

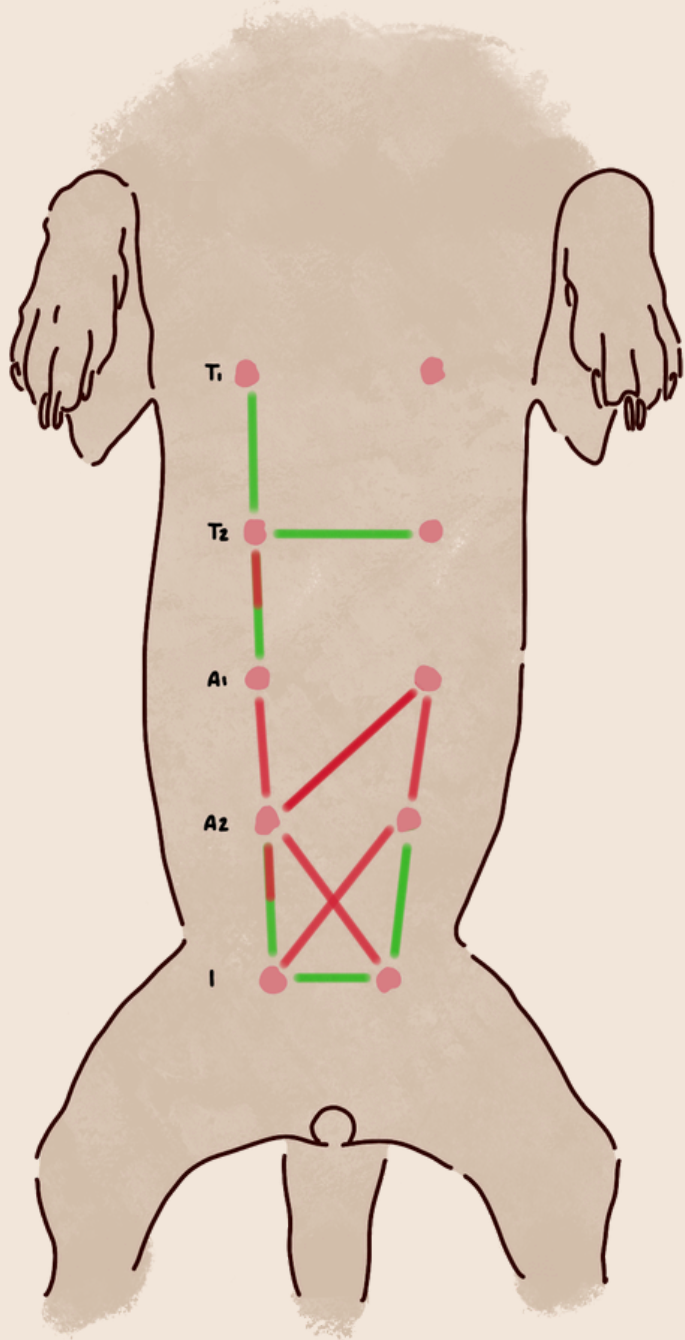
# ANALYSIS OF THE EFFECTS OF SPAYING ON THE OCCURRENCE OF MAMMARY TUMOURS IN FEMALE DOGS

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## 1. INTRODUCTION AND OBJECTIVES



Canine mammary tumours (CMT) are the most frequent neoplasias in intact female dogs, representing 40% of the total tumours detected in females.

The influence of spaying as a factor to prevent or avoid the development of CMT has been a topic of extensive debate in recent years.

It is a multifactorial process; therefore, factors such as age, breed, exposure to sex hormones and obesity can contribute to the malignancy of the tumour.

Therefore, it is considered that a mammary tumour can form new channels, thereby altering the lymphatic drainage pattern and causing metastasis more rapidly.

**Figure 1.** Schematic drawing of the lymphatic drainage of the mammary glands in healthy female dogs compared to neoplastic mammary glands and the resulting anastomoses.

## 2. MATERIAL AND METHODS

All the articles have been extracted from scientific sources or search engines such as PubMed. For document searches, keywords like “canine mammary tumour” were used, yielding 970 results from articles published in the last 10 years. Given the abundance of content, efforts were made to narrow down the search with concepts like “canine mammary tumour AND spaying,” which returned 33 results, or “canine mammary tumour AND neutering” with 25 results, among others.

## 3. RESULTS AND DISCUSSION

A total of 16 articles were evaluated, of which only 3 assert that spaying reduces the occurrence of CMT. The vast majority (13/16) state that the effect is unclear, emphasising the variability depending on the age at which this practice is performed.

**Table 1.** Reproductive status and CMT malignancy.

Duration of ovary exposure (years)	Dogs with mammary carcinoma (n)	Dogs without mammary carcinoma (n)	Total dog-years
Total cohort	19	223	2272
Category			
<2.5	0	79	714
2.5-4.9	4	50	487
5.0-7.4	8	57	618
≥7.5	7	37	453

Note: Modified from the article *Ovariectomy reduces the risk of tumour development and influences the histologic continuum in canine mammary tumours* (Gedon et al., 2021).

**Table 2.** Lifetime exposure of ovaries and risk of mammary carcinoma in 242 female Rottweilers.

Reproductive status	Benign CMT		Malignant CMT	
	n	%	n	%
Intact	778	62.8	461	37.2
Neutered	101	45.9	119	54.1
Total	879		580	

Note: Modified from the article *Life course analysis of the impact of mammary cancer and pyometra on age-anchored life expectancy in female Rottweilers* (Waters et al., 2017).

## 4. CONCLUSIONS

Although it is known that ovarian hormones have an effect on the occurrence of mammary tumours in female dogs, studies do not allow for a conclusive determination of their specific effect or the benefit of early spaying, making further studies necessary.