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# Retrospective Evaluation of Pathological Lesions of the Oral Cavity in Dogs

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**Abstract:** Oral neoplasms and non-neoplastic lesions are commonly encountered pathologies in dogs. The histopathological examination of these lesions is required to make a diagnosis and lead the practitioners to appropriate treatment. This study aims to retrospectively document pathological lesions commonly observed in the oral cavity of dogs. In this context, 167 oral pathology cases were investigated in dogs of different breeds, genders, and age groups in the years between 2010 and 2020. Oral pathologies were classified as neoplastic (benign and malignant neoplasms) and non-neoplastic lesions according to the histopathological features diagnosed by the hematoxylin and eosin staining method. The results showed that malign (46.10%; 77/167) and benign neoplasms (40.11%; 67/167) were predominant, but non-neoplastic lesions (13.77%; 23/167) were restricted. The most common malignant neoplasm was malignant melanoma (50.64%; 39/77), while odontogenic neoplasms were determined as the most common benign neoplasms (74.62%; 50/67). When the affected patient profiles were evaluated, the results showed that males were more prone to oral pathologies (M/F: 62.87%/35.32%; 105/59), mostly affected life stage was senior (79.48%; 31/39), and large pure breed dogs were the most commonly encountered dog breeds (49.10%; 82/167), followed by mixed breeds (19.76%; 33/167). These findings showed statistically significant differences by the chi-square test. In addition, the most common affected area in the oral cavity was found to be the gingiva (30.76%; 12/39). As a result, this study contributes to the knowledge about the most common oral pathologies in terms of gender, age, breed, and affected area.
**Keywords:** Canine, non-neoplastic lesions, oral neoplasms, prevalence

**Köpeklerde Oral Kavitedeki Patolojik Lezyonlarının Retrospektif Değerlendirilmesi**

**Öz:** Köpeklerde oral neoplaziler ve neoplastik olmayan lezyonlar sıklıkla karşılaşılan patolojilerdir. Bu lezyonların histopatolojik incelemesi tanı koymak ve klinisyen hekimleri uygun tedaviye yönlendirmek için gereklidir. Bu çalışmada, köpeklerin ağız boşluğunda yaygın olarak gözlenen patolojik lezyonları retrospektif olarak belgelemek amaçlandı. Bu kapsamda 2010-2020 yılları arasında farklı ırk, cinsiyet ve yaş gruplarındaki köpeklerde 167 oral patoloji vakası incelendi. Oral patolojiler hematoksilen ve eozin boyama yöntemi ile teşhis edilen histopatolojik özelliklere göre neoplastik (benign ve malign neoplazmalar) ve neoplastik olmayan lezyonlar olarak sınıflandırıldı. Bulgularda malign (%46.10; 77/167) ve iyi huylu neoplazmların (%40.11; 67/167) baskın olduğu, ancak neoplastik olmayan lezyonların (%13.77; 23/167) kısıtlı olduğu tespit edildi. En sık görülen malign neoplazm, malign melanom (%50.64; 39/77) iken, odontojenik neoplazmlar en sık görülen benign neoplazmlar olarak belirlendi (%74.62; 50/67). Etkilenen hasta profilleri değerlendirildiğinde, erkeklerin oral patolojilere daha yatkın olduğunu (E/D: %62.87/%35.32; 105/59), en çok etkilenen yaşam evresinin ileri yaş (%79.48; 31/39) olduğu ve büyük safkan köpeklerin en sık rastlanan köpek ırkları (%49.10; 82/167) olduğu, bunu karma ırkların (%19.76; 33/167) izlediği tespit edildi. Bu bulgular ki-kare testi ile istatistiksel olarak anlamlı farklılıklar gösterdi. Ayrıca oral kavitede en sık etkilenen bölgenin dişeti olduğu (%30.76; 12/39) bulundu. Sonuç olarak, bu çalışma cinsiyet, yaş, cins ve etkilenen bölge açısından en sık görülen oral patolojiler hakkında literatür bilgisine katkı sağlamaktadır.
**Anahtar kelimeler:** Köpek, neoplastik olmayan lezyonlar, oral neoplazmalar, prevelans

## Introduction

Oral lesions are very common pathologies in dogs in routine clinical examinations. These lesions may occur depending on the dental diseases, infectious conditions, idiopathic inflammatory responses, mucosal and cutaneous immune-mediated disorders, reactive lesions, or neoplasms (Lommer, 2013). Oral neoplasms in dogs constitute 5% of all canine neoplasms (Munday et al., 2017). Among them, malignant melanoma (MM) has been described as the most common oral malignancy (Bonfanti et al., 2015; Wingo, 2018; Mikiewiczet al., 2019). In benign neoplasms, odontogenic neoplasms take the first place, especially pe-

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ripheral odontogenic fibroma (POF) (Wingo, 2018; Mikiewiczet al., 2019) or acanthomatous ameloblastoma (AA) (Bonfanti et al., 2015).

Regardless of the exact nature of the lesion, the clinical findings and macroscopic appearances of oral pathologies may be similar (Verhaert, 2010; Mikiewicz et al., 2019).The clinical signs are generally seen as halitosis, tooth mobility, exfoliation of teeth, bleeding, increase in salivation, and nasal discharge when maxilla is affected (Verhaert, 2010). Niemiec (2008) has stated that approximately 1% of lesions that appear benign on clinical examination may actually be neoplastic, whereas lesions that appear neoplastic may be benign. Therefore, histopathological examination is necessary for differential diagnosis of similar macroscopic entities and for definitive diagnosis of non-neoplastic lesions and neoplastic diseases (Verhaert, 2010).

The aim of this retrospective study is to provide reference for literature about the incidence of oral pathologies in Istanbul between the years of 2010 and 2020. For this purpose, histopathological and statistical analyses were used in dogs to evaluate different pathologies in different breeds, ages, sexes, and affected areas.

## Materials and Methods

### *Sampling*

A total of 167 oral biopsies were documented from the databases between the years of 2010 and 2020 from the Pathology Department of Veterinary Faculty. Since the study is retrospective, there is no need for an ethics committee approval. The samples were mostly obtained from small animal clinics of the faculty (143/167), and some private veterinary clinics (24/167). The biopsies were evaluated depending on genders, the life stages, breeds of the patients and the area of the lesions. The genders were categorized as male and female, no information about neutering was available. The life stages of the animals were subdivided as a puppy (0-6 m old), junior (7-12 m old), adult (13m-4 y old), mature (5-7 y old), senior (8-15 y old) and geriatric (>15 y old) (Creevyet al., 2019). For statistical evaluations, dog breeds were classified as mixed breeds (no data was given about kg for mixed breeds) and pure breeds; large (20-40 kg, including Great Dane), medium (10-20 kg), small (<10 kg).

### *Histopathological investigation*

The histopathological examinations were carried out on the hematoxylin and eosin (H&E) stained tissue sections by three different pathologists regarding the histopathological properties of each oral pathology, as described previously (Head et al., 2003; Uzal et al., 2016; Munday et al., 2017).

### *Statistical analysis*

A total of 167 oral biopsies were used in the study. However, 11 out of 167 cases had missing data and therefore statistical analysis was performed only in the remaining 156 out of 167 cases. The frequencies and percentage values of total lesions are given in Tables. SPSS Statistics version 21.0 (IBM, New York, USA) was used for statistical analyses of the study and the frequencies of the dogs' oral pathologies were compared in terms of the pathological lesion, gender, age, and breed using the Fisher`s exact chi-square test ($P<0.001$). Significance level of the statistical analysis was accepted as $P<0.05$.

## Results

The cases revealed total numbers of 77/167 (46.1%) malignant, 67/167 (40.1%) benign neoplasms and 23/167 (13.8%) non-neoplastic lesions, and these results showed statistically significant differences ($P<0.001$; Table 1). There were 105 (62.9%) males and 59 (35.3%) females. There was no available information on the genders for three patients (1.8%). Also, the most common life stage was senior (56.9%; 95/167). A total of 34 different dog breeds were observed in this study. Large pure breed dogs were the most commonly encountered dog breeds (49.1%; 82/167), followed by mixed breeds (19.8%; 33/167). Affected patient profiles showed significant differences for each gender, age scale, and breed group ($P<0.001$, Table 1).

Malignant melanoma (Figure 1, Figure 2a) was determined as the most common malignancy (50.6%; 39/77) among all malignant neoplasms encountered in the study. A slightly higher prevalence was observed in Golden Retriever (23.1%; 9/39), as a large pure breed, compared to other breeds. Male dogs (64.1%; 25/39) were found more than females (33.3%; 13/39), and no gender information was available for one patient (2.6%; 1/39). Even though, the gender information was not available, the data of that dog was not excluded from the study. The affected mean age was determined to be 10.7, and senior

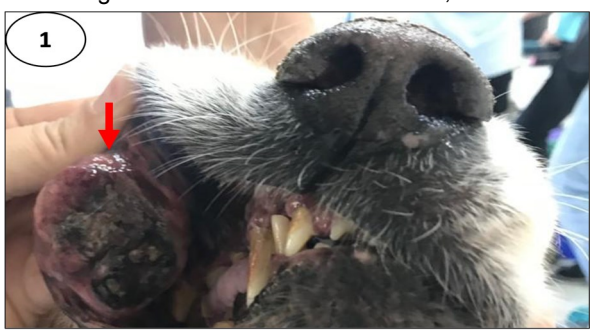


**Figure 1.** Malignant melanoma, buccal mucosa, Golden retriever, 15 y, male. A variably pigmented, irregular mass with soft consistency arising from the buccal mucosa is visible (red arrow).

**Table 1.** Frequency of canine oral pathologies according to the type of lesion, breed group, gender, and life stages in 156/167 patients

| Factor | Number of cases | % | P value |
|---|---|---|---|
| **Type of lesion** | | | <0.001 |
| **Malign Neoplasm** | 73 | 46.8[a] | |
| **Benign Neoplasm** | 61 | 39.1[b] | |
| **Non-neoplastic lesions** | 22 | 14.1[c] | |
| **Breed group** | | | <0.001 |
| **Small** | 17 | 10.9[c] | |
| **Medium** | 29 | 18.6[b,c] | |
| **Large** | 77 | 49.4[a] | |
| **Mixed** | 33 | 21.2[b] | |
| **Gender** | | | <0.001 |
| **Male** | 102 | 65.4[a] | |
| **Female** | 54 | 34.6[b] | |
| **Life stages** | | | <0.001 |
| **Puppy** | 2 | 1.3[d] | |
| **Junior** | 5 | 3.2[d] | |
| **Adult** | 18 | 11.5[c] | |
| **Mature** | 35 | 22.4[b] | |
| **Senior** | 93 | 59.6[a] | |
| **Geriatric** | 3 | 1.9[d] | |

[a,b,c] *Values within a row with different superscripts differ significantly at P<0.001.*

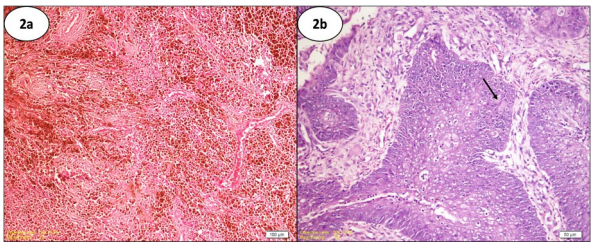


**Figure 2a.** Malignant melanoma, gingiva, Cocker Spaniel, 17 y, male. Numerous neoplastic cells containing high amount of melanin pigments (Bar:100 µm).**2b.** Oral squamous cell carcinoma, gingiva, mixed breed, 6 y, female. Islands of neoplastic squamous cells with inflammatory reaction, arrow shows a small area of keratinization (Bar: 50 µm).

dogs showed a predominantly higher prevalence for the affected life stage (79.5%; 31/39). The most frequently affected site in the oral cavity was detected as the gingiva (30.8%; 12/39) (Table 2).

The second most common malignant neoplasm was oral squamous cell carcinoma (OSCC) (Figure 2b) (13%; 10/77) with the higher incidence in the senior life stage (60%; 6/10). No predisposed breed was determined for this malignancy. Genders were found equally affected (males and females: 50%; 5/10). Other malignancies were mast cell tumors (2.6%; 2/77), malignant lymphoma (2.6%; 2/77), and malignant mesenchymal neoplasms, which were composed of undifferentiated sarcoma (9.1%; 7/77), osteosarcoma (7.8%; 6/77), and fibrosarcoma (7.8%; 6/77). The remaining single cases were undifferentiated round cell tumor (1.3; 1/77), undifferentiated carcinoma (1.3%; 1/77), malignant fibrous histiocytoma (1.3%; 1/77), transmissible venereal tumor (1.3%; 1/77), and hemangiosarcoma (1.3%; 1/77). Detailed data regarding the number of cases, patient profiles and commonly affected areas for malignant neoplasms are described in Table 2.

Benign neoplasms were predominantly composed of the odontogenic tumors (74.6%; 50/67) consistent with POF in the first line (46.3%; 31/67) (Figure 3, Figure 4a) and AA (26.9%; 18/67) (Figure 4b) in the second line. The most common breeds affected by odontogenic tumors were Golden retrievers and mixed breeds (both: 22%; 11/50). POF was observed more frequently in male patients (71%; 22/31) than females (25.8%; 8/31), and no gender information was available for one patient (3.2%; 1/31). Female patients were observed slightly more than males in AA (male: 44.4%; 8/18 / female: 55.5%; 10/18). The most affected life stage in POF was the mature stage (48.4%; 15/31), and in AA was the senior stage (61.1%; 11/18) (Table 3).

Oral papilloma was found to be the third most common benign tumor (17.9%; 12/67) following POF and AA, respectively. No breed predisposition for oral papilloma was observed. Male dogs (75%; 9/12) appeared slightly more than females (25%; 3/12). The most affected life stage was the adult stage (33.3%; 4/12). Other benign neoplasms were extramedullary plasmacytoma (6%; 4/67), fibroma (1.5%; 1/67), and cementoma (1.5%; 1/67), as another type of odontogenic tumor. Detailed data regarding the number of

**Table 2.** Detailed information for malignant neoplasms seen in oral cavity

| Malign Neoplasms | NC (%) | CALS | MA (Year) | PB | CAL | ♂ | ♀ | UG |
|---|---|---|---|---|---|---|---|---|
| **MM** | 39 (23.4%) | Senior | 10.7 | Golden Retriever | Gingiva | 25 | 14 | - |
| **OSCC** | 10 (6%) | Senior | 7.7 | NA | Non-tonsillar areas | 5 | 5 | - |
| **US** | 7 (4.1%) | Senior | 8.42 | Rottweiler | Mandible and palate | 2 | 5 | - |
| **OS** | 6 (3.6% | Senior | 9.16 | NA | Maxilla | 4 | 2 | - |
| **FS** | 6 (3.6%) | NA | 10 | NA | Oral mucosa | 3 | 3 | - |
| **MCT** | 2 (1.2%) | NA | 11.5 | NA | Lip mucosa | 1 | 1 | - |
| **ML** | 2 (1.2%) | Senior | 9 | NA | NA | 1 | - | 1 |
| **URCT** | 1 (0.6%) | Senior | 12 | Mixed breed | Gingiva | - | 1 | - |
| **UC** | 1 (0.6%) | Senior | 13 | Belgian Shepherd | Pharynx | 1 | - | - |
| **MFH** | 1 (0.6%) | Adult | 3 | Golden Retriever | Mandible | 1 | - | - |
| **TVT** | 1 (0.6%) | Junior | 1 | Golden Retriever | Gingiva | 1 | - | - |
| **HES** | 1 (0.6%) | NA | NA | Labrador Retriever | Gingiva | 1 | - | - |

*NC: Number of cases; %: The percentage value of total lesions; CALS: Commonly affected life stage; MA: Mean age; PB: Predominant breed; CAL: Commonly affected localization; G: Gender; MM: Malignant melanoma; OSCC: Oral squamous cell carcinoma; US: Undifferentiated sarcoma ; OS: Osteosarcoma; FS:Fibrosarcoma; MCT: Mast cell tumor; ML: Malignant lymphoma; URCT: Undifferentiated round cell tumor; UC: undifferentiated carcinoma; MFH: Malignant Fibrous Histiocytoma; TVT: Transmissible venereal tumor; HES: Hemangiosarcoma ; NA: Not applicable; ♂ : Male; ♀ : Female; UG: Unknown gender.*


**Figure 3.** Peripheral odontogenic fibroma, gingiva, Golden Retriever, 10 y, female. A sessile, round, pink masshaving hard consistency with crepitation during cutting is located at the level of the 3rd premolar tooth in the maxilla (red arrow).

cases, patient profiles and commonly affected areas for benign neoplasms are given in Table 3.

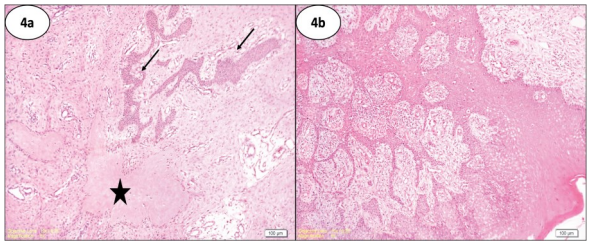


**Figure 4a.** Peripheral odontogenic fibroma, gingiva, Dogo Argentino, 7 y, female. Arrows show odontogenic epithelial islands, and star indicatesan area of osseous metaplasia (Bar:100 µm). **4b.** Acanthomatous ameloblastoma, gingiva, mixed breed, 3 y, male. Significant epithelial growth of the gingival mucosa with the prominent intercellular bridges (Bar: 100 µm).

Non-neoplastic lesions were seen in 23 patients, except for those accompanying most neoplastic cases. Non-neoplastic lesions included inflammatory lesions (52.2%; 12/23), reactive lesions (52.2%; 9/23), and single cases of leukoplakia (4.3%; 1/23), and odontogenic cyst (4.3%; 1/23). Detailed data regarding the number of cases, patient profiles and commonly affected areas for non-neoplastic lesions are described in Table 4.

**Table 3.** Detailed information for benign neoplasms seen in oral cavity

| Benign Tumors | NC (%) | CALS | MA (Year) | PB | CAL | ♂ | ♀ | UG |
|---|---|---|---|---|---|---|---|---|
| **POF** | 31 (18.6%) | Mature/ Senior | 7.78 | Golden Retriever | Gingiva | 22 | 8 | 1 |
| **AA** | 18 (10.8%) | Senior | 7.97 | Mixed Breed | Gingiva | 8 | 10 | - |
| **Papilloma** | 12 (7.2%) | Adult | 5.2 | NA | Oral mucosa | 9 | 3 | - |
| **EP** | 4 (2.4%) | Senior | 10.75 | Cocker Spaniel | NA | 4 | 0 | - |
| **Fibroma** | 1 (0.6%) | NA | NA | Anatolian Shepherd | Lip mucosa | - | 1 | - |
| **Cementoma** | 1 (0.6%) | NA | NA | Dachshund | Gingiva | 1 | - | - |

*NC: Number of cases; %: The percentage value of total lesions; CALS: Commonly affected life stage; MA: Mean age; PB: Predominant breed; CAL: Commonly affected localization; G: Gender; POF: Peripheral odontogenic fibroma; AA: Acanthomatous ameloblastoma; EP: Extramedullary plasmacytoma; NA: Not applicable; ♂ : Male; ♀ : Female; UG: Unknown gender.*

**Table 4.** Detailed information for non-neoplastic lesions seen in oral cavity

| Non-Neoplastic Lesions | NC (%) | CALS | MA (Year) | PB | CAL | ♂ | ♀ | UG |
|---|---|---|---|---|---|---|---|---|
| **Inflammatory lesions** | 12 (7.2%) | Senior | 8.58 | Mixed Breed | Gingiva | 8 | 4 | - |
| **Reactive Lesions** | 9 (5.4%) | Mature | 6.63 | Terrier | Gingiva | 7 | 2 | - |
| **Leukoplakia** | 1 (0.6%) | Adult | 5.66 | Kangal Shepherd | Tongue | - | 1 | - |
| **Odontogenic cyst** | 1 (0.6%) | Mature | 6 | Golden Retriever | Gingiva | 1 | - | - |

*NC: Number of cases; %: The percentage value of total lesions; CALS: Commonly affected life stage; MA: Mean age; PB: Predominant breed; CAL: Commonly affected localization; G: Gender; ♂ : Male; ♀ : Female; UG: Unknown gender.*

**Discussion and Conclusion**

This retrospective study presents statistical analysis for the most frequently encountered oral pathologies in the years between 2010 and 2020. The results of the study showed that oral neoplastic lesions constituted a large part of the oral pathologies as indicated in other studies (Vural et al., 2007; Bonfanti et al., 2015; Wingo, 2018; Mikiewicz et al., 2019). But, non-neoplastic lesions constituted a small percentage of all cases. In this study, large pure breeds were the most commonly affected breeds, which was not compatible with the other studies (Wingo, 2018; Mikiewicz et al., 2019; Cray et al., 2020). Male patients were determined almost twice as much compared to female ones, although no specific gender predisposition has been reported previously (Wingo, 2018; Mikiewicz et al., 2019). The affected mean age was found to be 8.5 years, consistent with the other studies (Svendenius and Warfvinge, 2010; Verhaert, 2010; Bonfanti et al., 2015; Wingo, 2018; Mikiewicz et al., 2019; Cray et al., 2020). The most common affected area was determined to be gingiva, which was also compatible with the literature (Cray et al., 2020).

Malignant neoplasms represented the largest part of the study as described in other studies (Wingo, 2018; Mikiewicz et al.,2019). Among them, MM was the most common malignancy, which is considered to be an extremely malignant neoplasm characterized by rapid growth, local invasiveness, and high metastatic propensity (Goldschmidt, 1985; Bergman, 2007; Mikiewicz et al., 2019). Although MM is especially seen in older dogs (Goldschmidt,1985; Svendenius and Warfvinge, 2010; Bergman, 2007; Mikiewicz et al., 2019), it can also occur in younger ones (Mikiewicz et al., 2019). Gingiva of the caudal maxilla has been reported as more predisposed localization (Putnová et al., 2020). Commonly affected dog breeds have been reported as Cocker Spaniels, Dachshunds, Golden Retrievers, Scottish Terriers, and Poodles (Goldschmidt, 1985; Yoshida et al.,

1999). In the present study, Golden Retrievers were slightly more common than the other dog breeds, which were followed by mixed breeds. There was a slightly greater tendency for male dogs, in contrast to a former study (Ramos-Vara et al., 2000).

The second most common oral malignancy in this study was OSCC, which is considered to be the most common first (Brønden et al., 2009; Wingo, 2018) or second (Verhaert, 2010; Munday et al., 2017; Mikiewicz et al., 2019) oral neoplasm in dogs. In this study, OSCC was commonly observed in older dogs, as previously stated (Munday et al., 2017). This malignancy frequently is assessed as a tonsillar or non-tonsillar SCC (Munday et al., 2017). The neoplasm shows high invasiveness, but the metastatic rate varies depending on the affected area. The tonsillar SCC tends to metastasize in comparison to the non-tonsillar SCC (Vos and Van der Gaag, 1987). In this retrospective study, the most commonly affected area was found as gingiva. Besides the characteristic histopathological properties of OSCC (Munday et al., 2017), the neoplasia was characterized by high invasiveness, bone lysis, and ulceration.

The next most common malignant neoplasms were derived from mesenchymal origin. Generally, fibrosarcoma is presented as the most frequent malign mesenchymal neoplasm for the oral cavity (Vos and Van der Gaag, 1987; Munday et al., 2017; Mikiewicz et al., 2019). In contrast, osteosarcoma and fibrosarcoma were found equal in number in this study, and undifferentiated sarcoma was slightly more than them.

Benign neoplasms constituted a prominent part of the study. Among them, odontogenic neoplasms were the most common benign neoplasms of the oral cavity. Both POF (Mikiewicz et al., 2019) and AA (Fiani et al., 2011) have been described as the most common benign neoplasms in dogs. These two neoplasms arise from different parts of the gingiva. While AA derives from the epithelial cell rests of Malassez, the reduced enamel epithelium, or from the basal epithelial cells of the oral mucosa (Poulet et al., 1992; Fulton et al., 2014), POF arises from the periodontal ligament and refers to the mesenchymal origin (Verhaert, 2010). However, their clinical appearances are hardly distinguished from each other, hyperplastic lesions or other malignant neoplasms arising from the gingiva (Munday et al., 2017). Unlike the benign nature of POF, AA is locally invasive and destructive, resulting in lysis of alveolar bone, and loss of teeth. Therefore these features should be differentiated from OSCC (Liptak and Withrow, 2013). The presented study showed that POF was the first, and AA the second most common benign neoplasm. Although Boxers are overrepresented as a predisposed breed (Vos and Van der Gaag, 1987), the mixed breed was found to be the most affected breed in this study. The most commonly encountered life stage was consistent with the previously reported information (Yoshida et al., 1999; Fiani et al., 2011).

Canine oral papilloma is considered a common benign neoplasm of juvenile (Lange and Favrot, 2011), and immunosuppressed dogs (Sundberg et al., 1994). It has been stated that the exact information about the prevalence of the disease remains unknown since very few of the dogs receive treatment and therefore most are not registered (Munday et al., 2017). In this study, oral papilloma was the third most common benign neoplasm. Unlike other studies, not only young patients but also seniors were affected by the disease resulting in increased mean age.

Non-neoplastic lesions were found less than neoplastic lesions in this study, and the reactive lesions were found less than in other studies (Bonfanti et al., 2015; Mikiewicz et al.,2019).

In conclusion, this retrospective study statistically shows the prevalence of the patient profiles, and commonly affected areas for the oral pathologies in order to make an accurate clinical assessment, and also indicates the importance of histopathology for the differential diagnosis.

**References**

Bergman PJ.Canine oral melanoma. Clin Tech Small Anim Pract 2007; 22(2): 55-60.

Bonfanti U,Bertazzolo W,Gracis M,Roccabianca P, Romanelli G, Palermo G, Zini E. Diagnostic value of cytological analysis of tumours and tumour-like lesions of the oral cavity in dogs and cats: A prospective study on 114 cases. Vet J 2015; 205(2): 322-7.

Brønden LB, Eriksen T, Kristensen AT. Oral malignant melanomas and other head and neck neoplasms in Danish dogs-data from the Danish Veterinary Cancer Registry. Acta Vet Scand 2009; 51 (1): 1-6.

Cray M, Selmic LE, Ruple A. Demographics of dogs and cats with oral tumors presenting to teaching hospitals: 1996-2017. J Vet Sci 2020; 21: 5.

Creevy KE, Grady J, Little SE, Little SE, Moore GE, Strickler BG, Thompson S, Webb JA. 2019 AAHA canine life stage guidelines. J Am Anim Hosp Assoc 2019; 55(6): 267-90.

Fiani N, Verstraete FJ, Kass PH, Cox DP. Clinicopathologic characterization of odontogenic tumors and focal fibrous hyperplasia in dogs: 152 cases (1995-2005). J Am Vet Med Assoc 2011; 238(4): 495-500.

Fulton A, Arzi B, Murphy B, Naydan DK, Verstraete

FJ. The expression of calretinin and cytokeratins in canine acanthomatous ameloblastoma and oral squamous cell carcinoma. Vet Comp Oncol 2014; 12(4): 258-65.

Goldschmidt MH. Benign and malignant melanocytic neoplasms of domestic animals. Am J Dermatopathol 1985;7: 203-12.

Head KW, Cullen JM, Dubielzig RR, Else WR, Misdrop W, Patnaik AK, Tateyama S, Van der Gaag I. Histological classification of tumors of the alimentary system in domestic animals. In: WHO International Histological Classification of Tumors of Domestic Animals Armed Forces Institute of Pathology, American Registry of Pathology. Second Edition. Washington: World Health Organization, 2003; pp. 29-57.

Lange CE, Favrot C. Canine papillomaviruses. Vet Clin Small Anim 2011; 41(6): 1183-95.

Liptak JM, Withrow SJ. Oral tumours. Withrow SJ. Vail DM. eds. In: Withrow &Mac Ewen's Small Animal Clinical Oncology. Philadelphia: Elsevier Saunders, 2013; pp. 381-98.

Lommer MJ. Oral inflammation in small animals. Vet Clin Small Anim 2013; 43(3): 555-71.

Mikiewicz M, Paździor-Czapula K, Gesek M, Lemishevskyi V, Otrocka-Domagała I. Canine and feline oral cavity tumours and tumour-like lesions: a retrospective study of 486 cases (2015-2017). J Comp Pathol 2019; 172: 80-7.

Munday JS, Löhr CV, Kiupel M. Tumors of the alimentary tract. Meuten DJ. ed. In: Tumors in Domestic Animals. Iowa: John Wiley & Sons, Inc. Ames, 2017; pp.500-43.

Niemiec BA. Oral pathologies. Top Companion Anim Med 2008; 23(2): 59-71.

Poulet FM, Valentine BA, Summers BA. A survey of epithelial odontogenic tumors and cysts in dogs and cats. Vet Pathol 1992; 29(5): 369-80.

Putnová B, Burová J, Georgiou M, Fichtel T, Stehlík L, Frgelecová L, Škorič M. Occurrence site of canine oral lesions: a retrospective study of 659 cases. Acta Vet Brno 2020; 89(2): 179-87.

Ramos-Vara JA, Beissenherz ME, Miller MA, Johnson GC, Pace LW, Fard A, Kottler SJ. Retrospective study of 338 canine oral melanomas with clinical, histologic, and immunohistochemical review of 129 cases. Vet Pathol 2000; 37(6): 597-608.

Sundberg JP, Smith EK, Herron AJ, Jenson AB, Burk RD, Van Ranst M. Involvement of canine oral papillomavirus in generalized oral and cutaneous verrucosis in a Chinese Shar Pei dog. Vet Pathol 1994; 31(2): 183-7.

Svendenius L, Warfvinge G. Oral pathology in Swedish dogs: A retrospective study of 280 biopsies. J Vet Dent 2010; 27(2): 91-7.

Uzal FA, Plattner BL, Hostetter JM. Alimentary system. Maxie M. ed. In: Jubb, Kennedy, and Palmers` Pathology of Domestic Animals. Missouri: Elsevier, 2016; pp. 2-28.

Verhaert L. Oral proliferative lesions in the dog and cat. Eur J Companion Anim Pract 2010; 20(3): 1-3.

Vos JH, Van der GaagI. Canine and feline oral-pharyngeal tumours. J Vet MedA 1987; 34(1-10): 420-7.

Vural SA, Keleş H, Özsoy ŞY, Özkul IA. Köpek ve kedilerde 1977-2005 yılları arasında saptanan orofaringeal bölge tümörleri: Retrospektif çalışma. Ankara Univ Vet Fak Derg2007; 54(3): 197-203.

Wingo K. Histopathologic diagnoses from biopsies of the oral cavity in 403 dogs and 73 cats. J Vent Dent 2018; 35(1): 7-17.

Yoshida K, Yanai T, Iwasaki T, Sakai H, Ohta J, Kati S, Mikami T, Lackner AA, Masegi T. Clinicopathological study of canine oral epulides. J Vet Sci 1999; 61(8): 897-902.