

# Clinical Study of Canine Soft Tissue Tumours

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## ABSTRACT

The study was conducted over a 14-months period (April 2024 to May 2025) on a total of 6,742 canine cases with various clinical conditions reported to the Veterinary Clinical Complex of the College in Junagadh (Gujarat, India). Of these, 1,984 cases (29.43%) were diagnosed with different types of surgical affections, of which 40 dogs (2.02%) were recorded with soft tissue tumours. The highest incidence of soft tissue tumours was observed in dogs aged between 4 and 8 years (52.5%). Among the tumour types, mammary gland tumours were the most prevalent (40%), followed by cutaneous tumours (35%), abdominal tumours (12.5%), perineal tumours (7.5%), epulis (2.5%) and warts (2.5%). Breed-wise, the highest incidence was recorded in German Shepherd dogs compared to other breeds. Of the 40 dogs diagnosed with soft tissue tumours, 12 were males (30%) and 28 were females (70%).

**Key words:** Age groups, Dogs, German Shepherd, Mammary gland tumours, Soft tissue tumours

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## INTRODUCTION

Cancer is defined as an abnormal new growth of cells characterized by uncontrolled and continuous proliferation. These cells closely resemble the normal cells from which they originate, lack orderly structural organization, serve no useful physiological function, and have no clearly understood cause (Rao, 2001). The development of tumours is influenced by several factors, broadly categorized into extrinsic and intrinsic influences. Extrinsic factors include exposure to ionizing and ultraviolet radiation, chemical carcinogens, and viral infections, whereas intrinsic factors comprise genetic alterations, hormonal influences, and age. An initiating agent induces permanent changes or defects in the genome or DNA of the target cell. Tumour-promoting agents cause reversible cellular damage, primarily by enhancing the proliferation of initiated cells. Progression agents, however, induce major genomic alterations that are generally irreversible, ultimately leading to malignant transformation (Kuntz, 2003). The present study was undertaken to evaluate the incidence of soft tissue tumours in dogs and to assess the influence of major clinico-epidemiological factors on their occurrence.

## MATERIALS AND METHODS

The present study was conducted on canine patients presented to the Veterinary Clinical Complex, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Junagadh (Gujarat, India), with a history and clinical signs suggestive of soft tissue tumours over a 14-month period from April 2024 to May 2025. Data pertaining to the incidence of soft tissue tumours in dogs, including age-wise, sex-wise, breed-wise distribution and

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anatomical site of tumour occurrence, were systematically recorded and analyzed.

## RESULTS AND DISCUSSION

During the 14-months period, a total of 6,742 canine patients were registered at the Veterinary Clinical Complex of the College, Junagadh. Of these, 1,984 cases (29.43%) were affected by various surgical ailments, among which 40 cases (2.02%) were diagnosed as soft tissue tumours. Clinico-epidemiological studies of soft tissue tumours in dogs are valuable for optimizing treatment strategies, as they aid in identifying risk factors and assessing prognosis.

**Age-wise Incidence:** During the present study, the highest incidence of soft tissue tumours in dogs was recorded in the age group of 4-8 years (52.5%, 21/40), followed by 9-12 years (37.5%, 15/40), more than 13 years (7.5%, 3/40), and less than 3 years (2.5%, 1/40). The increased incidence observed in the later stages of life may be attributed to the accumulation of genetic damage over time, which leads to diminished immune

function, as well as the prolonged latent period between malignant transformation of a single cell and the development of a clinically detectable neoplasm (Sharma, 2019).

The age-wise distribution of soft tissue tumours observed in the present study is consistent with the findings of Kumar *et al.* (2018). The lowest incidence was recorded in dogs younger than 3 years of age, which is in agreement with the observations of Umeshwori *et al.* (2011). These findings indicate that soft tissue tumours occur more frequently in older dogs, suggesting that ageing tissues are more susceptible to neoplastic transformation than juvenile tissues.

**Sex-wise Incidence:** Out of the 40 cases evaluated, the incidence of soft tissue tumours was higher in female dogs (70%, 28/40) compared to male dogs (30%, 12/40). Similar findings have been reported by Roshini *et al.* (2013) and Hussain *et al.* (2020). The higher incidence observed in female dogs may be attributed to hormonal influences, as evidenced by the detection of estrogen and progesterone receptors in neoplastic tissues.

**Breed-wise Incidence:** The breed-wise incidence of canine mammary tumours is presented in Table 1. The highest occurrence of soft tissue tumours was observed in German Shepherds (32.5%), followed by Labrador Retrievers (25%), Spitz (12.5%), non-descript breeds (12.5%), mixed breeds (7.5%), Rottweilers (5%), Great Danes (2.5%), and Dalmatians (2.5%). Similarly, Rokad *et al.* (2024) reported the maximum cases of canine mammary tumours in German Shepherds, followed by Labrador Retrievers, non-descript breeds, and Lhasa Apso. Arya *et al.* (2018) suggested that breed predisposition may also reflect the popularity of certain breeds in specific regions, as pet owners often show distinct preferences for particular breeds, which may contribute to the observed diversity in breed susceptibility to canine cancers.

**Table 1:** Breed-wise distribution of cases showing soft tissue tumours in dogs

S.No.	Breeds	No.	Percentage
1	German Shepherd	13	32.5
2	Labrador Retriever	10	25.0
3	Non-Descript	5	12.5
4	Pomeranian	5	12.5
5	Mixed	3	7.5
6	Rottweiler	2	5.0
7	Great Dane	1	2.5
8	Dalmatian	1	2.5
<b>Total</b>		<b>40</b>	<b>100.0</b>

**Site of Tumour:** The site-wise distribution of soft tissue tumours among the 40 affected cases is presented in Table 2. Mammary gland tumours were the most common, accounting for 16 cases (40%), followed by cutaneous tumours in 14 cases (35%), abdominal tumours in 5 cases (12.5%), perineal tumours in 3 cases (7.5%), and epulis and wart, each in 1 case (2.5%) (Fig. 1). These findings are consistent with earlier reports on tumour location by Roshini *et al.* (2013).

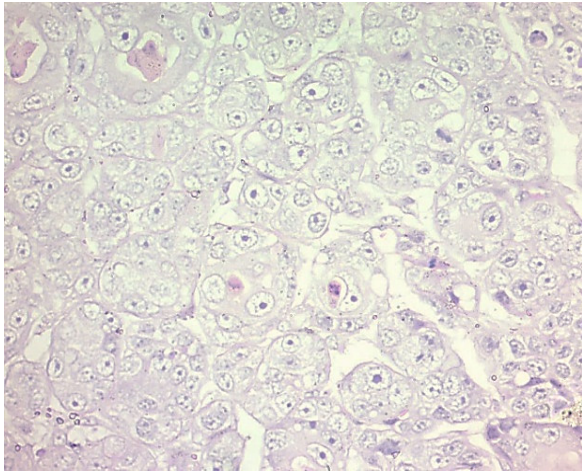
**Table 2:** Various types of soft tissue tumours in dogs observed during study period

S.No.	Types of tumour	No.	Percentage
1	Mammary gland tumour	16	40
2	Cutaneous tumour	14	35
3	Abdominal tumour	5	12.5
4	Perineal tumour	3	7.5
5	Epulis	1	2.5
6	Wart	1	2.5

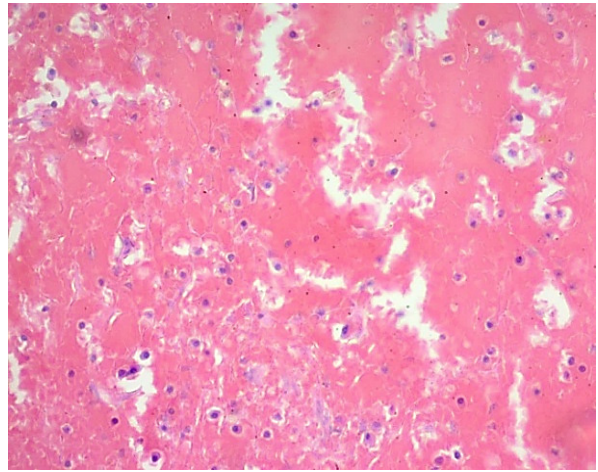
Histopathological examination of the 40 soft tissue tumours revealed 24 (60%) benign and 16 (40%) malignant



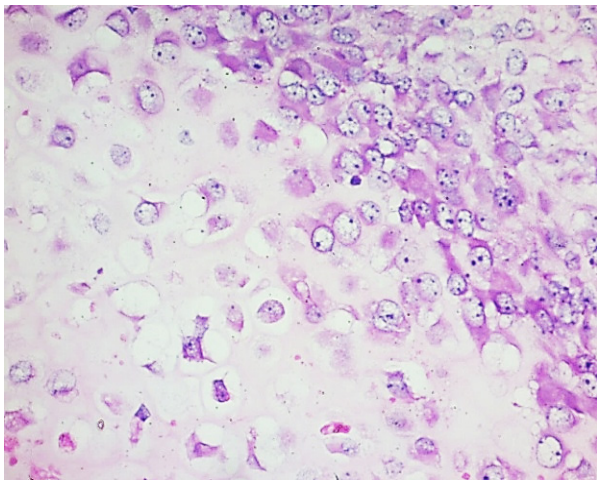
**Fig. 1:** Canine soft tissue tumours on thigh, base of the ear, tail and mammary gland.



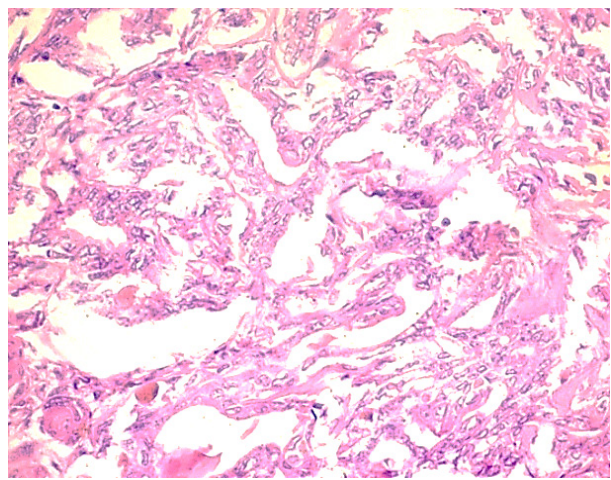
**Fig. 2:** Section from adenoma showing cells of uniform size arranged in adenoid pattern containing moderate amount of cytoplasm (H & E × 400X)



**Fig. 3:** Section from plasmacytoma showing eosinophilic amyloid compound with cartwheel shape nucleus in cells (H & E × 400X)



**Fig. 4:** Section from adeno-osteoma showing osseous metaplasia (H & E × 400X)



**Fig. 5:** Fibrosarcoma – herringbone pattern of fibroblasts with wavy nucleus (H & E × 400X)

cases. Among the benign tumours, the types identified were fibroma (6 cases), fibroadenoma (3 cases), adenoma (2 cases, Fig. 2), adenochondroma (2 cases), hepatoid gland adenoma (2 cases), hemangioma (2 cases), trichoblastoma (1 case), myxoma (1 case), lymphoma (1 case), plasmacytoma (1 case, Fig. 3), histiocytoma (1 case), and adeno-osteoma (1 case, Fig. 4). The malignant tumours included tubular carcinoma (4 cases), fibrosarcoma (3 cases Fig. 5), ductal carcinoma (2 cases), adenocarcinoma (2 cases), squamous cell carcinoma (2 cases), myxosarcoma (1 case), mast cell tumour (1 case), and basal cell carcinoma (1 case).

Immunohistochemical (IHC) analysis was performed on the malignant tumours using markers including PCNA, Ki-67, pancytokeratin, vimentin, and desmin to confirm malignancy. The IHC results corroborated the histopathological findings, confirming all 16 malignant cases and 24 benign tumours.

The study concluded that dogs aged between 4 to 8 years were most commonly affected by soft tissue tumours. Among the different breeds, German Shepherds exhibited the highest susceptibility in the Junagadh region. Furthermore, mammary gland tumours were the most prevalent type among all soft tissue tumours identified during the study period.

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