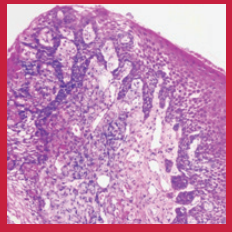
Antinol®
Case Study
Contest

2017

Case Report : Efficacy of PCSO-524® (VetzPetz Antinol®) for Inflammation Control in Cat with Chronic Juvenile Gingivitis Responsive to Full Mouth Extraction



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Abstract

A male, neutered, domestic short hair cat aged 3 years and 10 months, 4.8 kg body weight was kept indoors, annually vaccinated for feline panleukopenia, cat flu, and rabies for the first 2 years of life, and given regular backdrop for prevention of ectoparasites and endoparasites. The test for FeLV/FIV was negative. The cat was having signs of juvenile gingivitis and retained deciduous dentition. Extraction of deciduous teeth were performed when the cat was 11 months old. However, gingivitis was persistent and causing severe halitosis, saliva stain on hair around the lips, drooling, and gingival overgrowth. The cat was treated with New Zealand green-lipped mussel oil extract PCSO-524® (VetzPetzAntinol®, DKSH, Thailand) 1 capsule daily for 2 months after the extraction of deciduous teeth. The treatment was able to reduce degree of drooling and gingivitis but could not completely eliminate the disease. Full mouth extraction was then performed. Post-operative care included anti-inflammatory drug, Tolfenamic acid (Tolfedine®, Vétoquinol, Best Agro; Thailand) 4 mg/kg for 3 consecutive days, Amoxicillin-Clavulanic acid (Clavamox®, Zoetis, Thailand12.5 mg/kg for 1 week, and New Zealand green-lipped mussel oil extract PCSO-524® (VetzPetzAntinol®, DKSH, Thailand) 1 capsule per day continuously. The severity of gingivitis was rapidly decreased after the operation and within 2 weeks after the operation, the gingivitis was completely subsided. The oil extract was administered continuously for 31 months without showing any clinical signs or impaired hematological indicators.

Introduction

Periodontal disease is the most common disease found in small animals. Incidence of the disease in cats and dogs over 2 years old is 70% and 80%, respectively (Niemiec, 2018). Primary clinical sign of the disease is gingivitis. The inflammation causes bacterial plaque buildup which can be combined with calcium from saliva and become tartar. The plaque and tartar can lead to periodontitis and permanent gingival damage (Niemiec, 2018). Lymphocytic-plasmacytic gingivitis/stomatitis is one of the diseases infeline chronic gingivostomatitis group. It is an autoimmune disease caused by genetic disorder, stress, physiological factors, nutrition, or viral infection such as FIV and feline calicivirus. There is a report of significant association between felinecalicivirus infection and feline chronic gingivostomatitis. The disease can occur in kittens and cats and requires a life-long treatment. Its clinical signs include inflammation, exfoliation, or excessive growth of tissue in oral cavity that causes pain, dysphagia, weight lost, complications from other diseases, and poor quality of life (Hung et al., 2014, Gorrel, 2008, Thoma et al., 2017, Diehl and Rosychuck, 1993). Cats with gingivostomatitis therefore need scholarly diagnosis and appropriate treatment plan.

Case history

A male, neutered, domestic short hair cat aged 3 years and 10 months, 4.8 kg body weight was diagnosed with juvenile gingivitis and retained deciduous dentition. Extraction of deciduous teeth were performed when the cat was 11 months old. However, gingivitis was persistent and causing severe halitosis, red and swollen gum, saliva stain on hair around the lips, and drooling. The cat was able to eat pellet food normally. Oral cavity care included rinsing with 0.12% chlorhexidine (C-20: OsothInterlab, Thailand) when necessary. New Zealand green-lipped mussel oil extract PCSO-524® (VetzPetzAntinol®, DKSH, Thailand) 1 capsule daily was prescribed. About 1 week after the treatment, the degree of drooling, halitosis, red and swollen gum were decreased significantly. The medication was continued due to persistent symptoms. Six months later, the cat was surgically treated bycleaning teeth, and extraction of half amount of all teeth. Biopsy specimen of the overgrowth gum was collected. Full mouth extraction was performed 6 months later.

Diagnostic and treatment plan

Diagnosis consisted of physical examination, radiographic examination of oral cavity, hematological test and blood chemistry test was performed. Surgical treatment including teeth cleaning and full mouth extraction was planned. Specimen from biopsy of the overgrowth gum was submitted for laboratory examination.

Results of oral cavity examination

There were no remained deciduous teeth since they were totally extracted when the cat was 11 months old. Other findings included loose incisor 104, loose premolar 106 and molar 107 with tartar buildup, gingival recession of incisor 204, halitosis and gingival hyperplasia. There was no sign of faucitis.

Results of complete blood count test

Table 1. Complete blood count test results prior to and after administration of New Zealand green-lipped mussel oil extract PCSO-524 (Vetz Petz Antinol®)

Parameter	Ref. range	Unit	1st and before oil extract treatment (2/7/2013)	2nd and before oil extract treatment (23/4/2013)	3rd and before 1st operation	4th and before 2nd operation	5th and 1 year after operation
RBC	4.60-10.20	10^6/µL	7.6	7.8	6.7	7.4	9.24
Hb	8.5-15.3	g/dL	11.7	11.2	10.4	12.6	14.1
Hct	26-47	%	38.7	35	30	36	43.9
MCV	38-54	FL	51	56.5	52	57	47.5
MCH	11.8-18.0	Pg	16.7	17.2	17.7	17.7	15.3
MCHC	29.0-36.0	g/dL	32.9	30.5	34.0	30.9	32.4
Platelet	100-518	10^3/µL	242	245	286	202	277
WBC	5.5-19.5	10^3/µL	6.7	10.3	9.1	10.3	12.8
Seg	3.12-12.58	10^3/µL	66	69	73	77	65
Lymphocyte	0.73-7.86	10^3/µL	33	29	25	19	32
Monocyte	0.07-1.36	10^3/µL	0	1	1	2	1
Eosinophil	0.06-1.93	10^3/µL	1	1	1	2	2
Basophil	0.00-0.12	10^3/µL	0	0	0	0	0
SGPT	10-60	U/L	58	43	56	53	50
Creatinine	0.8-2.1	Mg/dL	1.6	1.4	1.3	1.6	1.53
BUN	5-30	Mg/dL	21	18	40	17	NA

Remark: CBC-complete blood count, RBC-red blood cell, WBC-white blood cell, g-gram, dl-deciliter, mm3-cubic millimeter, SGPT- serum glutamic pyruvic transaminase, ALT-alanine alanine transaminase, MCV-mean corpuscular volume, MCH-mean corpuscular hemoglobin, MCHC-mean corpuscular hemoglobin concentration, Fl- femtoliter, pg-picogram, NA-not applicable

Treatment and treatment outcome

The first operation was performed to extract half amount of the teeth and clean the other half of the teeth. Specimen was collected from gum hyperplasia for laboratory examination. The operation took a prolonged time and only half of the teeth could be extracted. The owner was required to provide oral cavity care at home and observe the response after surgery. In case there was persistent gingivitis of the remained teeth, they would be extracted later. After the operation, anti-inflammatory drug, Tolfenamic acid (Tolfedine®, Vétoquinol, Best Agro; Thailand) 4 mg/kg was given for 3 consecutive days and antibiotic, Amoxicillin-Clavulanic acid (Clavamox®, Zoetis, Thailand) 12.5 mg/kg was given for 1 week. The oil extract from New Zealand green-lipped mussel, PCSO-524® (VetzPetz Antinol®, DKSH, Thailand), was continued at 1 capsule sid. Oral cavity was rinsed 1-2 times daily with Chlorhexidine 0.12% (C-20® OsothInterlab, Thailand). The cat was fed with recovery formula diet (a/d Hill's prescription diet, Vet Recommend) for 2 days after the operation and then continued with the regular diet (Optimum care Hill's Science diet, Vet Recommend). There was no inflammation of gum where the teeth were extracted. Halitosis and drooling were significantly decreased. However, gingivitis was found at the remaining teeth.

The second operation was performed to extract the rest of the teeth. Post-operative care was similar to that of the previous operation. The recovery and response after treatment was satisfied. Examination did not find gingivitis or inflammation in the oral cavity. Halitosis, drooling, and dysphagia were disappeared.

Laboratory results

The examination of biopsy specimen identified mild lymphocytic-plasmacytic gingivitis that may be the result of autoimmune reaction to protein at the dental neck. Other potential etiology included viral or bacterial infection, nutrition, dental diseases, deformed structure of oral cavity, genetic disorder, allergy, systemic immunodeficiency, and immunodeficiency of the oral cavity.

Discussion

Periodontal disease is the most common disease found in small animals. Incidence of the disease in cats and dogs over 2 years old is 70% and 80%, respectively (Niemiec, 2018). Primary clinical sign of the disease is gingivitis. The inflammation causes bacterial plaque buildup which can be combined with calcium from saliva and become tartar. The plaque and tartar can lead to periodontitis and permanent damage (Niemiec, 2018).Lymphocytic-plasmacytic gingivitis/stomatitis is one of the diseases infeline chronic gingivostomatitis group. It is common in cats but not frequently found in dogs. It is abnormal reaction of the immune system that is caused by genetics, stress, physiological factors, nutrition, or viral infection such as FIV and calicivirus. There is a report of significant association between felinecalicivirus infection and feline chronic gingivostomatitis. The disease can occur in kittens and cats and requires a life-long treatment. Its clinical signs include inflammation, exfoliation, or excessive growth of tissue in oral cavity that causes pain, dysphagia, weight lost, complications from other diseases, and poor quality of life (Hung et al., 2014, Gorrel, 2008, Thoma et al., 2017, Diehl and Rosychuck, 1993). Cats with gingivostomatitis therefore need scholarly diagnosis and appropriate treatment plan.

In this case, the overall condition of the cat was healthy. No systemic diseases were identified. The test for FeLV/FIV was negative. There was gingivitis, gingival recession, loose teeth, and tartar buildup at the cheek teeth. Chronic inflammation caused by retained deciduous dentition was found. There was no caudal faucitis. The lesion at the teeth and gum was in the 2nd stage of periodontitis and 1st grade of lymphocytic-plasmacytic gingivitis/stomatitis. Stages of periodontitis and lymphocytic-plasmacytic gingivitis/stomatitis are classified as follows;

Stages of Periodontitis (Gorrel, 2008)

Grade 0: Normal gum and periodontium. No gingivitis. Gingival groove is normal (0.5-1 mm)

Grade 1: Mild inflammation that is confined only at the gum. Can be restored if treated. No damage of periodontal ligament. Slightly red gum. Blunt marginal gingiva. Normal alveolar bone.

Grade 2: Mild periodontitis. Normal condition cannot be restored after treatment. There is loss of bone mass. Red and swollen gum. There is hemorrhage when dental probe is used for examination. Exposed dental root. Approximately 25% of the tissue are damaged.

Grade 3: Moderate periodontitis. Normal condition cannot be restored after treatment. Bleeding gum, gingival recession, and exposed dental root are found. Approximately 25-50% of the tissue are damaged.

Grade 4: Severe periodontitis. Deep gingival groove and gingivitis are found. Severe periodontitis. Tooth loss. Exposed dental root. Approximately 50% of the tissue are damaged.

Stages of lymphocytic-plasmacytic gingivitis/stomatitis (Hung et al., 2014)

Grade 0:There is no inflammation of gum and buccal mucosa at the lateralpalatoglossal arch

Grade 1:Mild inflammation. Tissue hyperplasia of the caudal oral mucosa. Gingivitis is found on both upper and lower aspect but not at palatoglossal fold

Grade 2:Moderate inflammation. There is inflammation of buccal mucosa on both sides, upper and lower gum, caudal oral mucosaor tongue, and partial area of caudal oral cavity.

Grade 3:Severe inflammation. There is ulcer or fistula of mandible and caudal oral mucosa. Exfoliation of tongue surface or gum is found. There is nodular proliferation at the caudal oral mucosa, buccal mucosa, gum or tongue. Size of caudal oral cavityis decreased.

Conventional treatment of lymphocytic-plasmacytic gingivitis/stomatitis consists of teeth cleaning and brushing daily to eliminate bacterial plaque and tartar. Rinsing oral cavity with diluted chlorhexidine 3 weeks after teeth cleaning and continuously brushing is effective against plaque buildup. If the gingivitis developed, adding chlorhexidine rinse to the program is recommended (Gorrel, 2008). Use of anti-inflammatory drugs, either corticosteroid, NSAIDs, or immunosuppressant, in combination with antibiotics is recommended for controlling infection. There is a report of effective use of piroxicam and thalidomide to reduce inflammation in combination with spraying bovine lactoferrin. Lactoferrin is effective against controlling the disease without adverse effect on kidney after 12 weeks of consecutive use. Additionally, when piroxicam was terminated and only lactoferrin spray was applied, the symptom was suppressed and satisfied (Hung et al.,2014, Addie et al., 2003). The treatment success was due to antimicrobial, immunomodulation, antiinflammation andanticarcinogenic effects of lactoferrin. The other alternative treatment of the disease is premolar and molar extraction which is found to be 80% effective. The other 20% that do not respond to the surgical treatment, conventional treatment is recommended.

Long-term use of non-steroidal anti-inflammatory drugs (NSAIDs) or steroidal drugs to treat inflammation due to feline chronic gingivostomatitis is limited. Action of these drugs is to prohibit function of COX-1 enzyme, which contributes to electrolyte balance, proliferation of mucosa of gastrointestinal tract, secretion of hydrochloric acid, glomerular filtration rate, and kidney blood supply. Long-term prohibition of COX-enzyme function could therefore disturb kidney function. Alternative medication that is not harmful to kidney is necessary (Kampanart, 2012 and Suemanotham, 2014).

PCSO-524® or Antinol® (VetzPetz® Antinol® DKSH, Thailand) is extracted from New Zealand green-lipped mussel(Perna canaliculus) using liquefied carbon dioxide technique. There is a report of anti-inflammatory effect of the extract for treatment and prevention of inflammation (McPhee et al., 2007; Coulson et al., 2013; Coulson et al., 2015). The extract from green-lippedmussel (Perna canaliculus) contains non-saturated fatty acids that consists of eicosatetraenoic acid (ETA), omega-3 PUFAs and docasahexaenoicacid (DHA). ETA is effective against control of inflammatory mediators including prostaglandins and leukotrienes without causing any side effects (Kampanart, 2013). Other properties of the extract include gastroprotective effect, antihistaminic effect, antioxidant, anticytokines, and antiarthritis. The extract from green-lippedmussel also contains other ingredients from the mussel's tissue, such as protein and peptide, that are the main ingredient of the extract and effective for use as anti-microbial agent, antioxidant, binding agent, and antihypertensive agent (Coulson et al., 2015). The lack of adverse effects makes it an alternative for long-term anti-inflammatory treatment.

Conclusion

Lymphocytic-plasmacytic gingivitis in cats is Type II hypersensitivity reaction. The disease can occur in kittens and cats and requires a life-long treatment. Its clinical signs include inflammation, exfoliation, or excessive growth of tissue in oral cavity that causes pain, dysphagia, weight lost, complications from other diseases, and poor quality of life. The disease can be treated with full mouth extraction. In case that full mouth extraction is not feasible or prior to the surgery, anti-inflammatory agent can be used in conjunction with oral cavity care and use of antibiotics. New Zealand green-lipped mussel extract (PCSO-524® or Antinol®) is effective against inflammation caused by the disease and can be used for long-term treatment. Treatment program consisting of administration of the extract, anti-inflammatory agent, and antibiotic can be used for controlling of inflammation or used as pre-operative medication or post-operative care in cats. Its advantage to using steroidal and NSAIDs is the lack of adverse effects for long-term use, especially in cats that surgical treatment is not feasible.

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Illustrations

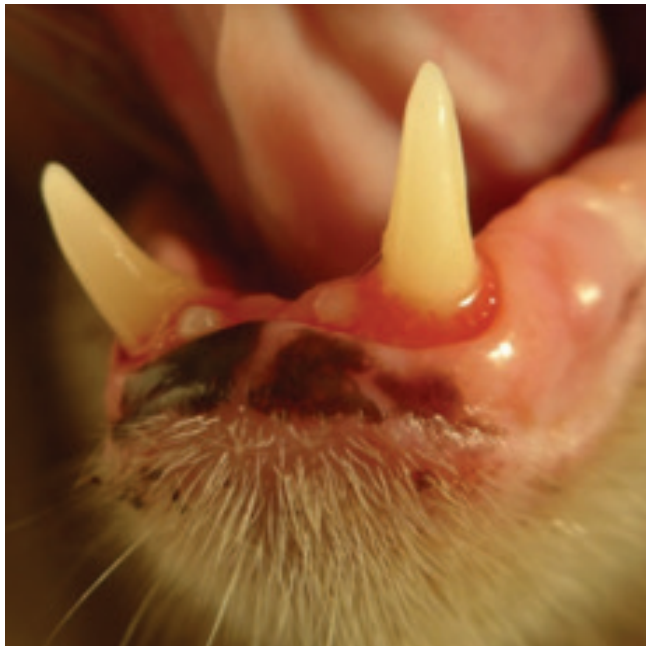

Figure 1. Image showing gingival recession and gingival hyperplasia at tooth 204. Teeth 101, 102, 201, and 202 were extracted when the cat was 11 months old.

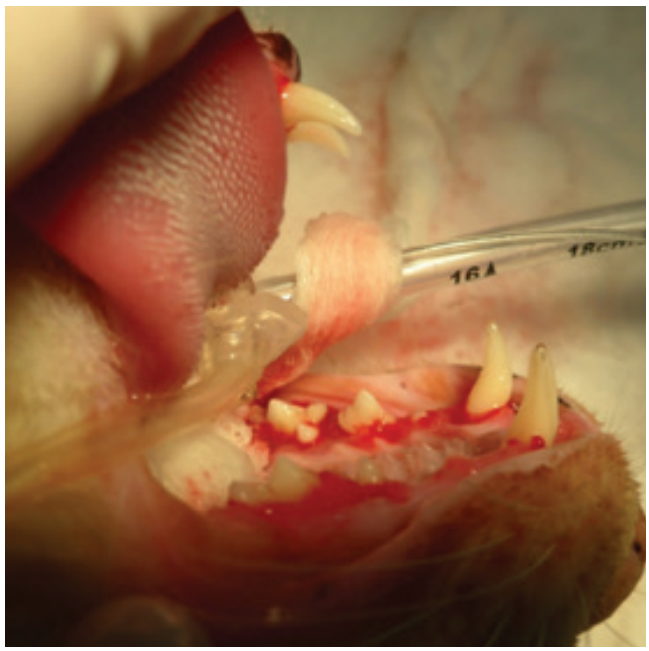

Figure 2. Image showing chronic gingivitis or grade 2 mild periodontitis with red and swollen gums that bleed when examined with dental probe, root furcation, and gingival recession

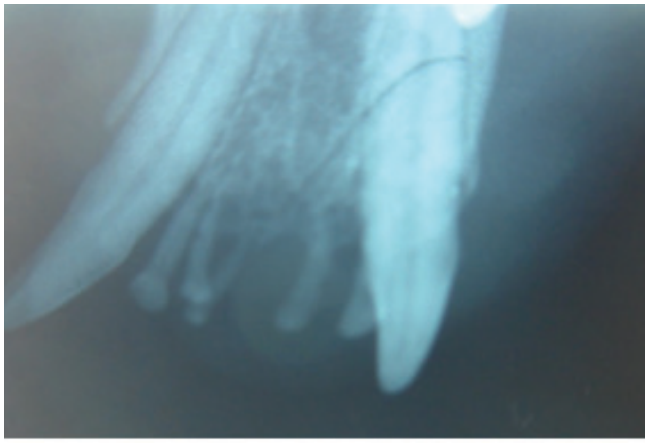

Figure 3. Radiographic image showing the cat's teeth at age 11 months. There were no deciduous teeth at the anterior mandible and no signs of periodontal disease.

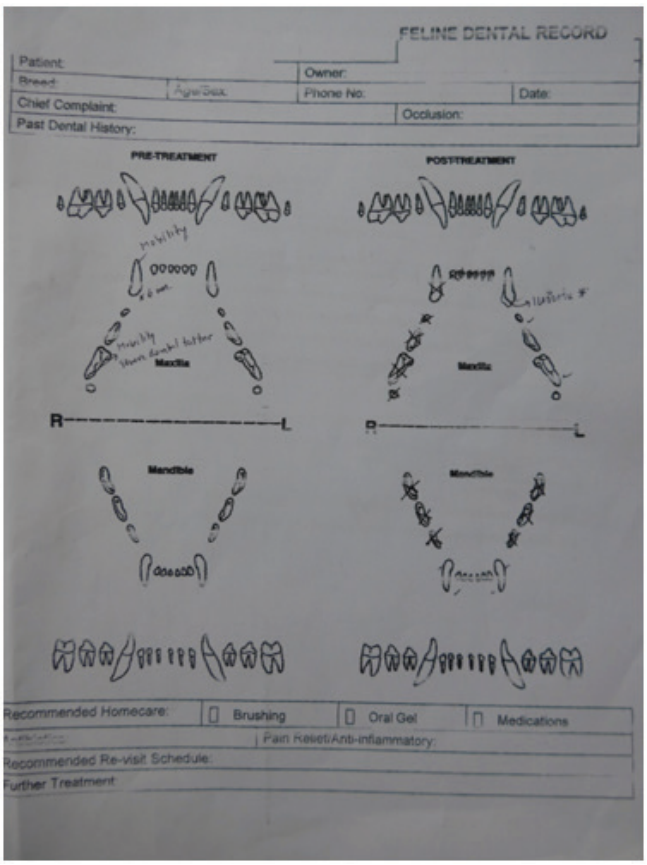

Figure 4. Diagram of gum and teeth before and after the first surgical treatment. The extracted teeth included teeth 101-108, 305-307, and 405-407. The remaining teeth were cleaned in the same operation.

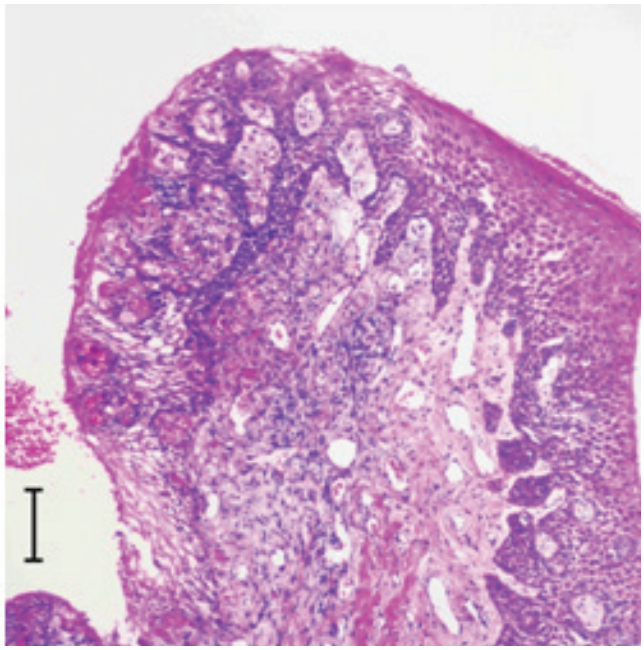

Figure 5. Histopathological section of gingival hyperplasia stained with H&E dye at 10X

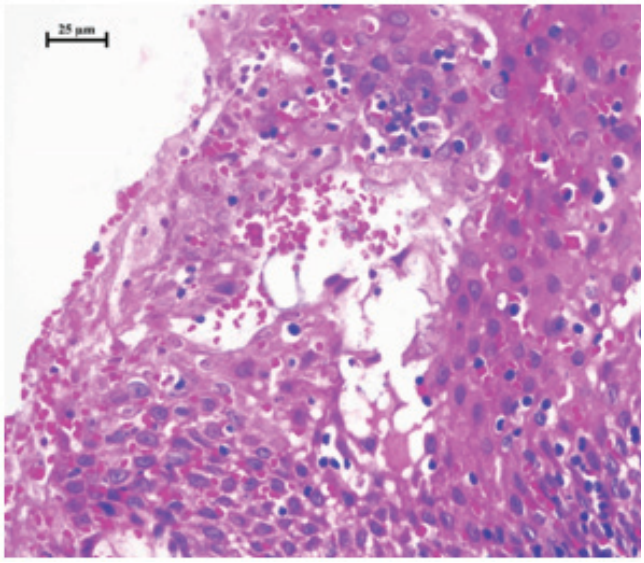

Figure 6. Histopathological section of gingival hyperplasia stained with H&E dye at 40X. The diagnosis was mild lymphocytic-plasmacytic gingivitis. There was a focally mild intraepidermal blister. The remaining epithelium was mildly hyperplastic with prominent intracellular bridging (spongiosis). Focally, there is a submucosal edema with low numbers of lymphocytes, plasma cells, degenerate neutrophils, and fewer macrophages. There was multifocal congestion of small vessels.Etiology was concluded as autoimmune reaction which is type II hypersensitivity to the protein in intercellular junction at the epithelium (e.g., the epidermal cadherin desmoglein) of the gum.

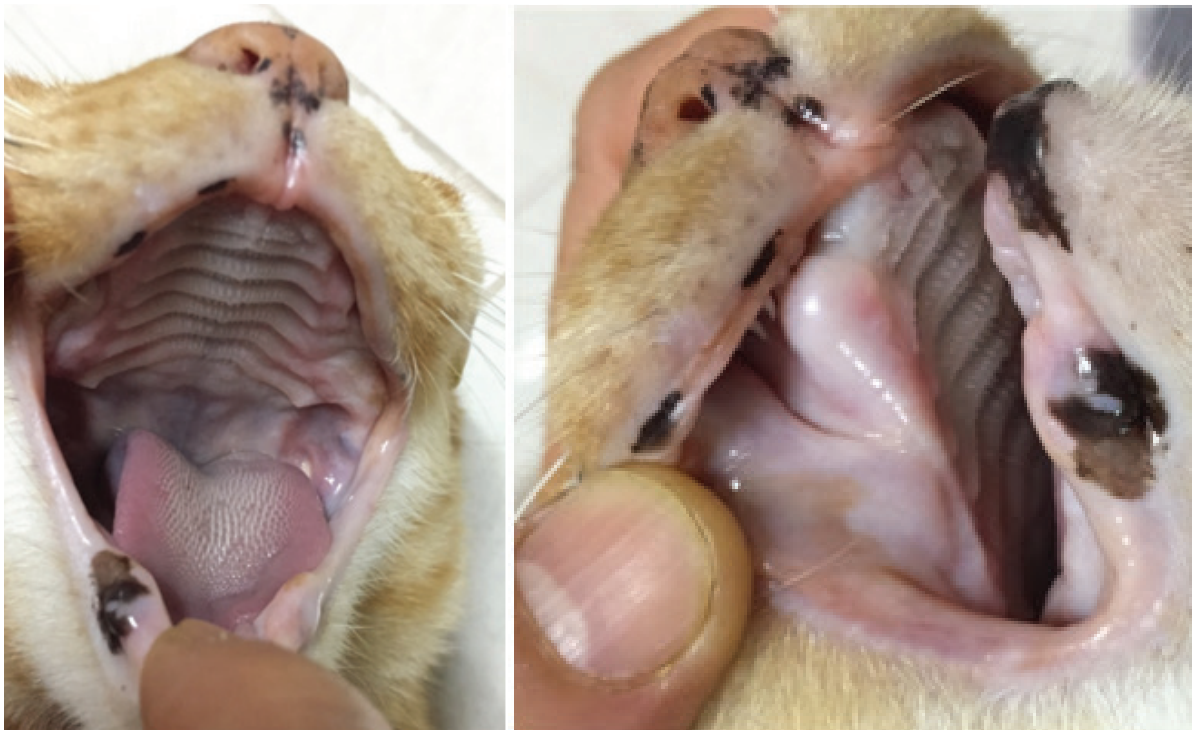

Figure 7 and 8. Images showing disappearance of inflammation since the second week after full mouth extraction

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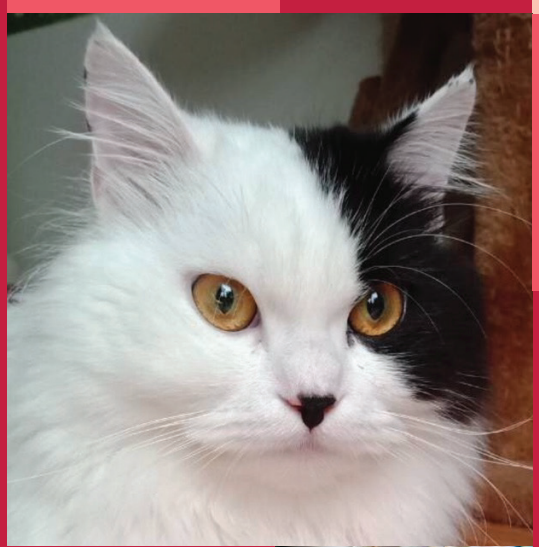

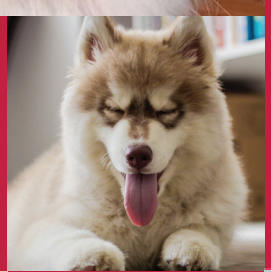

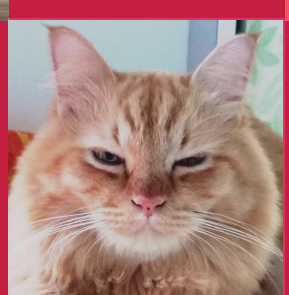

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