

## Retrospective study of the frequency of feline oral diseases at the Dentistry Service of the Hospital of the Veterinary School in Uruguay

### Estudio retrospectivo de la frecuencia de enfermedades orales en felinos atendidos en el servicio de odontología del Hospital de la Facultad de Veterinaria del Uruguay

Agustina Algorta<sup>1,2</sup>, Laura Tejera<sup>1,2,3</sup>, Gabriela Turini<sup>3</sup>, Juan Eguren<sup>3,4</sup>, Andrés Gil<sup>5</sup> Kevin Yaneselli\*

<sup>1</sup>Unidad de Inmunología e Inmunoterapia, Departamento de Patobiología, Facultad de Veterinaria, Universidad de la República, PC: 13000, Montevideo, Uruguay.

<sup>2</sup>Servicio de Odontología, Departamento de Clínicas y Hospital Veterinario, Facultad de Veterinaria, Universidad de la República (Udelar), Montevideo, Uruguay.

<sup>3</sup>Unidad de Imagenología, Análisis Clínicos y LEMA, Departamento de Clínicas y Hospital Veterinario, Facultad de Veterinaria, Universidad de la República, Uruguay

<sup>4</sup>Unidad de Cirugía y anestesia de pequeños animales. Departamento de Clínicas y Hospital Veterinaria.

<sup>5</sup>Unidad de Bioestadística, Departamento de Salud Pública, Facultad de Veterinaria, Universidad de la República, Uruguay

\*Corresponding author: [kevin.yaneselli@fvvet.edu.uy](mailto:kevin.yaneselli@fvvet.edu.uy)

#### ABSTRACT

Oral disorders represent a common reason for veterinary consultations worldwide among felines. However, epidemiological studies in feline dentistry are notably lacking in international literature. Thus, this study aims to establish a casuistry of oral disorders in felines admitted to the Dentistry Service of the Veterinary Hospital Centre (DSVHC) Veterinary School in Uruguay. A retrospective analysis of clinical records from the dental clinic at the DSVHC between 2014 and July 2019 was conducted. This study evaluated the number of felines, age, sex, reason for consultation, diagnosis, and the association between primary pathologies and age/sex variables. Forty-six feline dental consultations were documented, including 28 male and 18 female felines. The most common reasons for consultation were halitosis, pain, and salivation. The most prevalent oral disorders among felines included feline chronic gingivostomatitis (FCGS) at 69.6%, periodontal disease (PD) at 45.7%, and feline odontoclastic resorptive lesions (FORL) at 23.9%. Moreover, 39.1% exhibited a combination of FCGS and PD, 19.6% FCGS and FORL, and 13% simultaneous FCGS, PD, and FORL. The mean ages for FCGS, PD, and FORL were  $9.1 \pm 3.3$ ,  $10.1 \pm 3.6$ , and  $10 \pm 3.1$  years, respectively. Other diagnoses included oral neoplasms, malocclusions, osteomyelitis, alveolar osteitis, and chronic renal insufficiency. In conclusion, this study sheds light on the most prevalent oral disorders in feline dental practice and their common associations, along with identifying the age groups in which they are most prevalent.

**Key words:** Case studies; casuistry; oral diseases feline

#### RESUMEN

Los trastornos orales representan un motivo de consulta frecuente de pacientes felinos. Sin embargo, faltan estudios epidemiológicos en odontología felina en la literatura internacional. Así, este estudio tiene como objetivo establecer una casuística de los trastornos orales en felinos ingresados en el Servicio de Odontología del Centro Hospitalario Veterinario (SOCHV) de Facultad de Veterinaria en Uruguay. Se realizó un análisis retrospectivo de las historias clínicas de la clínica odontológica del SOCHV entre 2014 y julio de 2019. Se evaluó el número de felinos, su edad, sexo, motivo de consulta, diagnóstico y la asociación entre patologías primarias y variables edad/sexo. Se documentaron 46 consultas dentales felinas, incluidos 28 felinos machos y 18 hembras. Los motivos de consulta más frecuentes fueron halitosis, dolor y salivación. Los trastornos bucales más prevalentes entre los felinos incluyeron la gingivostomatitis crónica felina (GECF) con un 69,6 %, la enfermedad periodontal (EP) con un 45,7 % y las lesiones de odontoclasticas reabsortivas felina (LORF) con un 23,9 %. Además, el 39,1% presentó en simultaneo GECF y EP, el 19,6% GECF y LORF, y el 13% GECF, EP y LORF. Las edades medias para GECF, EP y LORF fueron  $9,1 \pm 3,3$ ,  $10,1 \pm 3,6$  y  $10 \pm 3,1$  años, respectivamente. Otros diagnósticos incluyeron neoplasias orales, maloclusiones, osteomielitis, osteítis alveolar e insuficiencia renal crónica. En conclusión, este estudio arroja luz sobre los trastornos bucales más prevalentes en la práctica odontológica felina y sus asociaciones comunes, además de identificar los grupos de edad en los que son más prevalentes.

**Palabras clave:** Estudios de caso; casuística; trastornos bucales; felino

## INTRODUCTION

Cats as pets have significantly increased globally in recent years, resulting in an increased frequency of Veterinary consultations. This uptick in consultations may correlate with heightened owner/guardian responsibility and awareness concerning their pets' health [1]. Oral and skin conditions, along with obesity, are the most prevalent disorders diagnosed [2, 3]. Oral diseases often manifest with nonspecific but severe symptoms such as weight loss, anorexia, and both acute and chronic pain in felines [4].

Reports from various countries highlight periodontal disease (PD), feline odontoclastic resorptive lesions (FORL), and feline chronic gingivostomatitis (FCGS) as the most prevalent feline oral diseases [3, 5, 6]. Despite their impact on feline quality of life, there is a significant lack of national reports regarding the casuistry of oral diseases. Such reports could greatly assist professionals in understanding the frequency and presentation of these conditions.

Therefore, this study aims to establish a casuistry of oral disorders in felines admitted to the Dentistry Service of the Veterinary Hospital Centre (DSVHC) in Uruguay. Additionally, the study aimed to explore potential associations between these diseases and the age and sex of the patients.

## MATERIALS AND METHODS

A retrospective analysis was conducted on the clinical records of felines attending consultations at the DSVHC, Veterinary School, Universidad de la República (Udelar), spanning from 2014 to July 2019. Data encompassing the consultation date, patient history, breed, sex, age, and reason for consultation were documented. Additionally, the anamnesis, feline immunodeficiency virus (FIV), and feline leukemia virus (FeLV) fast test and the presumptive or definitive diagnosis were recorded. The reference population utilized comprised the total number of cat consultations in general medicine consultation at the Veterinary Hospital Centre.

### Statistical analysis

The database was digitized for descriptive analysis of the various variables. Hypotheses regarding the independence of the most prevalent feline oral disorders concerning other categorical variables were assessed using Fisher's exact test or the Chi-square test ( $\chi^2$ ) as deemed appropriate. Statistical analysis was performed using Stata MP 14.0 software. The significance level for rejecting null hypotheses was set at  $P < 0.05$ , with trends evaluated for  $p < 0.10$ .

## RESULTS AND DISCUSSIONS

### Description of the reference population

A total of 9,878 general practice consultations were recorded during the study period, with 16.3% (1,607) attributed to feline consultations. The absolute number of feline consultations remained relatively stable throughout the study period. However, in 2018, there was a higher percentage of feline consultations (21%) compared to 2014 (12%). Conversely, while the absolute number of dog consultations decreased, the percentages remained relatively consistent (TABLE I). The population consisted of 854 (53.9%) males and 731 (46.1%) females, with the majority being under 2 years of age.

**TABLE I. Distribution of consultations by year and species received by the Veterinary Hospital Centre of the Faculty of Veterinary Medicine between 2014 and 2019.**

Year	Feline consultations	Canine consultations	Total consultation
2014	251 (12.3%)	1788 (87.7%)	2039
2015	345 (17%)	1685 (83%)	2030
2016	256 (15.6%)	1383 (84.4%)	1639
2017	273 (17.1%)	1324 (82.9%)	1597
2018	345 (21%)	1300 (79%)	1645
2019*	137 (14.7%)	791 (85.3%)	928

\*until July 2019

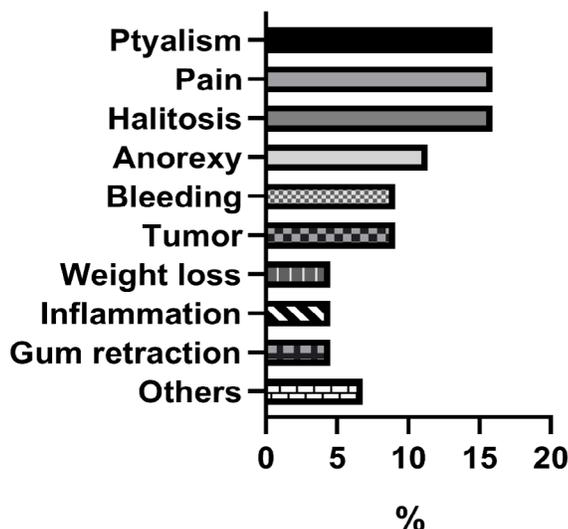
### Description of dental consultations

There was a total of 46 felines and 116 canine consultations during the study period. Feline consultations exhibited an increasing trend, rising from 9.1% in 2014 to 56.3% in 2018, with a subsequent increase to 31.8% in up to July 2019 (TABLE II). Most of the cats were mixed breed, except for 3 siamese and 1 exotic. The average age of feline patients was  $9.1 \pm 4.4$  years, ranging from 1 to 20 years, significantly differing from the reference population's age distribution ( $P < 0.001$ ). The most common reasons for consultation were halitosis, pain, and salivation (FIG. 1). Regarding sex of the feline population, 60.9% were males and 39.1% were females. Results for FIV and FELV revealed a positivity rate of 28.3% (14 cats) between 2017 and 2019.

**TABLE II. Distribution of consultations by year and species received by the Dentistry Service of the Veterinary Hospital Centre between 2014 and 2019.**

Year	Feline consultations	Canine consultations	Total consultations
2014	2 (9.1%)	20 (90.9%)	22
2015	6 (26.1%)	17 (73.9%)	23
2016	5 (13.5%)	32 (86.5%)	37
2017	8 (44.4%)	10 (55.5%)	18
2018	18 (56.2%)	20 (43.7%)	32
2019*	7 (31.8%)	17 (69.2%)	22

\*until July 2019

**Feline oral diseases at the Dentistry / Algorta et al.**

**FIGURE 1. Distribution of reasons for consultation of felines attending the dentistry service in the period 2014-2019**

A reference population was established for comparative analysis of dental consultations. A total of 46 feline patients attended dental consultations during the study period. A notable increase in dental consultations occurred in 2018, rising from merely 2 patients in 2014 (9.1%) to 18 in 2018 (56.5%). This trend has been consistently rising since 2017 and continued through 2019. Such an uptrend might be attributed to the heightened global interest in feline health among pet owners [1].

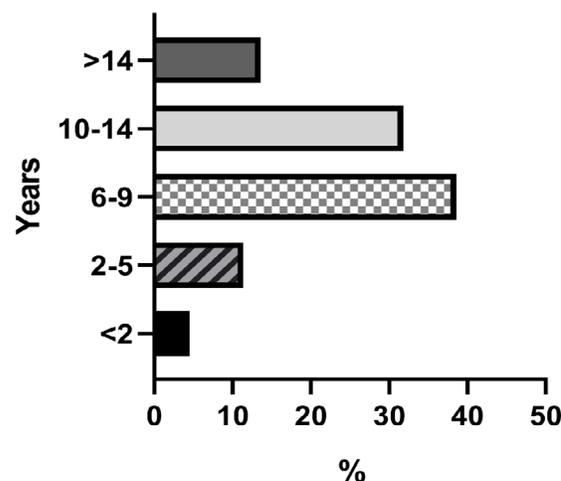
**Oral diseases diagnosed**

The most frequently diagnosed diseases included FCGS (69.6%), PD (45.7%), and FORL (23.9%). The average age of affected animals was over 9 years (TABLE III; FIG. 2).

**TABLE III. Distribution of diagnoses of oral disorders received by the Dentistry Service of the Veterinary Hospital Centre between 2014 and 2019**

Diagnosis	Frequency of diagnosis	Age (year)	Sex	
			F	M
FCGS	32/46 (69,6%)	9,1±3,3	12 (37.5%)	20 (62.5%)
PD	21/46 (45,7%)	10,1±3,6	6 (28.6%)	15 (71.4%)
FORL	11/46 (23,9%)	10±3,1	4 (36.4%)	7 (63.6%)
Neoplasms	4/46 (6,5%)	12,7±4,6	3 (75%)	1 (25%)
Malocclusion	2/46 (4,3%)	3,1±3,8	0	2 (100%)
Osteomyelitis	1/46 (2,2%)	2*	0	1 (100%)
Alveolar osteitis	1/46 (2,2%)	9*	0	1 (100%)
CKD	1/46 (2,2%)	10*	0	1 (100%)

The number of patients with each diagnosis out of the total is indicated and the corresponding percentage is shown in brackets. A patient may have more than one diagnosis at a time; F: female, M: male, FCGS: feline chronic gingivostomatitis, PD: periodontal disease, and FORL: feline odontoclastic resorptive lesion, CKD: chronic kidney disease.


**FIGURE 2. Age distribution of feline patients attending the dentistry service in the period 2014-2019**

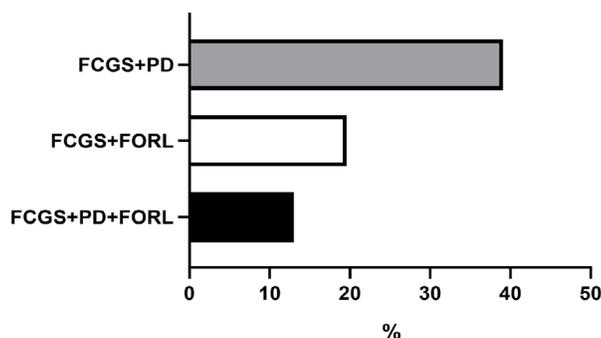
Other diagnosed diseases were oral tumors, malocclusion, osteomyelitis, alveolar osteitis, and chronic renal failure, together amounting to 17.4%. Regarding cytological studies of neoplasms, squamous cell carcinoma, sublingual myoblastoma, and adenocarcinoma of the soft palate were observed with an average age of  $12.7 \pm 4.6$  years. The malocclusions diagnosed were a deviation of the upper canine in a 7-month-old feline and the other case was a lingualized upper canine that deviated the lower canine and incisor teeth on the same side in a 7-year-old Persian. One case was diagnosed with chronic kidney disease, a 10-year-old male feline presented with symptoms of oral mucosal ulcers. On the other hand, a 9-year-old patient showed alveolar osteitis of the upper canines, and a 2-year-old patient presented with mandibular osteomyelitis, a consequence of an old mandibular fracture that deviated a lower canine towards the vestibular region. A total of 73 diagnoses were recorded due to the fact that patients in some cases had more than one disease.

**Association between diagnosed diseases**

a) Simultaneous diseases: 39.1% presented FCGS+PD, 19.6% FCGS+FORL, and 13% FCGS+PD+FORL, simultaneously (FIG. 3).

b) Age association: The majority of patients attending the DSVHC were diagnosed with FCGS, PD, or FORL falling in the 6 to 9-year age range. This was significantly higher ( $P < 0.001$ ) than the average age distribution ( $< 2$  years) of the reference population.

c) Sex association: Males exhibited a higher frequency of PD compared to the reference population ( $P = 0.053$ ), though no association was found between sex and FCGS or FORL.



**FIGURE 3.** Association between the main oral diseases in felines during the period 2014-2019. FCGS: feline chronic gingivostomatitis (FCGS), PD: periodontal disease, and FORL: feline odontoclastic resorptive lesions

The most frequent reasons for consultation included halitosis, pain, and salivation, all with equal frequency. Following closely was anorexia, trailed by tumors, bleeding, weight loss, and receding gums. These observations indicate that oral alterations in felines typically manifest with pain or discomfort, which concern owners, or halitosis, prompting consultations. Common symptoms of FCGS primarily comprise anorexia, dysphagia, weight loss, salivation, halitosis, bleeding, and facial pawing [7]. These findings align with the recorded reasons for consultation in this study and the notable percentage of FCGS cases encountered in dentistry consultations. Hence, these results reaffirm the non-specific nature of clinical signs in felines with oral diseases and their systemic repercussions.

Previous studies [8] concerning a feline population visiting general clinics in the United Kingdom showed that common reasons for consultation in cats included vomiting, weight loss, and inappetence. Similarly, frequent physical findings during patient examinations were weight loss and dental calculus. These findings, highlight the typically non-specific reasons for feline consultations. Consequently, routine oral cavity evaluations are imperative, and oral diseases should be considered differentially in cats exhibiting symptoms such as weight loss, anorexia, or pain.

The primary diseases diagnosed in this study were FCGS (69.9%), PD (45.7%), and FORL (23.9%). However, compared to other studies, FCGS has a relatively low prevalence, up to 26% [9] in general consultations, with PD being the predominant oral disorder [2, 3, 5]. These discrepancies may stem from the specific focus of the study on animals referred to a dentistry service, leading to a population bias. The present study exclusively evaluated animals with oral diseases. The observed higher frequency of FCGS could be attributed to its more noticeable and severe symptoms, easily discernible by owners. Notably, all relapsing patients presented FCGS either as the sole pathology or in conjunction with others, indicating the disease's severity and the challenges in symptom management despite treatment. The incidence of PD as the primary disease was 46%. Previous studies show that examinations with awake cats noted PD in 30% of cases, but with anesthetized cats, the rate rises to 78% [10]. These results emphasize that the perception of pain by the owners is the main reason that motivates the consultation.

These results are consistent with previous reports which found that the prevalence of FORL among cats with periodontal disease was 29.03% [11]. However, other studies have reported

higher FORL prevalence, such as 49.3% [12], 66% [13], 72.5% [14], and even 8.8% when diagnosis is not aided by radiograph [5]. These variations could be attributed to differences in the mean age of the evaluated groups, as the study population averaged 10 years, whereas other studies had mean ages of 3.5 [11], 8.5 [14], and 9 years [12]. Age has been identified as a factor associated with FORL, with the likelihood of lesions increasing with age [13, 14, 15, 16].

The average age of the study population was 9 years, with the majority between 6 and 9 years old. Patients diagnosed with FCGS, PD, and FORL were significantly older ( $P < 0.001$ ) than the reference population. The age distribution of the dental patients population also significantly differed from the reference population, with the majority being younger than 2 years, indicating that feline dental patients tend to be older. These findings resonate with literature suggesting that older cats ( $\geq 8$  years) have a higher prevalence of oral disorders [3]. In the case of FCGS, the average age was 9 years, consistent with previous studies that reported mean ages of 7 years [7], 6.4 years [6] or classified as young adults [17]. For PD, it was found a mean age of 10 years, in line with descriptions of older patients commonly associated with this disorder.

Male cats predominantly presented with PD, indicating a statistical trend. However, no significant differences were found between sex and the presence of FORL or FCGS. These findings align with studies that reported no significant sex-associated differences in periodontal disease prevalence. Conversely, other studies [3] observed a higher prevalence of PD and oral cavity disorders in males, which is consistent with the observed tendency for PD in males.

## CONCLUSION

During the period spanning from 2014 to July 2019, a total of 46 feline dental consultations were documented, with a notable increase observed in consultations over this timeframe. The primary reasons for consultation to the Dentistry Service of the Veterinary Hospital Centre included halitosis, pain, salivation, and anorexia. Among the diagnosed oral diseases, feline chronic gingivostomatitis (FCGS) was the most prevalent, accounting for 69.6% of feline consultations, followed by periodontal disease (PD) at 45.7% and feline odontoclastic resorptive lesions (FORL) at 23.91%. These diseases often present in association, particularly PD and FCGS. The age group most affected by these conditions ranged from 6 to 9 years.

## ACKNOWLEDGEMENTS

The authors thank Universidad de la República (UdelaR) for their financial support.

## Conflict of interest

The authors declare no conflict of interest.

## Authors' contributions

All authors contributed equally to the conception and writing of the manuscript. All authors critically revised the manuscript and approved the final version.

## BIBLIOGRAPHICS REFERENCES

- [1] Benítez C, Olivera J, Delucchi L. Estudio de la consulta neurológica felina en el Hospital de Facultad de Veterinaria durante el periodo enero 2009 a diciembre 2014. *Vet.* [Internet]. 2016 [cited Dec 18 2024]; 52(204):4–10. Available in: <https://goo.su/Vmz0ePZ>
- [2] O'Neill DG, Church DB, McGreevy PD, Thomson PC, Brodbelt DC. Prevalence of disorders recorded in cats attending primary-care veterinary practices in England. *Vet. J.* [Internet]. 2014; 202(2):286–291. doi: <https://doi.org/f6v8vk>
- [3] O'Neill DG, Gunn-Moore D, Sorrell S, McAuslan H, Church DB, Pegram C, Brodbelt DC. Commonly diagnosed disorders in domestic cats in the UK and their associations with sex and age. *J. Feline Med. Surg.* [Internet]. 2023; 25(2):1098612X231155016. doi: <https://doi.org/ppji>
- [4] Winer JN, Arzi B, Verstraete FJM. Therapeutic Management of Feline Chronic Gingivostomatitis: A Systematic Review of the Literature. *Front Vet. Sci.* [Internet]. 2016; 3:54. doi: <https://doi.org/ppjk>
- [5] Whyte A, Gracia A, Bonastre C, Tejedor MT, Whyte J, Monteagudo LV, Simón C. Oral Disease and Microbiota in Free-Roaming Cats. *Top Companion Anim. Med.* [Internet]. 2017; 32(3):91-95. doi: <https://doi.org/gcvt6j>
- [6] Thomas S, Lappin DF, Spears J, Bennett D, Nile C, Riggio MP. Prevalence of feline calicivirus in cats with odontoclastic resorptive lesions and chronic gingivostomatitis. *Res. Vet. Sci.* [Internet]. 2017; 111:124-126. doi: <https://doi.org/f95868>
- [7] Bellows J, Berg ML, Dennis S, Harvey R, Lobprise HB, Snyder CJ, Stone AES, Van de Wetering AG. 2019 AAHA Dental Care Guidelines for Dogs and Cats. *J. Am. Anim. Hosp. Assoc.* [Internet]. 2019; 55(2):49-69. doi: <https://doi.org/gg8ctd>
- [8] Robinson NJ, Brennan ML, Cobb M, Dean RS. Investigating preventive-medicine consultations in first-opinion small-animal practice in the United Kingdom using direct observation. *Prev. Vet. Med.* [Internet]. 2016; 124:69–77. doi: <https://doi.org/f8bcsq>
- [9] Soltero-Rivera M, Goldschmidt S, Arzi B. Feline chronic gingivostomatitis current concepts in clinical management. *J. Feline Med. Surg.* [Internet]. 2023; 25(8):1098612X231186834. doi: <https://doi.org/ppjm>
- [10] Soltero-Rivera M, Vapniarsky N, Rivas IL, Arzi B. Clinical, radiographic and histopathologic features of early-onset gingivitis and periodontitis in cats (1997–2022). *J. Feline Med. Surg.* 2023; 25(1): 1098612X221148577. <https://doi.org/ppjn>
- [11] Sepúlveda García PA, Mieres Lastra LM, Moreno Olivares JL. Caracterización de lesiones odontoclásticas reabsortivas felinas (LORF), diagnosticadas por radiografía, en gatos domésticos (*Felis catus*) con enfermedad periodontal [Tesis de Grado en internet]. Valdivia: Universidad Austral De Chile, 2012 [cited 16 December 2024]. 28 p. Available in: <https://goo.su/TwzzLa>
- [12] Harvey CE. Periodontal Therapy in Cats: Whats New. Paper presented: Proc. North Am. Vet. Conf. 2003; The North American Veterinary Conference; 2003 Jan 21; Orlando–Florida, USA, 2003. p. 184–186. Available in: <https://n9.cl/h2yc0>
- [13] Whyte A, Lacasta S, Whyte J, Monteagudo LV, Tejedor MT. Tooth Resorption in Spanish Domestic Cats: Preliminary Data. *Top Companion Anim. Med.* [Internet]. 2020; 38:100369. doi: <https://doi.org/ppjx>
- [14] Reiter AM, Lyon KF, Nachreiner RF, Shofer FS. Evaluation of calciotropic hormones in cats with odontoclastic resorptive lesions. *Am. J. Vet. Res.* [Internet]. 2005; 66:1446–1452. doi: <https://doi.org/cbnxdg>
- [15] Ingham KE, Gorrel C, Blackburn J, Farnsworth W. Prevalence of odontoclastic resorptive lesions in a population of clinically healthy cats. *J. Small Anim. Pract.* [Internet]. 2001; 42(9):439–443. doi: <https://doi.org/dhtqw3>
- [16] Pettersson A, Mannerfelt T. Prevalence of dental resorptive lesions in Swedish cats. *J. Vet. Dent.* [Internet]. 2003; 20(3):140–142. doi: <https://doi.org/ppjz>
- [17] Kim DH, Kwak HH, Woo HM. Prevalence of feline chronic gingivostomatitis in feral cats and its risk factors. *J. Feline Med. Surg.* [Internet]. 2023; 25(1):1098612X221131453. doi: <https://doi.org/ppj2>