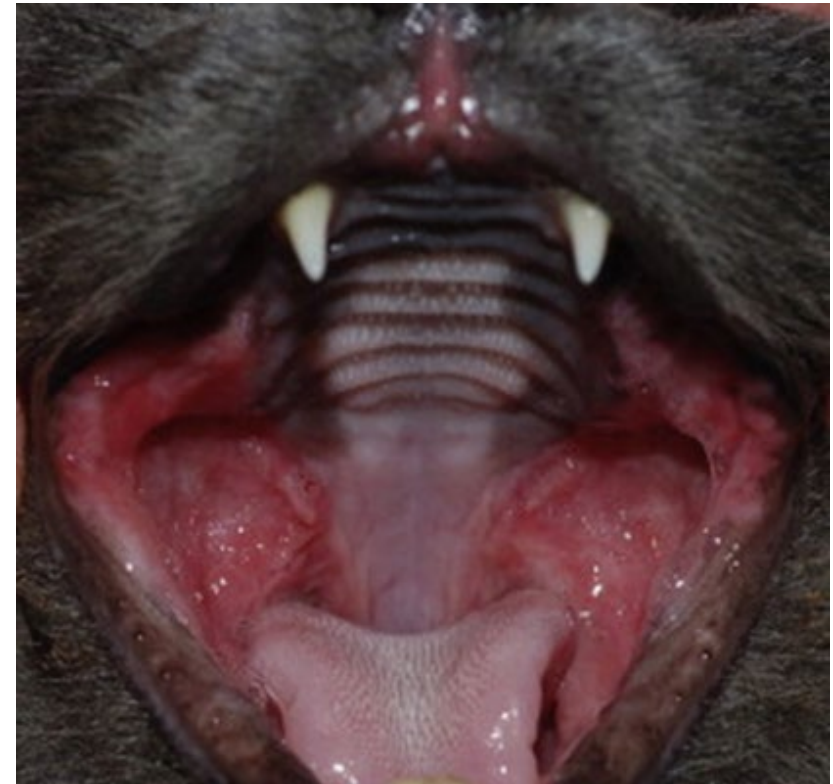
SURGICAL MANAGEMENT IS OUR STARTING POINT

- Reduce a portion of the chronic inflammatory burden
- Medical management
 - Temporary relief
 - Ineffective for long-term resolution of oral lesions



Preoperative evaluation

- Pre-GA workup
 - History
 - Physical exam
 - CBC, Biochemistry panel + UA
- Viral testing (Px significance)
 - FeLV, FIV and FCV
- Oral exam
- Stomatitis Disease Activity Index (SDAI)



Stomatitis Disease Activity Index (SDAI)

STOMATITIS DISEASE ACTIVITY INDEX	0	1	2	3
Owner evaluation				
Weight				
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)				

0 – normal tissue

1 – mild inflammation or ulcerative

2 – moderate inflammation/ulceration will bleed if gently stimulated with cotton bud

3 – severe inflammation/ulceration shows spontaneous bleeding

PARTIAL vs Full Mouth Extractions

Extraction of premolar and molar teeth only

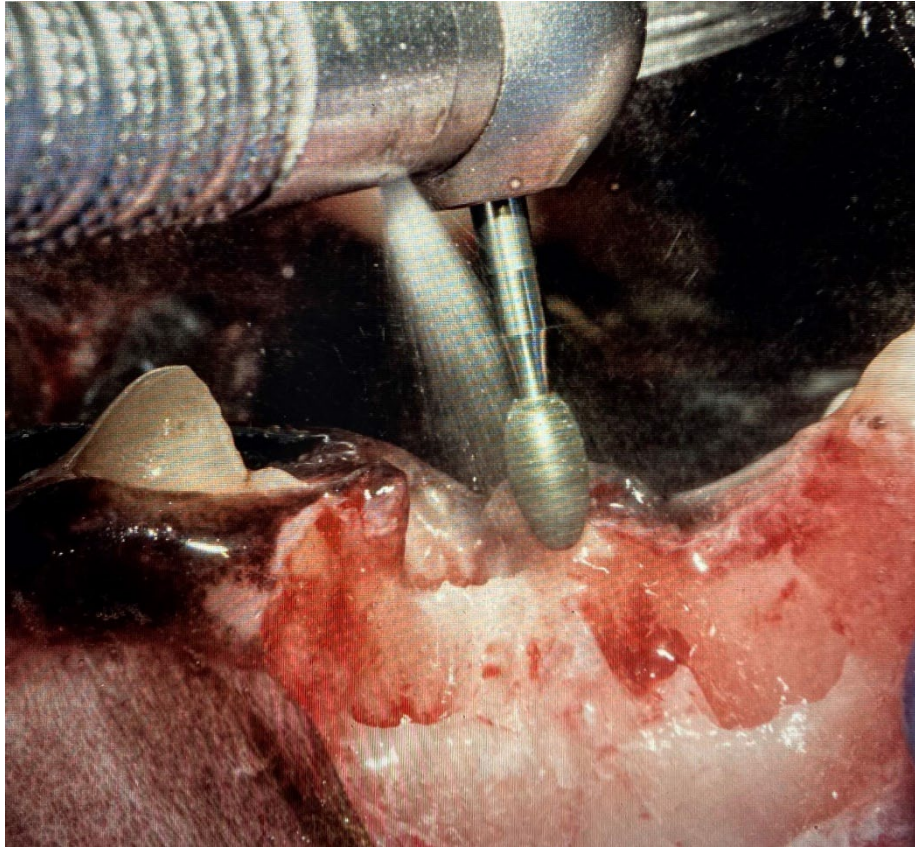
- Little or no inflammation of the gingiva and associated mucosa surrounding canines and incisors
- Scaling remaining teeth performed q1-3 months while inflammation remains



Partial vs FULL Mouth Extractions

- All cases with diffuse oral inflammation
- No response within 2-3 months of PME, remaining teeth extracted regardless of whether or not there is inflammation around the rostral teeth





Full mouth dental radiographs pre/post extraction
Incisional biopsy's for histopathology +/- Real-time PCR for FCV

Surgical Management

Therapeutic Management of Feline Chronic Gingivostomatitis: A Systematic Review of the Literature

Jenna N. Winer¹, Boaz Arzi^{2} and Frank J. M. Verstraete²*

Front. Vet. Sci., 18 July 2016

Sec. Veterinary Dentistry and Oromaxillofacial Surgery

- Complete remission in 28.4%
- Significant improvement 39%
- Partial response 26.3% of cats required ongoing medical management
- Refractory with no improvement 6.3% of cats



Currently PME and FME
continue to provide the best
long-term results

Medical Management

Medical management has no role as a sole treatment entity in place of surgery at this time

Analgesia

- Buprenorphine
- Gabapentin
- NSAIDs
- Other Opioids

Antimicrobials

- Amoxicillin clavulanate
- Clindamycin

Immunosuppressive

- Steroids
- Cyclosporine

- VIRAL NEGATIVE

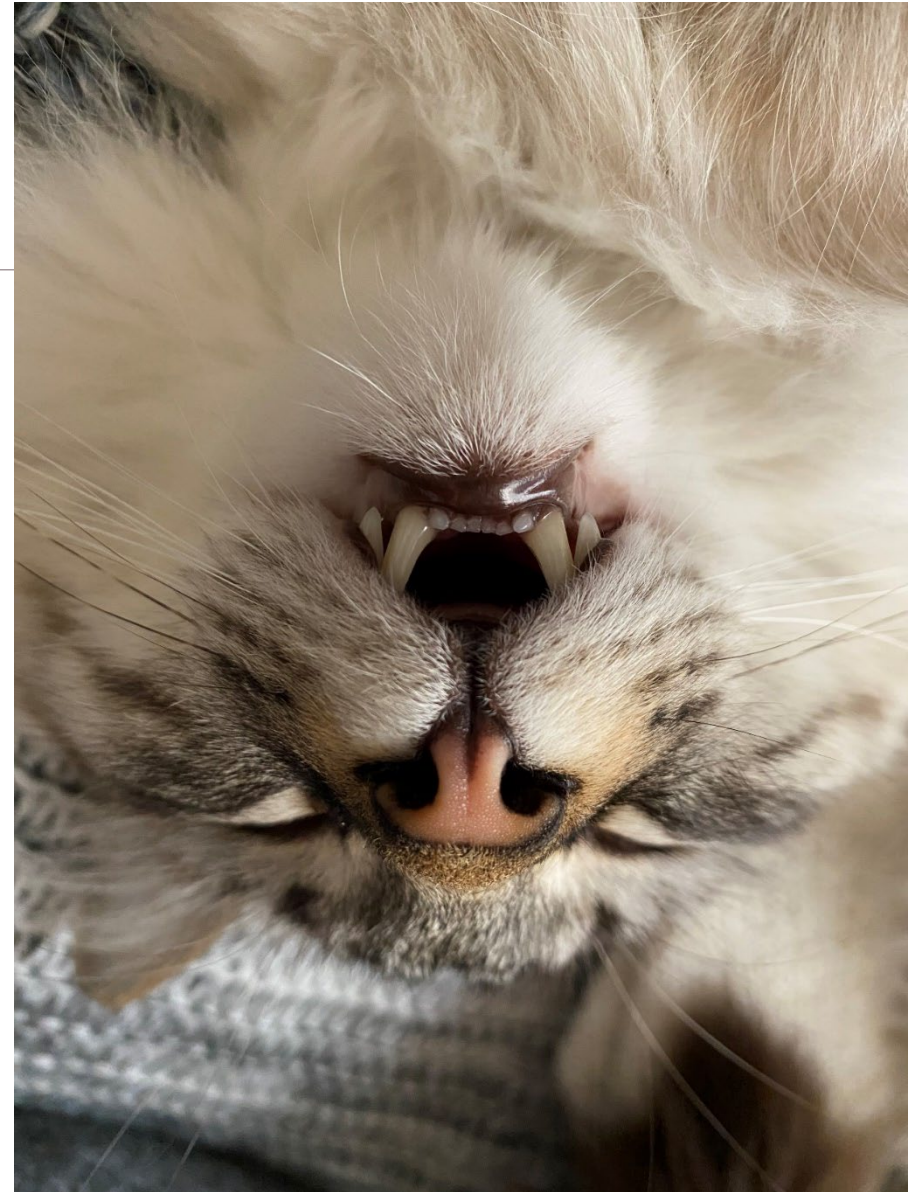
Immunomodulation

- Recombinant feline interferon-omega
- Mesenchymal Stromal Cell therapy

- VIRAL POSITIVE

Analgesia

- Pre/Post surgery/Refractory cases
- Buprenorphine
 - 0.02mg/kg q6-8 hours IV, buccal/transmucosal
 - Transdermal patch – 5 days
- +/- Gabapentin
 - 5-10mg/kg q12 hours PO
- NSAIDs
 - Meloxicam 0.05mg/kg SID PO
- Opioids



Antimicrobials

- Acute setting only
- 5 days postoperatively
 - Amoxicillin clavulanate 13.75mg/kg PO q12h OR
 - Clindamycin 5-11mg/kg PO q12h
- Benefit of >24 h antibiotic therapy?



Immunosuppressive therapy

PREDNISOLONE

- 23% patients marked improvement
 - 7% achieving clinical remission
- Reserve for:
 - Non-responders to analgesia protocols
 - Symptomatic Tx on tapering dose
 - Salvage option

CYCLOSPORINE

- 45.5% clinical remission
- Whole-blood cyclosporine levels >300ng/ml

Viral NEGATIVE

Immunomodulation

Recombinant feline interferon-omega

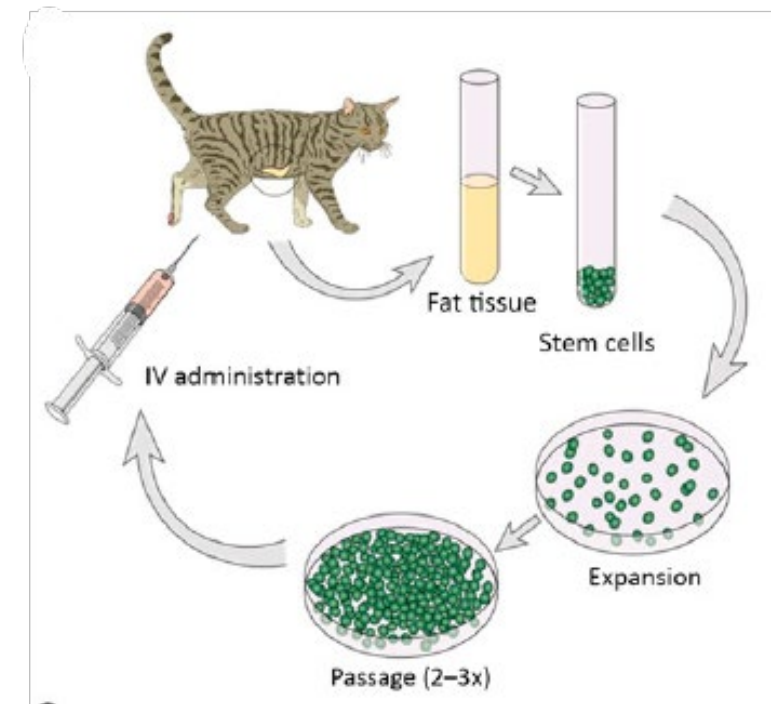
- 0.1MU/cat SID PO for 90 days
- Substantial improvement in 45%, of which 10% achieved clinical remission



Viral POSITIVE

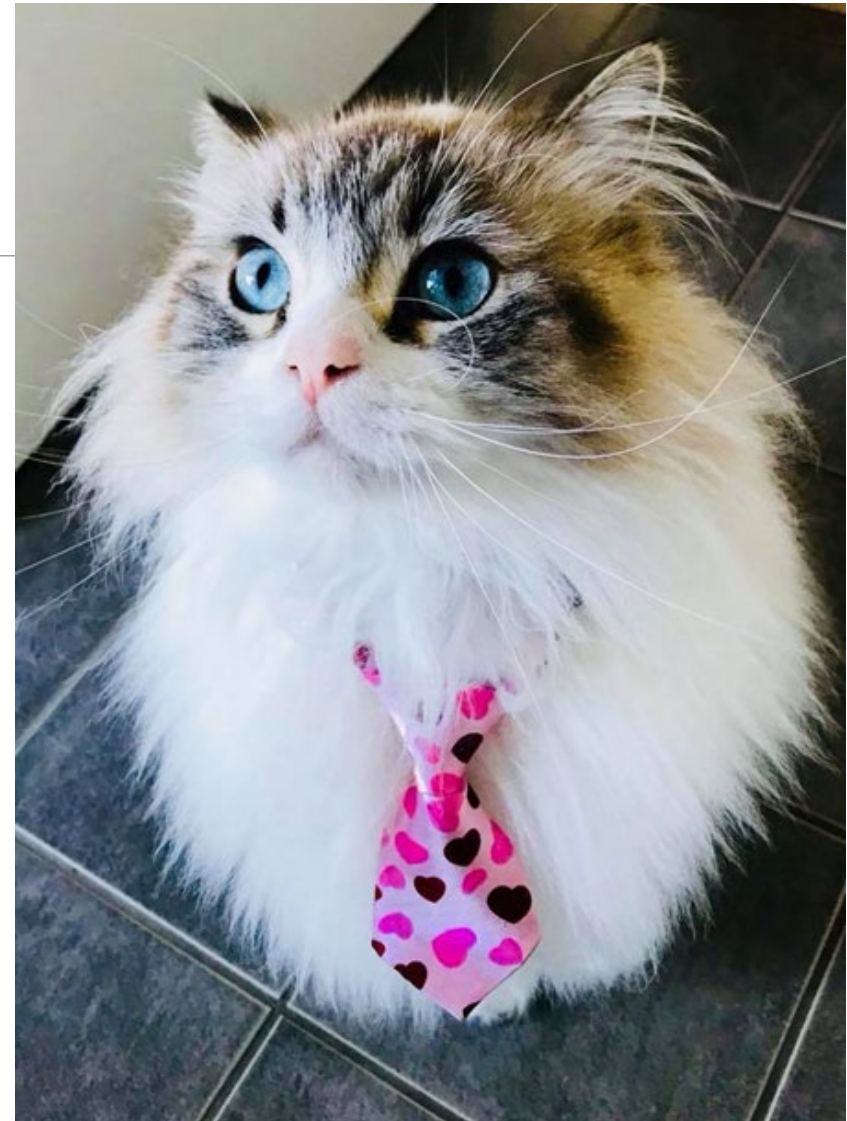
Mesenchymal Stromal Cell Therapy (MSC)

- Promising therapy for immune-mediated and inflammatory disorders
 - Clinical improvement in 57% (allogenic) and 71% (autologous)
- Systemic immunomodulation
 - Decreased # of circulating cytotoxic CD8+ T cells
 - Normalisation of the CD4/CD8 ratio
- Potential biomarker to predict response to therapy
 - Cats with <15% CD8 T cells with low expression of CD8 cells – 100% responsive
 - Cats with >15% CD8 T cells – non-responders



Take home message

- Immune response to chronic antigenic stimulation
- Increasing support for FCV role in FCGS
- Varying degrees of Periodontitis
- Surgical treatment remains as gold standard therapy
- Medical management alone is not acceptable
- Is regenerative therapy the future for FCGS management?





Questions?



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