



## Oral cavity neoplasms in companion animals: Clinical features and approaches to diagnosis and treatment

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**Abstract.** The relevance of this study is determined by the high prevalence of oral cavity neoplasms in companion animals, the difficulty of their early diagnosis, and the limited possibilities for effective treatment at advanced stages of the disease. In this regard, the present scientific work is devoted to identifying the clinical and morphological characteristics of oral cavity neoplasms in dogs and cats, as well as assessing the effectiveness of contemporary approaches to their diagnosis and therapeutic management. The principal research method was clinical and diagnostic analysis, which included the synthesis of findings from clinical examinations, imaging studies, and morphological investigations. During the study, 43 clinical cases of oral cavity neoplasms in companion animals were analysed, with older cats constituting the majority of cases. It was noted that squamous cell carcinoma was diagnosed in 86% of cases and was characterised by aggressive progression and invasion of bone tissue. The study established that tumours were most frequently localised in the maxilla and mandible, the sublingual region, and the tongue (59.5% of cases). Neoplastic processes in dogs, in which not only malignant neoplasms such as squamous cell sarcoma (68.8%) but also benign tumours (16.6%) were diagnosed, were recorded in adulthood. It was substantiated that the clinical manifestations included the formation of tumour masses, ulcerative lesions, destruction of bone tissue, and impairment of oral cavity functions. It was determined that diagnostic effectiveness largely depended on the application of a comprehensive approach incorporating clinical examination, imaging techniques, and histological verification of the diagnosis. The study found that the choice of therapeutic strategy was determined by the localisation and extent of tumour spread and may include surgical intervention, targeted therapy, or palliative treatment. The materials presented in this article are of practical value to veterinary practitioners, as they contribute to improving the effectiveness of the diagnosis and treatment of oral cavity neoplasms in companion animals

**Keywords:** cats; dogs; veterinary oncology; bone invasion; maxilla and mandible; sublingual region; tongue

## Introduction

Diseases of the oral cavity and teeth are common in animals. These include periodontal disease, early gingivitis, tooth resorption, endodontic diseases and dental trauma, chronic gingivostomatitis in cats, developmental abnormalities such as malocclusion, oral lesions and tumours. Neoplasms localised in the oral cavity of companion animals are one of the most pressing issues in modern veterinary oncology. Their prevalence in the dog and cat population, combined with the difficulty of early diagnosis, rapid progression and significant impact on the quality and duration of the animals' lives, highlights the need for in-depth study of this group of diseases.

Recent epidemiological studies have demonstrated significant variability in the morphological forms of oral cavity tumours, encompassing a wide spectrum of both benign and malignant neoplasms. P. Brilhante-Simões *et al.* (2025a) pointed to the considerable heterogeneity of histological structures and the clinical behaviour of tumour processes, which complicates the development of uniform diagnostic criteria and prognostic models. The authors emphasised that effective management of cancer patients requires the integration of clinical, morphological and imaging data into a unified diagnostic system. As established by C. Saththathum *et al.* (2023), a significant

proportion of oral neoplasms are malignant processes characterised by invasive growth and the ability to metastasise, which significantly complicates the prediction of clinical course and is accompanied by the development of halitosis in animals.

B.G. Murphy *et al.* (2025) identified two key categories of odontogenic neoplasms: tumours arising exclusively from odontogenic epithelium and tumours with features of induction. The first group comprises mainly various morphological variants of ameloblastomas, as well as other neoplasms, in particular odontogenic carcinoma and squamous cell odontogenic tumours. The second group comprises neoplasms characterised by inductive tissue interaction, including odontomas and less differentiated or structurally organised forms, such as ameloblastic fibroma and ameloblastic fibro-odontoma. In general, odontogenic tumours manifest as voluminous, expansively growing lesions localised in the region of the dental structures of the upper or lower jaw. Cases of ectopic development of such neoplasms in cats have been reported extremely rarely. Tumours of the oral cavity, according to S. Ahn & J.H. Yun (2026), were of significance in comparative oncology. In cats, squamous cell carcinoma of the oral cavity predominated and was very similar in its biological behaviour to the disease in humans. However, in dogs, a high incidence of oral melanoma was observed, a tumour that is rarely found in humans and cats.

As noted by H. Lobprise *et al.* (2025), melanoma, squamous cell carcinoma and fibrosarcoma were the most common types of malignant tumours of the oral cavity in animals. These neoplasms, according to the results obtained by R.C. Smedley *et al.* (2022), exhibited aggressive biological behaviour, manifested by rapid local invasion and a high frequency of metastatic involvement of regional lymph nodes and distant organs. According to a report by D. Giacobino *et*

*al.* (2025), oral melanoma is characterised by a particularly unfavourable clinical course. It is an aggressive tumour characterised by rapid growth and high local invasiveness, with a recorded metastasis rate, from the time of detection to follow-up, and following treatment, ranging from 30.3 to 74.0% in regional lymph nodes and from 14.0 to 92.0% in the lungs and other distant sites, distinguished by early systemic spread and a poor response to therapeutic interventions. In this context, as established by M.N. Mayer & S.L. Sukut (2025), staging of the lymphatic system was considered a key element of prognostic assessment, directly influencing the choice of treatment strategy. The diagnostic process for suspected oral neoplasms is based on a multidisciplinary approach combining clinical examination, cytological and histological verification, and modern medical imaging techniques.

Despite significant progress in the diagnosis and treatment of oral neoplasms in companion animals, a number of clinical and methodological aspects remain underdeveloped. In particular, there is a need to improve algorithms for the early detection of tumours, standardise diagnostic criteria, and evaluate the effectiveness of combined therapeutic approaches in real-world clinical settings. This highlights the need for further research aimed at systematising clinical experience and optimising approaches to the management of oncology patients in veterinary practice.

The aim of the study was to investigate the clinical characteristics of oral cavity neoplasms in companion animals, determine their morphological structure, and evaluate the effectiveness of modern diagnostic and treatment methods based on an analysis of clinical data.

## Literature Review

Neoplastic processes of the oral cavity in companion animals are one of the most complex

and, at the same time, most extensively studied problems in modern veterinary oncology. Their significance is due to their high incidence, the considerable biological aggressiveness of most malignant forms, and the difficulties in early detection, which significantly affect the prognosis and effectiveness of treatment. S. Ahn & J.H. Yun (2026) demonstrated that this group of pathologies is characterised by considerable morphological diversity and variability in clinical course, which complicates the standardisation of diagnostic approaches and prognosis.

Epidemiological studies have shown that oncological diseases in dogs and cats account for a significant proportion of all pathologies, with a considerable number of these occurring specifically in the oral cavity. According to M. Mikiewicz *et al.* (2019), oral cavity pathologies in dogs and cats are more commonly represented by benign tumours, hyperplastic lesions and inflammatory lesions; furthermore, in dogs, gingival hyperplasia and peripheral odontogenic fibroma were diagnosed, whilst in cats, chronic lymphoplasmacytic stomatitis was diagnosed. Among malignant tumours, the most common were high-grade melanoma in dogs and squamous cell carcinoma in cats. P. Brilhante-Simões *et al.* (2025a), in a large-scale analysis of cytological cases, noted that neoplasms exhibited a wide range of histological types, requiring a comprehensive approach to diagnosis. In turn, another study by these authors, P. Brilhante-Simões *et al.* (2025b), emphasised the importance of a systematic analysis of oncological processes in the canine population to improve clinical management.

Among malignant neoplasms of the oral cavity, the most clinically significant are squamous cell carcinoma, melanoma and fibrosarcoma, which are characterised by invasive growth and high metastatic potential. These tumours are often diagnosed at late stages of development due to the absence of specific clinical

symptoms in the early stages. In particular, as stated by Y. Xia *et al.* (2024), oral melanoma is considered aggressive, exhibiting a tendency for early metastasis to regional lymph nodes and the lungs. Considerable attention in modern veterinary oncology is paid to the staging of the tumour process. M.N. Mayer & S.L. Sukut (2025) emphasised that the assessment of lymph node status is a critical prognostic factor determining further treatment strategies and the patient's overall prognosis. In turn, D. Giacobino *et al.* (2025) demonstrated that the extent of metastatic disease directly correlates with survival in animals with oral melanoma. Diagnostic approaches to oral cavity neoplasms include clinical examination, cytological and histological methods, as well as modern imaging techniques. An important component of modern diagnosis is the histopathological and cytological verification of tumours. S. Goldschmidt *et al.* (2023) found that preoperative assessment is crucial for planning the extent of surgical intervention.

Alongside surgical methods, radiotherapy is becoming increasingly important as an alternative or adjunct to surgical treatment, demonstrating efficacy in controlling locally advanced tumour processes. According to data from P. Gualtieri *et al.* (2025), modern stereotactic radiotherapy regimens have enabled the stabilisation of tumour growth and an improvement in the animals' quality of life, whilst hypofractionated radiotherapy has provided effective local control of tumour growth. A positive effect of preventive irradiation of lymph nodes on the control of oral melanoma has been established. Furthermore, targeted therapeutic strategies aimed at blocking intracellular signalling cascades responsible for tumour cell proliferation are being actively developed. W.P. Katt *et al.* (2025) reported on the promise of MAPK/ERK pathway inhibitors as a potential avenue for personalised cancer therapy. The authors

demonstrated the efficacy of the MEK inhibitor (trametinib) in inhibiting the growth of squamous cell carcinoma cells of the oral cavity.

Molecular studies provide a deeper understanding of tumour pathogenesis. G. Mucignat *et al.* (2024) found that transcriptomic analysis of oral melanoma enables the identification of genetic signatures associated with prognosis and response to treatment. This has opened up possibilities for personalised treatment. Comparative oncology also plays an important role in understanding the mechanisms of tumour development. W.S. Kim *et al.* (2021) demonstrated the similarity of biological processes in animals and humans, making veterinary models important for translational research. A. Lo Giudice *et al.* (2024) described the establishment of melanoma cell cultures, which enabled *in vitro* studies of tumour growth and the testing of new therapeutic agents. This represents an important step in the development of experimental oncology.

Thus, oncological diseases in dogs are characterised by significant variability in clinical manifestations and histological variants, which complicates the standardisation of diagnostic approaches. The authors emphasised the importance of systematising data from cytological and histological studies to improve the epidemiological understanding of tumour processes, including those of oral origin. Summarising the literature, it can be stated that modern veterinary oncology has made significant progress in the diagnosis and treatment of oral neoplasms. At the same time, issues regarding early diagnosis, the standardisation of therapeutic protocols and the optimisation of combined treatment methods remain unresolved, highlighting the need for further research in this field; there is also a continuing need for the further integration of clinical, morphological and molecular data to develop more effective diagnostic and therapeutic algorithms.

## Materials and Methods

The study was conducted throughout 2025 at the Department of Veterinary Surgery named after Academician I.O. Povazhenko, National University of Life and Environmental Sciences of Ukraine and the “Vetlife” veterinary clinic in Kyiv. The study was retrospective in nature and was based on the analysis of medical records and the results of clinical, instrumental, cytological and histological examinations of the animals. The inclusion criterion for companion animals (dogs and cats) in the sample was the presence of a neoplasm (tumour) in the oral cavity. A total of 43 clinical cases were analysed: cats (n = 37), aged 3 to 17 years, and dogs (n = 6), aged 8 to 10 years. In clinical practice, a comprehensive diagnostic approach was employed, comprising clinical examination, imaging techniques and morphological verification. Histological examination confirmed the tumour type and assessed the degree of differentiation. All 43 clinical cases underwent the same diagnostic work-up, specifically cytological and histological examination, whilst radiography and computed tomography (CT) were used selectively depending on the clinical situation. An analysis of the available results of the relevant examinations was conducted.

The clinical examination included: a general examination of the animals, an assessment of the condition of the oral cavity tissues, and palpation of neoplasms and regional lymph nodes. To refine the diagnosis, instrumental diagnostic methods were employed, including radiographic examination using a high-frequency portable X-ray system, the Cubex 50 (JPI Healthcare, South Korea), and CT using the Philips MX 8000 IDT (Netherlands). Morphological verification of the diagnosis was carried out using cytological and histological methods. Fine-needle aspiration biopsy was performed to obtain cytological sample. A fine needle (22G) was inserted into the neoplasm and negative pressure

(aspiration) was created using a syringe to collect cells. The collected cellular material was applied to a microscope slide, a smear was prepared, and after drying, it was examined under an “Olympus CX 43” microscope (Labdepo, Japan).

For histological examination, biopsies were used, which were obtained by performing incisional or excisional biopsies of samples for microscopic examination. The samples were placed in histological cassettes and fixed for 48 hours in a 10% aqueous neutral formalin solution, after which they were rinsed for 24 hours in tap water. To remove water from the samples, dehydration was carried out using ethyl alcohol of increasing concentration (60°, 70°, 96°, 100°) for one to three hours. The material was then placed in a mixture of alcohol and chloroform, followed by immersion in pure chloroform, after which the material was placed in a chloroform-paraffin mixture (at 37°C) and in paraffin (at 55-56°C). A casting station and stainless steel moulds were used to produce paraffin blocks. Histological sections up to 5-10 µm thick were prepared from the paraffin blocks using an MPS-2 sliding microtome (MedTech-Price, Ukraine). Subsequently, the histological sections were stained with haematoxylin and eosin according to Mallory and impregnated according to Kelemen, in accordance with standard procedures. The preparations were examined using an “Olympus CX 43” binocular microscope (Labdepo, Japan) and an eyepiece micrometer.

The results obtained during the studies were recorded in the form of protocols, and statistical data analysis was performed on a personal computer using StatSoft Statistica 13.1 (2016) software. Microphotography of individual histological sections of affected oral cavity tissues was performed using a microscope fitted with a “Primo Star” digital camera (Carl Zeiss, Germany) and connected to a personal computer.

Diagnostic and therapeutic interventions were performed according to clinical indications. Informed consent was obtained from the animal owners for the performance of diagnostic procedures and the use of anonymised clinical data for scientific purposes. Scientific research involving animals complied with the requirements of the European Convention for the Protection of Vertebrate Animals Used for Research and Other Scientific Purposes (1986) and Law of Ukraine No. 3447-IV (2006). All necessary procedures on animals were carried out in accordance with the ARRIVE guidelines, without contravening the principles of Directive No. 2010/63/EU (2010) on the protection of animals used for scientific purposes.

## Results and Discussion

An analysis of clinical cases recorded at the “Vetlife” veterinary clinic (Kyiv) confirmed a high prevalence of malignant tumours of the oral cavity in companion animals, particularly in cats. The ages of the animals studied varied. Cats were examined at ages ranging from 3 to 17 years, and dogs from 8 to 10 years. However, the majority of patients, over 80% of cases, belonged to the older age group (>10 years). In the sample, the average age of cats was 12.8 years, and of dogs 9.3 years. In older animals (over 12 years) in the sample, 90% of inoperable forms were recorded – a trend also confirmed by studies conducted by D. Khayatan *et al.* (2023). By species, cats predominated in the sample: 37 cases out of 43 (~86%), whilst dogs accounted for 6 cases (~14%). In terms of sex, a slight predominance of tumours in females was noted, as the quantitative distribution of animals by sex showed that of the 43 animals in the sample, 23 were females and 20 were males. Analysis of 43 clinical cases of oral cavity neoplasms in companion animals revealed a predominance of malignant neoplasms of

epithelial origin. In particular, squamous cell carcinoma was diagnosed in 37 animals (86%), indicating the predominance of this tumour

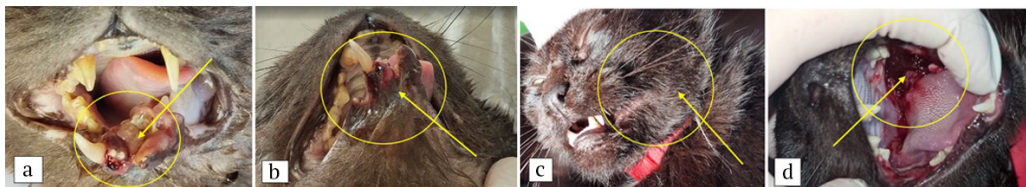
type in the study sample. The clinical picture of tumour lesions of the soft tissues of the oral cavity in cats is presented in Figure 1.



**Figure 1.** Results of clinical examinations of cats with soft-tissue tumours in the oral cavity  
**Note:** a – neoplasm in the necrotic stage in the left masseter region; b – neoplasm in the hard palate region, anaemia of the oral mucosa; c – neoplasm of the hard palate; d – neoplasm in the dorsal surface of the tongue; e – neoplasm of the lateral edge of the tongue; f – lesion of the soft palate tissues; g – lesion of the upper lip; h – tumorous lesion of the upper jaw gums; i – lesion of the sublingual region of the oral cavity  
**Source:** authors' photo

Clinically, the neoplasms in cats manifested as tumour masses of varying sizes. Tissue indurations, nodular formations and erosions were localised on the mucous membrane, on the tongue and in the sublingual region. Ulcerative lesions of the palate, lips and cheeks were accompanied by bleeding, difficulty eating and halitosis. Moreover, a sharp, unpleasant odour

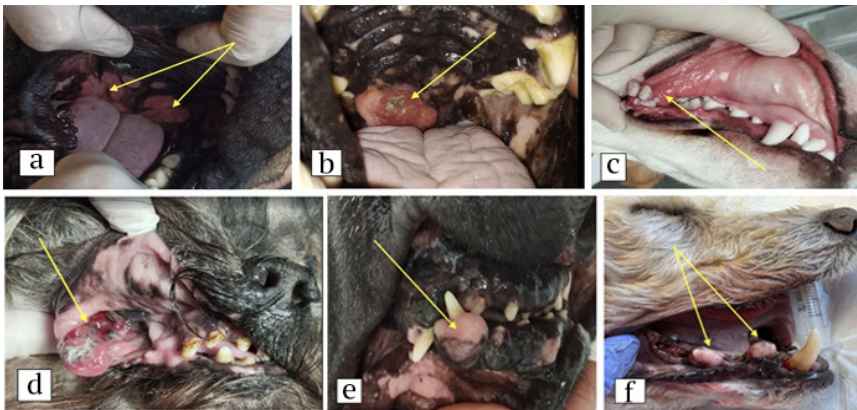
emanating from the mouth was caused by necrosis (decay) of tumour tissues and the development of a bacterial infection. The main clinical signs were: the presence of tumour masses in the region of the jaws, tongue or cheeks, ulcerative lesions, loosening of teeth, tissue oedema, as well as signs of invasion into bone tissue (bone lysis, deformation of anatomical structures) (Fig. 2).



**Figure 2.** Results of clinical examination of cats with tumours affecting the bone tissue in the oral cavity  
**Note:** a – neoplasm in the necrotic stage in the mandible with bone lysis, anterior view; b – neoplasm in the necrotic stage in the mandible with bone lysis, inferior view; c – local deformation of the jawbone (firm, immobile swelling) in a cat with a neoplasm in the lower jaw region (external view); d – tissue breakdown of a malignant tumour in a cat with a neoplasm in the lower jaw region (view from the oral cavity)  
**Source:** authors' photo

In a significant number of cases, tumour invasion into bone tissue was observed, manifesting as bone lysis and deformation of the jaws. Such changes are typical of the aggressive course of squamous cell carcinoma. In a number of cases, metastatic involvement was recorded, particularly of regional lymph nodes and distant

tissues, indicating progression of the tumour process. Clinically, the neoplasms manifested as: tumour masses of varying sizes, ulcerative lesions, bleeding, impaired food intake, deformation of anatomical structures and halitosis. In dogs, the clinical manifestations of neoplasms localised in the oral cavity are shown in Figure 3.



**Figure 3.** Results of clinical examinations of dogs with tumorous lesions of the oral cavity tissues

**Note:** a – diffuse tumorous lesion of tissues in the hard palate region; b – localised neoplasm in the hard palate region; c – neoplasm in the corner of the mouth appearing as white patches on the buccal mucosa; d – tissue proliferation with an erosive area on the buccal mucosa; e – localised, soft, asymmetrical enlargement of the gums; f – firm, nodular, pink growths

**Source:** authors' photo

Oral neoplasms in dogs are located on the mucous membrane of the palate, cheeks and gums. They appear as diffuse or localised, nodular, firm lesions of varying colours (white, pink, red or brown). As a result of tissue necrosis and tumour breakdown, halitosis and hypersalivation with traces of blood are present. During feeding, dysphagia and bleeding from the oral cavity were observed, particularly during chewing. In cases of gingival involvement, tooth mobility and tooth loss were noted. During clinical examination of the animals, the following localisation of tumours in the oral cavity was identified (Fig. 4).

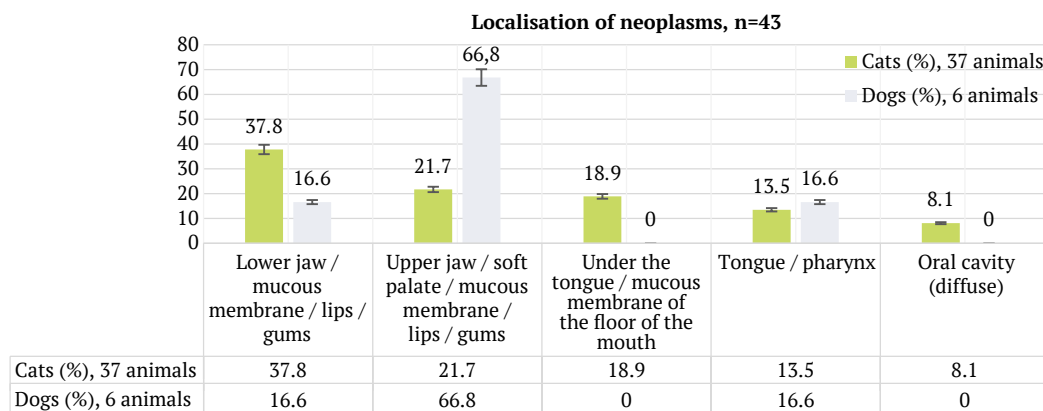
It was found that in cats, lesions of the oral cavity tissues were localised in the lower or

upper jaw in over 50% of cases, whilst in some cats, multifocal lesions were observed, specifically involving the jaw, gums and tongue simultaneously. In dogs, lesions of the upper jaw and oral mucosa were most frequently observed (66.8%). The results of the examination revealed that in cats, the lower and upper jaws were the main sites of tumour localisation (37.8% and 21.7%, respectively), whereas in dogs, lesions of the cheek mucosa, soft palate and gums were predominant (16.6% each).

To establish an accurate diagnosis, histological examination (65% of cases), cytological puncture (23%) and imaging methods (X-ray, CT – 12%) were used. Bone invasion was detected in 68% of cases in cats. Metastases (in

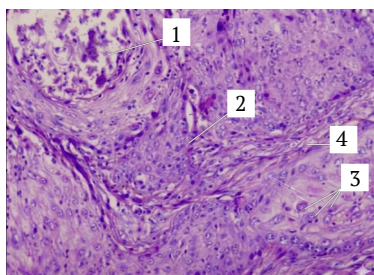
lymph nodes or lungs) were diagnosed in 15% of animals at the stage of tumour necrosis; in 43% of animals (16 cats and 3 dogs), the tumours were found to be inoperable. An accurate diagnosis was established for the animals under study based on the results of histological examination of the affected tissues, in which epithelial neoplasia with squamous differentiation of tumour cells was observed. There were strands of squamous-differentiated atypical keratinocytes associated with the epidermis,

exhibiting nuclear polymorphism, hyperchromasia and mitoses of tumour cells (1 mitosis per 10 large fields of view under the microscope). The tumour cells had irregular borders, visible intercellular contacts, abundant, strongly eosinophilic cytoplasm, round or oval nuclei with fine-grained chromatin and 1-3 prominent nucleoli. At the same time, anisokaryosis was moderate, with keratin pearls and keratinisation of individual cells present, accompanied by associated mixed-cell inflammation (Fig. 5).



**Figure 4.** Localisation of neoplasms in the study animals

Source: authors' own work



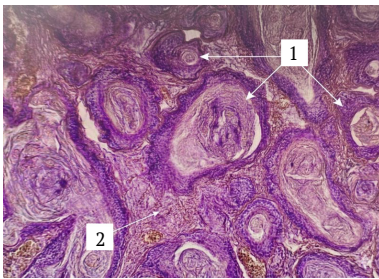
**Figure 5.** Histological appearance of a G2 squamous cell carcinoma of oral cavity tissue in a cat  
**Note:** 1 – concentric accumulation of eosinophilic keratin in the centre of the epithelial layer, indicating keratinisation of the tumour; 2 – massive proliferation of tumour cells infiltrating the stroma; 3 – enlarged hyperchromic nuclei of tumour cells with irregular contours; 4 – connective tissue with signs of inflammatory infiltration surrounding the tumour complexes

Source: authors' photo

Oral carcinomas in cats are characterised by a marked tendency towards invasive growth,

particularly invasion into the underlying bone tissue of the lower or upper jaw. This may be

accompanied by bone destruction, tooth loss, pain, difficulty eating and pathological fractures. The poor prognosis for squamous cell carcinoma of the oral cavity in cats is associated with the difficulty of achieving clear resection margins, high local invasiveness, a tendency to recur, and the potential for metastasis to regional lymph nodes and the lungs. A more detailed histological picture of squamous cell carcinoma of the oral cavity in cats, in particular the formation of keratin pearls and the desmoplastic reaction of the stroma, is shown in Figure 6.



**Figure 6.** Histological appearance of squamous cell carcinoma of the oral cavity in a cat (H&E stain,  $\times 400$  magnification)

**Note:** 1 – mature keratin pearls with characteristic keratin layering; 2 – area of marked desmoplastic stromal reaction with fibroblast proliferation around invasive epithelial nests

**Source:** authors' photo

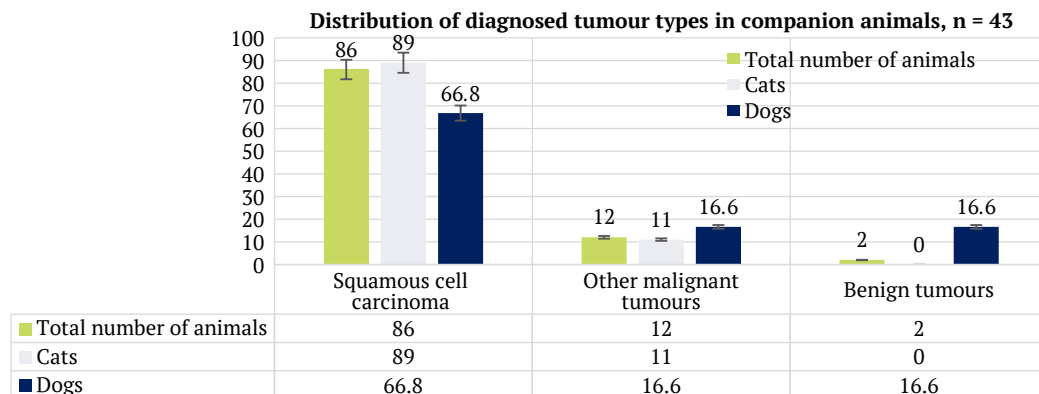
As shown in Figure 6, the histological specimen contains tumour nests composed of dense concentric masses of keratin, known as “keratin pearls”. Surrounding the “keratin pearls” are pleomorphic cells exhibiting features of anisocytosis and anisokaryosis. The nuclei are large and vesicular, with coarse chromatin and visible nucleoli. An intense reactive proliferation of fibrous connective tissue is present around the tumour complexes.

Based on the results of morphological examination and clinical assessment, it was

established that in most cases squamous cell carcinoma was characterised by an aggressive course with marked invasion into bone tissue. In one of the examined samples of squamous cell carcinoma, characteristic histological features were identified – the formation of keratin pearls and moderate anisokaryosis, confirming the differentiated type of carcinoma. Similar morphological characteristics are described in the works of K. Feigin & C. Bell (2024), who pointed to significant histological variability of tumours, which influences their biological behaviour and prognosis. The results obtained are consistent with those of S. Goldschmidt *et al.* (2025) in that clinically, the neoplasms manifested as invasion into bone tissue (lysis, deformation of the jaws), the formation of ulcerated surfaces, pain and impaired food intake, and in some cases, metastasis, which underscored the aggressiveness of local tumour growth in the oral cavity.

A comparison of the morphological structure of the neoplasms in the studied animals revealed that in cats, invasive variants with deep invasion into bone tissue and the formation of “keratin pearls” predominated, whereas in dogs, superficial, erosive-ulcerative forms were more frequently observed, confirming the observations of K. Feigin & C. Bell (2024) regarding the dependence of the histological type of tumour on the species of animal. In this study, bone invasion was observed in 68% of cats, which is consistent with the data obtained by D. Giacobino *et al.* (2025), who reported 65% of cases of infiltration in dogs with squamous cell carcinoma. This correlation demonstrates the universality of the pathomorphological mechanisms of invasion, regardless of species and geographical region.

The combined use of methods (histopathology with radiography, or cytology with CT) improved accuracy, particularly in determining invasion into bone tissue. The distribution of diagnosed tumour types is shown in Figure 7.



**Figure 7.** Distribution of diagnosed tumour types in companion animals

Source: authors' own work

Figure 7 shows a clear imbalance in the distribution of tumour types: malignant forms together account for the vast majority of cases, indicating the seriousness of oral cancer in companion animals as a whole. What is most significant is not so much the dominance of squamous cell carcinoma in itself, but rather the fundamental difference between species within the category of benign neoplasms: in cats, this is zero. This means that the detection of any oral neoplasm in a cat effectively indicates, with a very high probability, a malignant process – which has direct practical implications for the clinical decision to proceed with urgent intervention without waiting for further confirmation. In dogs, however, the picture is more varied: benign and other malignant forms together account for a third of cases, which justifies the need for a more detailed differential diagnosis before selecting a treatment strategy.

According to the results obtained, it was established that squamous cell carcinoma is the predominant type of neoplasia, the development of which was recorded in 86% of all cases, which is consistent with the data of P. Brilhante Simões *et al.* (2025a), who noted a significant frequency of epithelial malignant

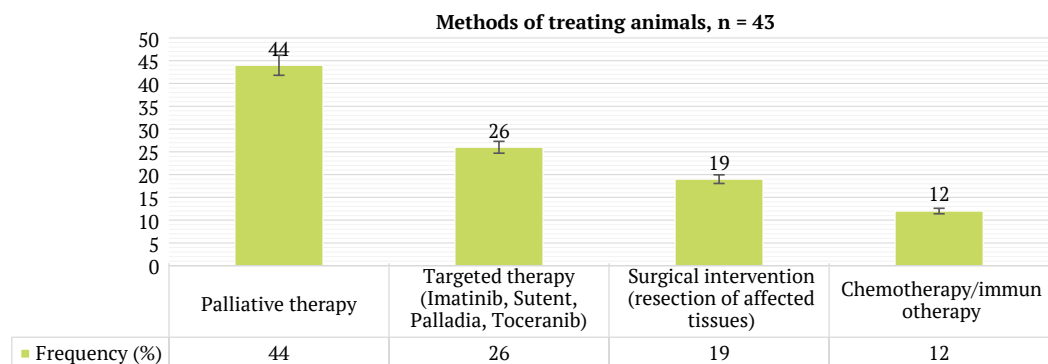
neoplasms detected during the examination of 12,671 dogs. In the present sample, this figure is even higher, which can be explained by the characteristics of the animal population and the selection of severe clinical cases. The predominance of cats in the sample (86%) may indicate a species-specific predisposition to the development of this type of tumour. It was found that the majority of animals belonged to the older age group, which is consistent with the general patterns of oncological processes.

The use of imaging methods, in particular radiography and CT, allowed the extent of bone structure involvement to be determined, which is critically important for treatment planning, as also discussed in the work by M. de Almeida *et al.* (2025). S. Goldschmidt *et al.* (2023) also noted the high diagnostic value of preoperative screening for assessing the extent of the tumour process. The cytological and histological methods used in the study demonstrated high diagnostic accuracy (over 90%). A similar accuracy of morphological methods was described by K. Feigin & C. Bell (2024), who analysed cases of ameloblastoma in dogs and emphasised that cytological assessment is effective when an experienced morphologist is available. At

the same time, M. De Almeida *et al.* (2025) emphasised the importance of CT in visualising local tumour invasion. In this study, it was CT that allowed an additional 5 cases to be classified as invasive, which had previously been considered superficial. Regarding the clinical course, stage III cancer was diagnosed in the majority of cats (45%), regardless of the type of treatment. Such a high proportion of advanced cases is consistent with the observations of S. Goldschmidt *et al.* (2023), who found that in over 60% of small animals, oral tumours were detected at late stages of development.

In this study, the radiographic sign of bone lysis was the most indicative criterion of inoperability, which fully coincides with the prognostic criteria proposed by P. Brilhante Simões *et al.* (2025b). Furthermore, S. Sabatini *et al.* (2026) demonstrated that molecular markers, such as SOX-10, can be used to identify metastatic cells in lymph nodes. S. Lee *et al.* (2021) established that CT is one of the most informative tools for assessing the extent of tumour invasion and allows for a detailed assessment of the anatomical boundaries of the lesion, the extent of invasion, and the involvement of the skull's bony structures. High-resolution imaging allows for a more precise

determination of the lesion boundaries, which is critical for planning surgical intervention. The use of high-resolution CT protocols provides a three-dimensional reconstruction of the pathological process, which significantly improves the accuracy of clinical staging. M. de Almeida *et al.* (2025) noted that the use of whole-body CT in veterinary oncology significantly improves the detection of primary tumours, substantially increasing diagnostic sensitivity, and allows for the visualisation of hidden metastases that may remain undetected during standard examination. This has a significant impact on the choice of therapeutic strategy. In addition to traditional diagnostic methods, as noted by G. Mucignat *et al.* (2024), molecular biological and immunohistochemical approaches are being actively introduced into modern veterinary oncology, enabling a more in-depth assessment of the biological nature of the tumour process. The integration of morphological and molecular markers has enabled the development of more accurate prognostic models and personalised treatment approaches. Analysis of clinical cases has shown that the choice of therapeutic strategy depends on the tumour's location, the degree of invasion, and the animal's general condition (Fig. 8).



**Figure 8.** Methods of treating animals

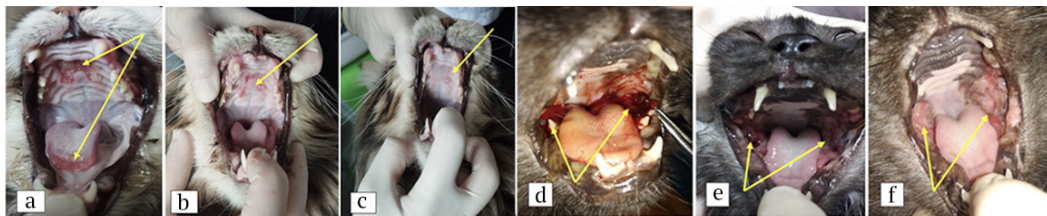
*Note:* figures are presented as percentages (%)

*Source:* authors' own work

Figure 8 reveals a significant imbalance between the approaches used, which has important clinical implications. Most notably, palliative care predominates (44%) – that is, almost half of the animals received treatment aimed not at eliminating the tumour, but merely at alleviating their condition. This indirectly suggests that a significant proportion of cases were already at a stage where radical intervention was impossible or inadvisable at the time of referral. Thus, the diagram indirectly reflects the problem of late detection – not as a statistic, but as a clinical consequence. At the same time, targeted therapy (26%) and surgical intervention (19%) together account for 45% – that is, almost as much as palliative care. However, these two approaches differ fundamentally in their objectives: surgery

involves the physical removal of affected tissue, whereas targeted therapy acts systemically. The fact that targeted therapy was used more frequently than surgery may indicate the prevalence of cases with bone invasion or anatomically complex localisation, where resection is technically limited. Chemotherapy/immunotherapy (1.2%) is used in virtually isolated cases, reflecting its adjunctive rather than primary role in treatment protocols for oral tumours in companion animals.

In one clinical case involving a cat with squamous cell carcinoma of the hard palate and tongue, combined treatment was recommended (Fig. 9a-c), comprising surgical intervention combined with targeted therapy using tyrosine kinase inhibitors. Such approaches are consistent with research.



**Figure 9.** Treatment outcomes for cats diagnosed with squamous cell carcinoma of the oral cavity

**Note:** a-c – a clinical case of squamous cell carcinoma of the hard palate and tongue in a cat: a – tumour involvement of tissues in the hard palate and tongue region prior to treatment; b – tissue condition on day 16 of treatment; c – condition of the tissues on day 30 of treatment; d-f – clinical case of a neoplasm in the sublingual region and on the gums in a cat: d – neoplasm in the sublingual region and on the gums; e – treatment results on day 16; f – treatment results on day 30

**Source:** authors' photo

In cases involving tumours in difficult locations (Fig. 9 d-f), particularly in a cat with sublingual carcinoma, the scope for radical surgical treatment was limited. In such situations, palliative care was provided with the aim of improving the animal's quality of life. The use of multi-kinase inhibitors and antibacterial drugs allowed the inflammatory process to be controlled and tumour progression to be partially

halted. Recent research by H. He *et al.* (2024) has also confirmed the promise of radiotherapy and the latest treatment methods, including immunotherapy and targeted approaches. However, treatment issues remain complex. In the sample cited, only 19% of animals underwent surgery, whilst 44% received palliative care and 26% received targeted therapy with tyrosine kinase inhibitors (imatinib, Sutent,

Palladia, toceranib). The treatment applied was in line with the global trend of shifting from aggressive surgical interventions to combined regimens of systemic treatment. Compared with the findings of K. Feigin & C. Bell (2024), who reported remission in only 15% of patients following resection without systemic therapy, the inclusion of targeted drugs in the treatment regimen increased early stabilisation of the disease to 33%.

Some studies have noted a significant prolongation of survival when receptor inhibitors are combined with non-steroidal anti-inflammatory drugs (Piroxicam, Meloxicam), which is consistent with the clinical observations of R. Gualtieri *et al.* (2025) regarding the synergy of antitumour and anti-inflammatory effects. This provides grounds for considering combination therapy as a promising direction in veterinary oncology. The treatment strategy for oral cavity neoplasms is complex and is determined by the histological type of tumour, the stage of the disease, and the patient's general condition. Surgical removal remains the primary method, the effectiveness of which depends directly on adherence to adequate surgical margins. S. Goldschmidt *et al.* (2025) emphasised that inadequate surgical margins significantly increased the risk of local recurrence, particularly in aggressive odontogenic and epithelial neoplasms, and that the precision of surgical removal directly influences the long-term prognosis.

A comparative analysis of the present animal study with the data of P. Brilhante Simões *et al.* (2025a) revealed that the frequency of metastasis (approximately 15%) is somewhat lower than in large-scale samples (20-25%). This can be explained by the predominance of locally invasive forms without distant lesions, as well as the short duration of clinical observation. In cats, metastases were recorded mainly in the submandibular and retropharyngeal lymph

nodes. The degree of tumour differentiation also influenced the prognosis. Less differentiated forms without keratinous structures were characterised by faster growth; in such animals, the median survival did not exceed 5 months, whereas for G1-G2 tumours with marked keratinisation, the median prognosis was up to 12 months. Similar patterns were identified by K. Feigin & C. Bell (2024) in cases of low-grade ameloblastomas, where differentiation correlated directly with clinical outcome.

The use of imaging techniques – contrast-enhanced CT – proved highly effective in detecting heterogeneity in neoplasms, and the results fully corroborated the findings of M. De Almeida *et al.* (2025) regarding the advantages of CT over radiography in the diagnosis of small head and neck neoplasms in animals. The study results showed that in 12% of cases, the true extent of local invasion was determined solely through CT. In a broader context, the results obtained expand the understanding of the pathogenesis and treatment options for epithelial carcinomas in animals. P. Brilhante Simões *et al.* (2025b) indicated that scientific attention should be directed towards the systematic classification and generalisation of histological variants in relation to survival prognosis. The results obtained confirmed the practical importance of this approach, as it was precisely the morphological verification of the degree of differentiation (G1-G2) that allowed the prognosis to be refined in more than half of the patients. This indicates the universality of the pharmacological response across species, even with different dosing regimens.

Based on the results obtained, it is possible to compare the clinical and morphological characteristics of oral cavity tumours in cats and dogs with current international trends, and to confirm the conclusion reached by S. Ahn & J.H. Yun (2026) that the generalisation of malignant tumour models in animals contributes

to a deeper understanding of the similarities in oncogenesis between species. In this sense, the study of squamous cell carcinomas in cats and dogs has not only veterinary but also comparative medical significance, as it models the behaviour of similar tumours in humans.

Thus, the study results are consistent with most contemporary international research and confirm the relevance of a comprehensive approach to the diagnosis and treatment of malignant neoplasms of the oral cavity in small animals. The approach used for the diagnosis and treatment of tumours has demonstrated the importance of morphological verification, anatomical localisation, the age factor, and the use of targeted drugs as key components in predicting the survival of animals with squamous cell carcinomas. The results obtained are generally consistent with studies demonstrating the predominance of squamous cell carcinoma in cats, aggressive local growth, and limited possibilities for radical treatment in advanced stages. At the same time, a distinctive feature of this study is its focus on clinical practice within the context of local veterinary medicine, which allows for an assessment of the realistic possibilities for diagnosis and treatment. The results obtained have made it possible to confirm that oral cavity tumours in small companion animals are one of the most pressing issues in clinical veterinary oncology.

### **Conclusions**

The study analysed 43 clinical cases and examined pathological processes in companion animals, establishing that neoplasms of the oral cavity in dogs and cats were characterised by a high prevalence of malignant forms, with squamous cell carcinoma being the most common (in 86% of the animals studied). In the study sample, the majority of animals belonged to the older age group: the vast majority of patients belonged to the geriatric group (over 10 years

old). At the same time, there was a significant numerical predominance of cats among the affected animals (86% of the total sample). The course of squamous cell carcinoma was characterised by a high degree of aggressiveness. The main complicating factor was tumour invasion into bone tissue (in 68% of the cats examined, tumour growth into the jaw was recorded), which was accompanied by bone destruction and significantly complicated treatment and worsened the prognosis of the disease. Metastasis to the lymph nodes or lungs was detected in 15% of animals at the stage of tumour disintegration. Due to the advanced stage of the disease, the tumours were inoperable in 43% of cases (16 cats and 3 dogs). The main clinical manifestations of the pathological process were the formation of tumour masses, the presence of ulcerative lesions of soft tissues, halitosis, bone destruction and impaired oral cavity function. These features significantly worsened the prognosis and complicated further therapeutic measures. It has been demonstrated that a comprehensive approach is essential for accurate diagnosis, combining the collection of medical history, a general clinical examination of the animals with a thorough examination of the patients' oral cavity, imaging techniques, and histopathological studies, all of which are necessary for accurate diagnosis and the determination of treatment strategies. It has been shown that the choice of treatment strategy depends on the tumour's location and the extent of its spread. In cases of localised neoplasms, surgical treatment was effective, whereas in cases of advanced disease, palliative or targeted therapy was used. Prospects for further research relate to the study of the efficacy of the latest treatment methods, in particular targeted and immunotherapy.

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**Conflict of Interest**

None.

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## Новоутворення ротової порожнини у тварин-компаньйонів: клінічні особливості та підходи до діагностики і лікування

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**Анотація.** Актуальність дослідження зумовлена високою поширеністю новоутворень ротової порожнини у тварин-компаньйонів, складністю їх ранньої діагностики та обмеженими можливостями ефективного лікування на пізніх стадіях захворювання. У зв'язку з цим, представлений науковий матеріал присвячений визначенню клінічних і морфологічних особливостей новоутворень ротової порожнини у собак і котів, а також встановленню ефективності сучасних підходів у їх діагностиці та лікувальній тактиці. Провідним методом дослідження слугував клініко-діагностичний аналіз, що включав узагальнення результатів клінічного обстеження, візуалізаційних та морфологічних досліджень. У ході дослідження проаналізовано 43 клінічні випадки новоутворень ротової порожнини у тварин-компаньйонів, серед яких переважали коти старшої вікової групи. Зазначено, що у 86 % випадків діагностовано плоскоклітинний рак, який характеризувався агресивним перебігом та інвазією у кісткову тканину. Встановлено, що найчастіше (у 59,5 % випадків) пухлини локалізувалися у верхній та нижній щелепі, під'язиковій ділянці та язика. Пухлинні процеси у собак, серед яких діагностовано не лише злоякісні новоутворення,

такі як плоскоклітинна сарком (68,8 %), а й доброякісні (16,6 %), реєстрували у дорослому віці. Обґрунтовано, що клінічні прояви включали утворення пухлинних мас, виразкові ураження, деструкцію кісткової тканини та порушення функцій ротової порожнини. З'ясовано, що ефективність діагностики значною мірою залежала від застосування комплексного підходу, який включав клінічне обстеження, методи візуалізації та гістологічну верифікацію діагнозу. Встановлено, що вибір лікувальної тактики визначався локалізацією та ступенем поширення пухлинного процесу і може включати хірургічне втручання, таргетну або паліативну терапію. Матеріали статті становлять практичну цінність для лікарів ветеринарної медицини, оскільки сприяють підвищенню ефективності діагностики та лікування новоутворень ротової порожнини у тварин-компаньйонів

**Ключові слова:** коти; собаки; ветеринарна онкологія; інвазія кістки; верхня та нижня щелепи; під'язикова ділянка; язик