

CASE REPORT**FELINE CHRONIC GINGIVOSTOMATITIS IN A NINE-YEAR-OLD NEUTERED MALE PERSIAN CAT MIX: A CASE REPORT**

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ABSTRACT

A nine-year-old neutered male Persian cat mix was presented for halitosis, blood-tinged saliva, poor appetite, and weight loss. The cat was diagnosed with Feline Chronic Gingivostomatitis (FCGS), a disease characterized by painful swelling of caudal oral tissues of unknown aetiology. Diagnosis was determined through detailed oral examination, oral radiography, and histopathology. Oral radiography demonstrated periodontitis with horizontal bone loss, tooth resorption, and retained tooth roots. Tests for Feline Immuno Deficiency Virus (FIV) and Feline Calicivirus (FCV) were administered to determine if they play a role in FCGS of which yielded low positive and negative results, respectively. Histopathology of caudal mucosal tissues showed subacute to moderate lymphocytic mucositis, undertaken to rule out neoplasia. Tissue swab isolated *Escherichia coli*. Since the pathogenesis of FCGS is multifactorial and inciting causes like periodontitis, tooth resorption, and retained roots were present in this case, full mouth dental extractions were performed. The gradual resolution of inflammation of caudal mucosa and palatoglossal folds were observed post operatively on days 6, 31, 67, 92, and 948. Full mouth extractions were completed in four visits using total intravenous anaesthesia (TIVA) and local blocks. Medical therapy using 1-TDC, 0.12% chlorhexidine oral spray, meloxicam, and marbofloxacin was also done.

Keywords: 1-TDC, feline chronic gingivostomatitis, full mouth dental extractions, lymphocytic mucocitis, TIVA cocktail, tooth resorption

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INTRODUCTION

Dental and oral diseases impart significant pain and potential local and systemic infections in cats. One of the five domains of animal welfare (mental state) is to keep animals free from pain. A veterinarian has a moral and ethical duty to extenuate this suffering by treating oral and periodontal diseases thus, keeping the cat free from pain and infection.

WSAVA Global Dental Guidelines state that dental/ oral disease is the most common medical issue in small animal medicine. Oral disease is painful however, veterinary patients rarely show signs of pain. Due to the significant amount of pain and infection, including the significant local, regional, and systemic consequences, and untreated/undertreated oral

and dental pathology significantly decreases the patient's quality of life. This can and should be interpreted as an animal welfare program. There is a tremendous lack of dental education in the veterinary profession and less than 20% of veterinary schools in the US and even fewer worldwide have a veterinary dentist on staff (<https://www.wsava.org/Global-Guidelines/Global-Dental-Guidelines/>, accessed October 18, 2019).

In the Philippines, a five-module course in veterinary dentistry was conducted by the Philippine Animal Hospital Association from 2015 to 2018 participated by 25 Filipino small animal veterinarians under the tutelage of a renown veterinary dental specialist Dr. James M.G.

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Anthony. Amongst 25 participants, 12 veterinarians are still pursuing the diplomate course in veterinary dentistry. Suffice to say that only 25 Filipino small animal practitioners were formally trained in veterinary dentistry. Anecdotally, they also encountered cases of FCGS where premolar and molar or full dental extractions were performed as the treatment of choice. However, no FCGS cases were ever published.

Feline chronic gingivostomatitis (FCGS) is an inflammatory disease of the oral cavity that causes severe pain and distress (Dolieslager, 2012). It covers a wide range of manifestations from the most severe inflammation and ulceration of the whole oral cavity to more focal conditions where inflammation may be confined to specific tissues and locations (Reiter *et al.*, 2019). It may be manifested by caudal and alveolar mucositis and caudal stomatitis which is a widespread oral inflammation involving submucosal tissues extending beyond gingivitis and periodontitis. Caudal mucositis is an 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 according to American Veterinary Dental College (AVDC).

The main clinical findings in a study of 27 cats with FCGS conducted by Rolim (2016) were dysphagia (83.3%), halitosis (72.2%), sialorrhea (44.4%), weight loss (38.8%), intense oral discomfort (33.3%), oral hemorrhage (22.2%), lack luster and fragile coat (11.1%), and dyspnea (5.5%).

Pathogenesis of the FCGS is not fully specified yet. For Winer *et al.*, (2016), FCGS arises from an inappropriate immune response to oral antigenic stimulation, potentially multifactorial in nature and possibly with varying inciting causes, from systemic pathogens (feline calici virus, herpes virus, leukemia virus, immunodeficiency virus, and Bartonella), to dental disease (feline resorptive lesions, periodontal disease, to hypersensitivity like an overreaction to plaque bacteria, and food allergies. Detection of circulating T-cells in cats suffering from FCGS supports the theory that the disease arises from an aberrant response to chronic antigenic stimulation stemming from clinical or subclinical viral infections. However, in a study conducted by Reginaldo *et al.* (2017), the presence of feline immunodeficiency viral (FIV) infection or the seropositive status of the animals does not seem to interfere with the severity of clinical signs nor the degree of histopathological changes when compared to the seronegative group. Little *et al.*,

(2020) mentioned that Retroviral positivity does not necessarily translate into disease, especially in FIV-positive cats, where the disease can remain latent for years without evolving into immunodeficiency and dental disease and stomatitis are considered manifestations of immunosuppression in the affected cats. Histopathology of inflamed mucosa and gingiva reveal plasma cells with varying numbers of lymphocytes, neutrophils, and macrophages (Greenfield, 2017).

For the treatment of FCGS, Winer *et al.*, (2016) concluded that the mainstay of medical therapy of FCGS has traditionally been immunosuppression (corticosteroid or cyclosporine) while surgical treatment involves the extraction of premolar and molar teeth or the full dentition. For Papadimitriou (2016), the only effective way to deal with the disease process is altering the oral microbiota from anaerobic to aerobic. Shifting of the oral flora is believed to play an important role in reducing the oral mucosa inflammation. Treatment protocol initially includes extraction of the teeth suffering from periodontal disease, scaling, and polishing of the remaining teeth. Non-steroidal anti-inflammatory drugs and opioids should be administered for the management of pain for a few days postoperative. The current therapeutic approach for FCGS is to eliminate all sources of infection and chronic inflammatory processes from the mouth, decrease discomfort, and better nutrition (Hennet, P. 2019). Chronic inflammation leads to periodontal tissue destruction. Modulation of the host response has been included in the treatment protocol of periodontal diseases. Use of an inflammatory agent, tetradecanol complex, a monounsaturated fatty acid, 1-TDC, (1-tetradecanol, esterified fatty acid complex, acetylated fatty acid complex) applied topically to inflamed oral tissue suppresses proinflammatory cytokines (De Caterina, *et al.*, 2016). It's topical use also restored the destructed periodontal tissues as a result of *Porphyromonas gingivalis*-induced periodontal disease in a rabbit model of experimental periodontitis. The fatty acid complex was not only able to stop disease progression but also resulted in new tissue and bone reformation, suggesting the potential novel therapeutic approach for the treatment of periodontal diseases (Kubitza and Anthony, 2019).

This case report presented the clinical, radiographic, and histopathological findings in a cat suspected with FCGS. Full mouth dental extractions including all retained roots resulted to remarkable decrease in inflammation at 92 days post-operative and complete resolution at

948 days post-operative.

CASE DESCRIPTION AND DISCUSSION

On July 23, 2019, a nine-year-old, castrated, male, indoor Persian cat mix was presented to Seven Lakes Veterinary Clinic for halitosis, blood-tinged saliva, poor appetite, and weight loss. These clinical manifestations were persistently observed in the cat for about six months. She was still alert and responsive but showed discomfort and resistance during awake oral examination. There were no visible signs of lameness on both forelimbs and hindlimbs. She has been fed with softened cat food and table food. Her vitals were the following: heart rate was 200 beats/minute, respiratory rate of 20 beats/minute, body temperature of 38°C, capillary refill time of <2 seconds, weight of 3.25 kg and a body condition score of 3 out of 9. Her poor appetite resulted to weight loss.

The cat was tested for FIV and FCV. The result was low positive and negative, respectively. Other tests were declined by the owner. Da Bin, Lee *et al.* (2020), mentioned that although the cause of FCGS remains unknown, and despite extensive investigations, infectious pathogens such as feline calicivirus (FCV), feline herpesvirus (FHV-1), feline immunodeficiency virus (FIV), and feline leukemia virus (FeLV) have been implicated. Demonstration of causal relationships have not been successful, but of these agents, FCV appears to have the most consistent evidence of being associated with FCGS. Various bacteria, as well as noninfectious factors such as dental disease, environmental stress, and hypersensitivity, have also been linked.

The isolation of *Escherichia coli* from palatoglossal folds and caudal mucosa and the absence of other oral bacteria like

Pasteurella multocida, could be attributed to Marbofloxacin administered for three days and use of 0.12% Chlorhexidine before and after extractions and daily flushing post-op.

For detailed oral examination, a 25-g IV catheter was inserted along with lactated Ringers Solution at a flow rate of 5 ml/kg/hr. Total Intravenous Anaesthesia (TIVA) cocktail of (Zoletil 50 mg/ml (Zolazepam/Tiletamine) at 1 mg/kg bwt + Morphine (16 mg/ml) at 0.075 mg/kg bwt + Medetomidine (1 mg/ml) at 0.005 mg/kg bwt) is given at a dose rate of 0.015 ml/kg administered slow intravenous (IV). An endotracheal tube size 3.5 French internal diameter was inserted. The oral cavity was flushed with 0.12% chlorhexidine gluconate to decrease bacterial load. Inflamed and ulcerative bilateral caudal buccal mucosal tissues were observed. Modified Triadan System was used for dental charting. The following were recorded: 102 and 202 both has gingival index 2 and 2 mm gingival recession. Missing teeth are the following: 101, 103, 106, 107, 201, 203, 206, and 207. The root of 104 protruded from the hyperemic gingiva; 204 has a complicated crown fracture, 108 and 208 showed furcation index 3 with resorptive lesions, and 109 has gingivitis index 3. For the mandible, no incisors were recorded; 304 with gingival index 3 and gingival recession of 2 mm, missing 307, 308, and 404 ; 407 and 408 have moderate gingival recession and both 309 and 409 indicated furcation index 3 with resorptive lesions.

Full-mouth radiographs showed retained roots of 101, 103, 104, 106, 107, 201, 203, 206, and 207; 204 with complicated crown fracture; 108 with TR1 and 208 with TR3 and 109 with apical lucency. The mandible has missing 301, 302, 303, 401, 402, and 403; 304 with apical lucency and alveolar bone loss; retained roots of 307 and 308; 309 with TR3; 404 with retained root; 407

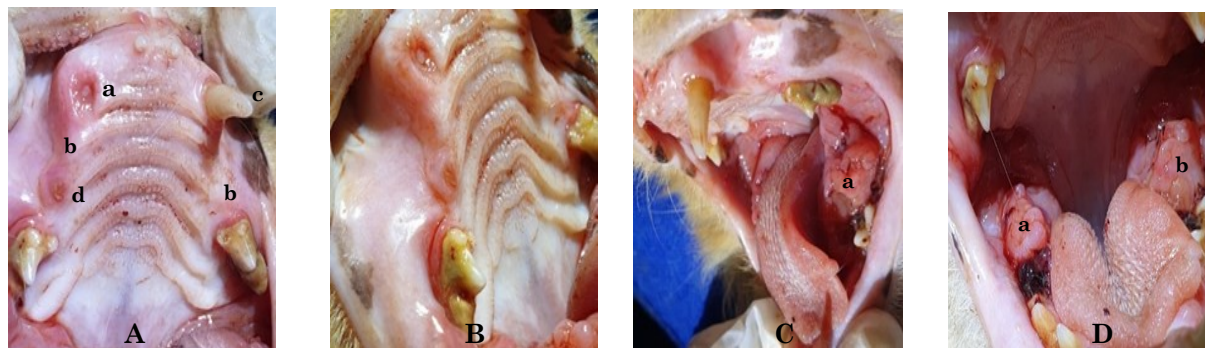


Figure 1. Photograph A showing root fragment of 104 (a), missing premolars (b), complicated crown fracture of 204 (c), and 107 root fragment (d). Photograph B showing the right buccal view. Photograph C showing the left buccal view, with inflamed palatoglossal folds and caudal mucosa (a). Photograph D showing right (a) and left (b) inflamed palatoglossal fold and caudal mucosa.

and 408 with alveolar bone loss and 409 with TR3. After all clinical, oral, and full mouth radiographs were assessed, the current standard of care is surgical intervention by means of dental extractions with or without additional medical management (Lee et al., 2020). It has been suggested that the sooner dental extractions are performed, the better the postsurgical outcome for cats with FCGS (Jennings et al., 2015). The author

opted for full mouth extractions with medical management.

The cat was subjected to four surgical dental extractions on July 23 and 24 and August 2 and 10, 2019. Initial dental extractions ensued after dental cleaning and charting. The patient was given subcutaneous injection of Meloxicam at 0.3mg/kg as an anti inflammatory and adjunct to anesthesia.

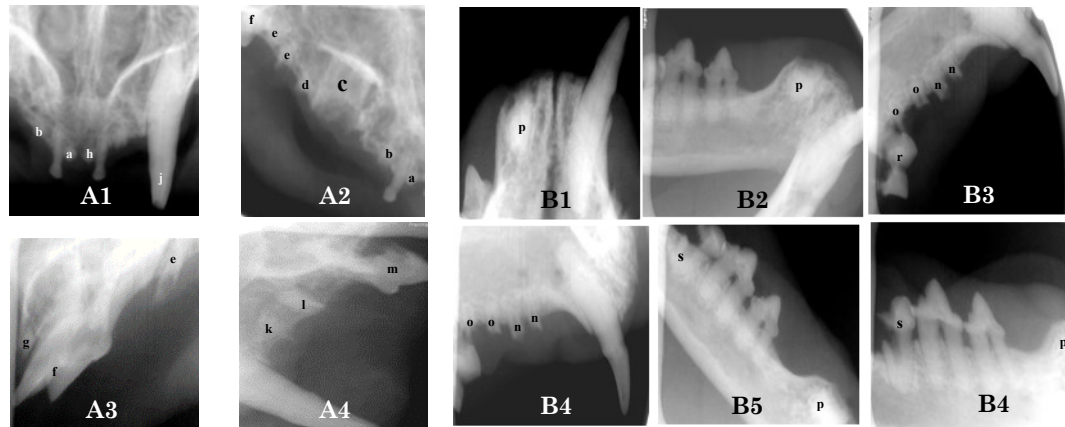


Figure 2: Radiophotograph of maxilla (A series) showing retained roots of 101 (a), 103 (b), 104 (c), 106 (d), 107 (er, ed), 201 (h), 203 (i), 206 (k), 207 (l), complicated crown fracture on 204 (j), tooth resorption (TR1) on 108 (f) and 109 (g), TR3 on 208 (m). Radiophotograph of the mandible (B series) showing retained root of 307 (n), 308 (o), 404 (p) and TR3 on 309 (s) and 409 (r). Both A and B show alveolar horizontal bone loss

Oxygen mask was placed for 10 minutes to improve oxygenation of blood. An endotracheal tube size 3.5 French internal diameter was inserted. TIVA was topped up as needed. For local anesthesia, lidocaine 20 mg/ml at 4mg/kg body weight, total dose divided per site, using infraorbital nerve block. Oral radiographs and photos were taken every after procedure.

The other three surgical extractions followed the same anesthesia protocol. Local anesthesia was applied on mental foramen. The patient was subjected to a minimum of three hours under general anesthesia for every procedure. Aside from being tedious on the part of

primary consideration. The cat had uneventful recovery every after procedure.

Marbofloxacin was given at a dose rate of 0.3 mg/kg bwt SQ for three days while in confinement when the first surgical extraction was done. No antibiotic sensitive testing was performed. Daily oral spray of 0.12% Chlorhexidine gluconate reduced the bacterial load and continued until extraction sites were completely healed. Gingival application of 1-TDC (1-tetradecanol, esterified fatty acid complex, acetylated fatty acid complex) was administered daily for 30 days until full extractions were completed and extraction sites were healed.

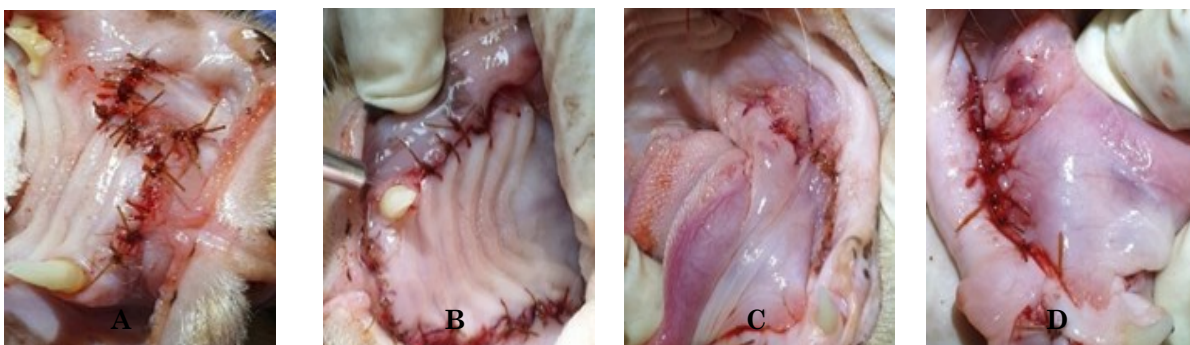


Figure 3. Photographs showing mandibular and maxillary surgical dental extractions (full mouth extractions) on July 23 (A), July 24 (B), August 2 (C) and August 10, 2019 (D) .

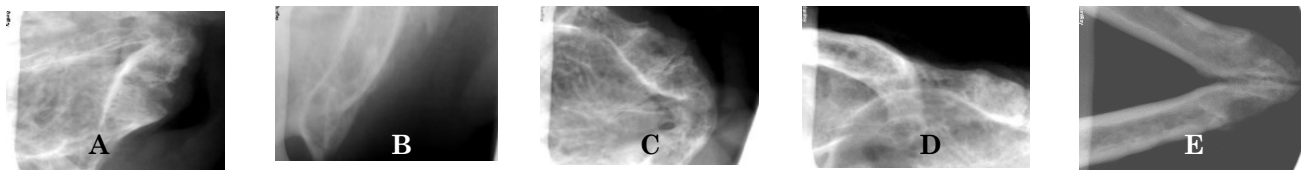


Figure 4. Post extraction radiographs of the mouth exhibiting the right cranial maxilla exposing the extraction sites of the incisors and canine (A), right distal maxilla showing the extraction sites of the premolars and the molars (B), left cranial maxilla exposing the extraction sites of the incisors and canine (C), left distal maxilla showing the extraction sites of the premolars and the molars (D) and the right and left mandible showing clean extraction sites (E).

1-TDC is a monounsaturated fatty acid which suppress proinflammatory cytokines (De Caterina *et al.*,2000). The daily oral topical application of 1-TDC every after dental procedures helped in reducing inflammation of the caudal mucosal tissues. (Kubitza and Anthony 2019). Soft diet was also recommended.

Tissue samples from both the right and left caudal buccal mucosa were submitted for histopathology at U.P Veterinary Teaching Hospital on August 9, 2019. Swabs on both sides

of caudal mucosa were taken for bacterial isolation. The histopathological reports showed *lymphocytic mucositis* and bacterial isolation gave an *Escheria coli* finding, a normal oral microflora.

Histopathology report showed subacute, mild to moderate mucositis, and lymphocytosis. This report demonstrated that the cat has FCGS and was substantiated in a study by Lommer (2013) and Greenfield (2017), that histopathology of inflamed mucosa and gingiva reveal plasma

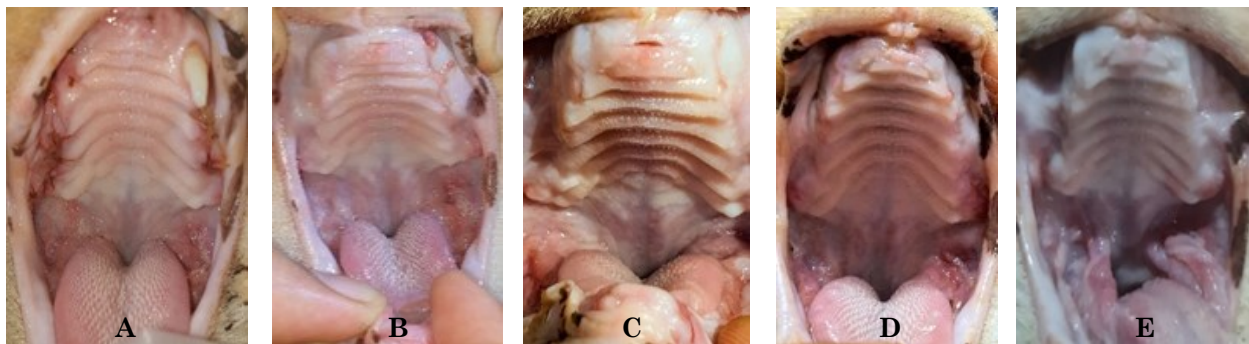


Figure 5. Photograph A showing six days post-operative (post-op) from the first extraction. Photograph B, 31 days post-op. Photograph C, 67 days post-op. Photograph D, 92 days post-op, and Photograph E, 948 days post-op.

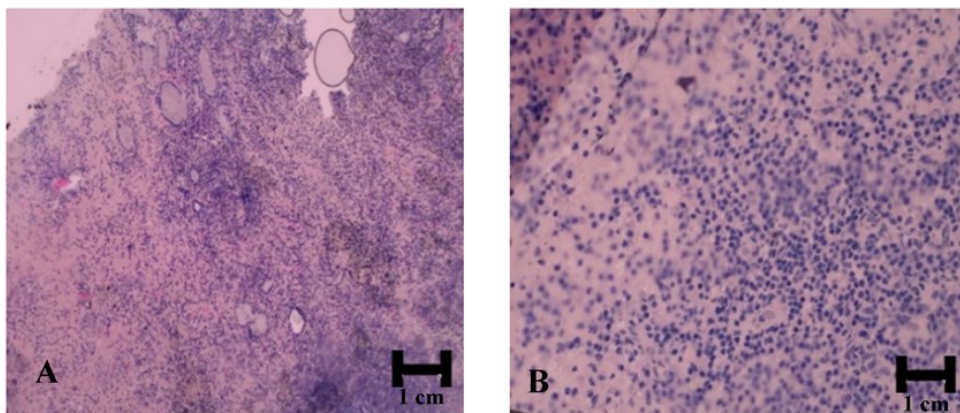


Figure 6. Micrograph A showing subacute to mild lymphocytic infiltrations with scant connective tissues and capillaries or small arterioles under low power objective (100 x magnification). Micrograph B under high power objective (400 x magnification) showing prominent lymphocytic infiltrates with basophilic nucleus and scant cytoplasm.

cells with varying numbers of lymphocytes, neutrophils, and macrophages.

Feline chronic gingivostomatitis is a difficult to manage disease because of its still unknown etiology. In this case report, both full mouth extractions and medical therapy were deemed successful. Oral radiography was vital in the assessment of periodontitis, root resorption, and retained roots which were associated in FCGS. Since further research is ongoing, this multifactorial disease will be better understood, and the success rate of available treatment options will be higher.

STATEMENT ON COMPETING INTEREST

The authors have no competing interests to declare.

AUTHOR'S CONTRIBUTION

AMM did the research related to the case and performed all the dental procedures, oral radiography, medical management during confinement, photography of the patient and writing of the manuscript. The JMGA mentored and guided the author in writing this case report.

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