



## Epidemiological findings of ocular dermoid in dogs and cats: 50 cases (2007-2024)<sup>1</sup>

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**ABSTRACT.-** Pigatto J.A.T., Carginin L.S., Melo A.P., Rocha R.S., Franceschini M.E.M., Méndez N.P., Seibel M.P., Martins M.A., Silva A.F. & Sonne L. 2025. **Epidemiological findings of ocular dermoid in dogs and cats: 50 cases (2007-2024).** *Pesquisa Veterinária Brasileira* 45:e07509, 2025. Serviço de Oftalmologia Veterinária, Faculdade de Veterinária, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves 9090, Porto Alegre, RS 91540-000, Brazil. E-mail: [pigatto@ufrgs.br](mailto:pigatto@ufrgs.br)

A dermoid is a tissue that resembles normal skin in a non-typical anatomical region. Dermoids can be found in various organs and affect ocular structures in the growth of normal tissue in a non-typical anatomical region. The aim of this study was to describe clinical signs, location, histopathologic findings and breed, age, and sex profile of dogs and cats diagnosed with ocular dermoids in the specialized Veterinary Ophthalmology Service of the Federal University of Rio Grande do Sul. Medical records of dogs and cats diagnosed with ocular dermoids from January 2007 to January 2024 were evaluated. Data regarding age, breed, gender, the affected eye and the location of the dermoid were recorded. In total, 53 eyes of 49 dogs affected with dermoid were included in the study. Of these dogs, 29 (59.18%) were male and 20 (40.82%) were female. Of the total number of dermoids diagnosed, 18 (33.96%) were located in the limbal region, 11 (20.75%) in the corneal region, 11 (20.75%) in the eyelid region, five (9.43%) in the bulbar conjunctiva region, five (9.43%) in the conjunctival and palpebral regions, two (3.77%) in the third eyelid and one (1.89%) in the limbal and corneal regions. The average age of the patients at the time of dermoid diagnosis was 1.17 years. In total, 12 dog breeds were represented, including Shih-Tzu, Labrador, Dachshund, French Bulldog, Pug, Rottweiler, English Cocker Spaniel, Doberman, Fila Brasileiro, Lhasa Apso, German Shepherd and Malinois Shepherd. Furthermore, 15 dogs were of mixed breed. A 4-month-old male mixed-breed cat was diagnosed with a dermoid on the bulbar conjunctiva. It is possible to conclude that ocular dermoids most frequently affect young, mixed-breed dogs and Shih Tzus. They occur mainly unilaterally and especially affect the limbal regions of the cornea and the eyelids. Although rare, ocular dermoids can be diagnosed in cats.

INDEX TERMS: Choristoma, small animal, congenital disease, ocular.

**RESUMO.- [Achados epidemiológicos de dermoides oculares em cães e gatos: 50 casos (2007-2024).]** Dermoide é um tecido que se assemelha à pele normal em uma região

anatômica não típica. Os dermoides podem ser encontrados em vários órgãos e também afetar estruturas oculares. O objetivo deste estudo foi descrever sinais clínicos, localização, achados histopatológicos e perfil racial, etário e sexual de cães e gatos diagnosticados com dermoides oculares no Serviço de Oftalmologia Veterinária da Universidade Federal do Rio Grande do Sul. Os prontuários de cães e gatos diagnosticados com dermoides oculares de janeiro de 2007 a janeiro de 2024 foram avaliados. Dados como idade, raça, sexo, olho afetado e localização do dermoide foram registrados. No total, 53 olhos de 49 cães afetados por dermoides foram incluídos no estudo. Destes cães, 29 (59,18%) eram machos

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e 20 (40,82%) eram fêmeas. Do número total de dermóides diagnosticados, 18 (33,96%) estavam localizados na região limbal, 11 (20,75%) na região corneana, 11 (20,75%) na região da pálpebra, cinco (9,43%) na região da conjuntiva bulbar, cinco (9,43%) nas regiões conjuntival e palpebral, dois (3,77%) na terceira pálpebra e um (1,89%) nas regiões limbal e corneana. A idade média dos pacientes no momento do diagnóstico do dermoide foi de 1,17 anos. No total, 12 raças de cães estavam representadas, incluindo Shih-Tzu, Labrador, Dachshund, Buldogue Francês, Pug, Rottweiler, Cocker Spaniel Inglês, Doberman, Fila Brasileiro, Lhasa Apso, Pastor Alemão e Pastor de Malinois. Além disso, 15 cães eram de raça mista. Um gato macho de raça mista com quatro meses de idade foi diagnosticado com um dermoide na conjuntiva bulbar. Foi possível concluir que os dermóides oculares afetam mais frequentemente cães jovens sem raça definida e da raça Shih Tzu. Dermóides ocorrem principalmente de maneira unilateral e afetaram principalmente as regiões limbares da córnea e das pálpebras. Embora raros, os dermóides oculares podem ser diagnosticados em gatos.

TERMOS DE INDEXAÇÃO: Coristoma, pequenos animais, doença congênita, ocular.

## INTRODUCTION

Dermoids represent congenital choristomas characterized by the growth of normal tissue in a non-typical anatomical region (Balland et al. 2015). Ocular dermoids have been described in humans (Gonzales et al. 2013, Zhong et al. 2018) and animals, including dogs (Erdikmen et al. 2013), cats (Narfström 1999), cattle (Silva et al. 2021), horses (Joyce et al. 1990), rabbits (Wagner et al. 2000), guinea pigs (Wappler et al. 2002) and birds (Leber & Burge 1999), among others. Dermoids can affect any structure of the body, including the ocular region (Badanes & Ledbetter 2019). Cases of dermoids located on the eyelids, the third eyelid, the cornea, the conjunctiva and the limbus have been described (Maggs 2008). Ocular dermoids can have a uni- or bilateral presentation (Badanes & Ledbetter 2019).

The definitive diagnosis of dermoids is made after biopsy and histopathological examination (Balland et al. 2015). The dog breeds most predisposed to ocular dermoids are the Basset Hound, Dachshund, Dalmatian, Doberman, German Shepherd, Golden Retriever, Saint Bernard and Welsh Corgi (Badanes & Ledbetter 2019). In cats, the breed most affected by this condition is the Birman (Narfström 1999). Because dermoids are developmental anomalies present at birth, they are seen more frequently in young patients (Badanes & Ledbetter 2019). Retrospective studies have contributed to determining the frequency of diseases and characterizing the breed, age and sex profile of these patients. Despite the importance and occurrence of ocular dermoids, there were no retrospective studies on this topic for Brazil when searching the literature. Thus, the objective of the present study was to characterize the population of dogs and cats diagnosed with ocular dermoids in the “Serviço de Oftalmologia Veterinária” (specialized Veterinary Ophthalmology Service – SOV) at the “Universidade Federal do Rio Grande do Sul” (UFRGS).

## MATERIALS AND METHODS

**Ethical approval.** In this study, we did not perform any animal experiments. All data were obtained from the files of the “Serviço de Oftalmologia Veterinária” (Veterinary Ophthalmology Service - SOV) at “Universidade Federal do Rio Grande do Sul” (UFRGS) and the “Setor de Patologia Veterinária” (Veterinary Pathology Sector - SPV) at UFRGS.

The medical records of dogs and cats diagnosed from January 2007 to January 2024 with ocular dermoids in the specialized SOV-UFRGS were examined. During the period, 8,643 dogs and 890 cats underwent eye examinations. The breed, age and gender of the patients were collected, and the dermoid location was analyzed. All patients underwent an ophthalmic examination, which included a Schirmer tear test (Ophthalmos, São Paulo, Brazil), biomicroscopy with a portable slit lamp (Kowa SL-15, Nagoya, Japan), a fluorescein test (Allergan, São Paulo, Brazil) and tonometry (Tonovet, Tiolat, Finland), among others. Samples were collected through an excisional biopsy and stored in 10% formaldehyde to confirm the dermoid diagnosis. They were subsequently sent to the SPV-UFRGS for histopathological analysis.

Statistical analysis was carried out by considering five variables: breed, age, sex, dermoid location, and the affected eye. For categorical variables, absolute frequencies were calculated along with the percentage corresponding to the total for each group. For categorical variables, absolute frequencies were calculated along with the percentage corresponding to the total for each group. Soon after, *p*-values were calculated using the Chi-square adherence test to evaluate the proportions between the frequencies of the categories. For the quantitative analysis of the age variable, the mean of a confidence interval was estimated from a Bootstrap analysis.

## RESULTS

During the analysis period, 49 dogs and one cat were diagnosed with ocular dermoids. Forty-five (91.84%) dogs had a unilateral presentation of the disease, while four (8.16%) had a bilateral presentation, representing a statistically significant difference between the two groups ( $p < 0.05$ ). For the dogs, 29 (59.18%) were male and 20 (40.82%) were female. In relation to the gender of dogs diagnosed with ocular dermoids, there was no statistically significant difference. The age at diagnosis ranged from two months to 14 years, with an average of 1.17 years. Considering unilateral cases, 23 dermoids affected the right eye and 22 dermoids affected the left eye. Of the 53 dog ocular dermoids, 18 (33.96%) were located in the limbal region, 11 (20.75%) were in the corneal region, 11 (20.75%) were in the palpebral region, five (9.43%) were in the bulbar conjunctiva region, five (9.43%) were in the conjunctival and palpebral regions, two (3.77%) were on the third eyelid and one (1.89%) was in the limbal and corneal regions (Table 1). There was no statistically significant difference between the regions ( $p > 0.05$ ). Ocular dermoids were diagnosed in 12 dog breeds, and 15 of the dogs were mixed-breed (Table 2). There was no statistically significant difference between mixed breed, Shih Tzu and all other breeds together ( $p > 0.05$ ). A 4-month-old male mixed-breed cat was diagnosed with a dermoid on the bulbar conjunctiva. In addition to dermoids, ocular clinical signs were observed. Dogs with limbal (18 eyes), corneal (11 eyes), and limbal and corneal dermoids (1 eye) presented epiphora (10 eyes), conjunctival hyperemia (11 eyes), corneal vascularization (9 eyes), blepharospasm

(12 eyes), and corneal pigmentation (16 eyes). When the dermoid was located in the eyelids (11 eyes), epiphora (2 eyes), corneal vascularization (2 eyes), blepharospasm (2 eyes), and corneal pigmentation (2 eyes) were presented. Dogs with bulbar conjunctival (5 eyes), conjunctival and palpebral (5 eyes), and third eyelid (2 eyes) dermoids presented the following: epiphora (4 eyes), corneal pigmentation (2 eyes), conjunctival hyperemia (4 eyes), blepharospasm (4 eyes), and corneal vascularization (4 eyes). Cat with conjunctival dermoid (1 eye) presented epiphora, conjunctival hyperemia, and blepharospasm. Macroscopically, regardless of the affected ocular region, all dermoids presented as protruding tissue with hair (Fig.1-2). The biopsy samples were subjected to routine hematoxylin and eosin (HE) staining and then examined with a light microscope (Fig.3). Histologically, examined dermoids included stratified squamous epithelium, normal dermis and epidermis, hairy and fibrous skin connective tissue. The tissues resembled normal skin and contained hair follicles, adipose tissue, fibrous tissue, sweat and sebaceous glands, and smooth muscle.

## DISCUSSION

A dermoid is a tissue resembling normal skin in an anatomical region that is not typical (Maggs 2008). Despite the clinical relevance of this condition, this seems to be the first retrospective study carried out in Brazil to characterize the population of dogs and cats diagnosed with ocular dermoids. Compared with dogs, ocular dermoids are even rarer in cats (Cathelin et

**Table 1. Frequency and anatomical location of the ocular dermoids diagnosed in dogs from January 2007 to January 2024**

Location	N	%
Limbal	18	33.96%
Corneal	11	20.75%
Palpebral	11	20.75%
Bulbar conjunctiva	5	9.43%
Conjunctival and palpebral	5	9.43%
Third eyelid	2	3.77%
Limbal and corneal	1	1.98%

**Table 2. List of dog breeds diagnosed with ocular dermoids from January 2007 to January 2024**

Race	N	%
Mixed breed	15	30.61%
Shih Tzu	13	26.53%
Labrador	5	10.20%
Dachshund	5	10.20%
French Bulldog	2	4.08%
Pug	2	4.08%
English Cocker Spaniel	1	2.04%
Doberman	1	2.04%
Fila Brasileiro	1	2.04%
Lhasa Apso	1	2.04%
German Shepherd	1	2.04%
Rottweiler	1	2.04%
Malinois Shepherd	1	2.04%



Fig.1. Limbal dermoid in a dog. Corneal neovascularization, fibrosis and opacity are also present. 85 x 58 mm (600 x 600 DPI).

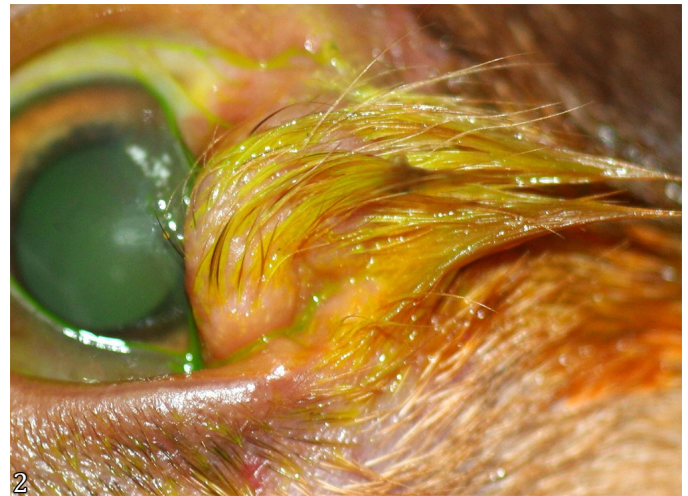


Fig.2. Dermoid in the bulbar conjunctiva and eyelid of a dog. 65 x 47 mm (600 x 600 DPI).

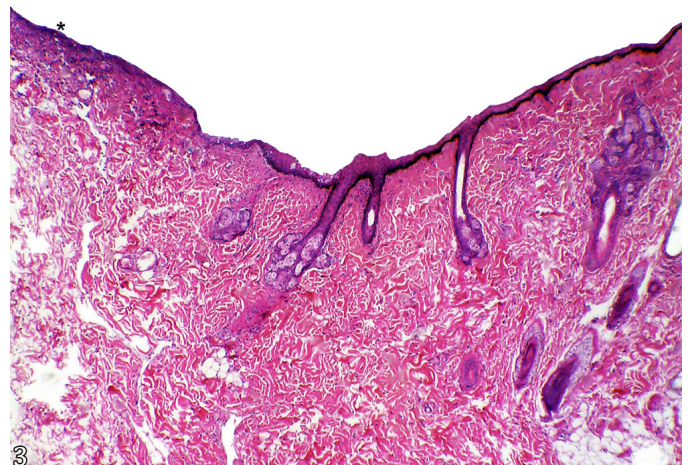


Fig.3. Dermoid in a dog and the transition to the conjunctival epithelium (asterisk). HE, obj.10x. 127 x 95 mm (300 x 300 DPI).

al. 2022). In a retrospective study, the authors analyzed 123 cases of congenital ocular malformations in dogs and cats; 16 dogs and no cats were diagnosed with ocular dermoids (Saraiva & Delgado 2020). In the present study, 49 dogs and one cat were diagnosed with ocular dermoids. There are few published case reports of ocular dermoids in cats (LoPinto et al. 2016), and a multicentre retrospective study was carried out in France (Cathelin et al. 2022). Dermoids in cats were mainly located in the temporal limbus (Cathelin et al. 2022) and more rarely in the dorsal cornea (LoPinto et al. 2016). In the present study, the ocular dermoid diagnosed in a cat was located in the bulbar conjunctiva. In a multicentre retrospective study carried out in France, which included five private veterinary ophthalmology clinics and a veterinary faculty, out of a total of 6,006 cats diagnosed with ocular diseases, 13 had an ocular dermoid. The authors concluded that for every 462 cats seen with ocular disease, one patient was diagnosed with ocular dermoid (Cathelin et al. 2022). In the present study, 89.7% of patients diagnosed with eye diseases were dogs, and 10.3% were cats. This may also have contributed to a large number of ocular dermoids being diagnosed in dogs. In cats, the Burmese breed has been described as having a predisposition to develop dermoids (Narfström 1999). In the present study, the cat diagnosed with dermoid was mixed-breed. Ocular dermoids have been reported in several dog breeds including the Yorkshire Terrier (Badanes & Ledbetter 2019), German Shepherd (Abu-Seida 2014, Bodh et al. 2015), Neapolitan Mastiff (Bodh et al. 2015), Rottweiler (Erdikmen et al. 2013, Bodh et al. 2015), Labrador (Brudenall et al. 2007, Saxena et al. 2013), Shih Tzu (Lee et al. 2005, Badanes & Ledbetter 2019), French Bulldog (Lee et al. 2005, Badanes & Ledbetter 2019), Doberman (Erdikmen et al. 2013, Abu-Seida 2014), Pug (Badanes & Ledbetter 2019) and Golden Retriever (Abu-Seida 2014). Researchers have indicated that the Dachshund, German Shepherd, Saint Bernard and Dalmatian dog breeds are the most predisposed to ocular dermoids (Maggs 2008). In the present study, ocular dermoids were diagnosed in 12 different dog breeds and mixed-breed dogs. Mixed-breed dogs and Shih Tzus were identified as the main affected. In a study at the University of Pennsylvania in the United States, 22 dog breeds were diagnosed with dermoids, including mixed-breed dogs (Badanes & Ledbetter 2019). Two other studies showed that the majority of the diagnosed dogs with ocular dermoids were German Shepherds (Erdikmen et al. 2013, Abu-Seida 2014). In cats, dermoids have been diagnosed in the domestic short-haired, Birman and Avana breeds, among others (LoPinto et al. 2016, Cathelin et al. 2022). In the present study, mixed breed dogs and Shi Tzus were highly represented, probably because they were frequently taken for veterinary care at the hospital where the study was carried out. Because a dermoid is a developmental anomaly present at birth, it is usually diagnosed more frequently in young animals (Badanes & Ledbetter 2019, Cathelin et al. 2022). In the present study, ocular dermoids were diagnosed mainly in young dogs (93.88% under 2 years of age). Similar data has been presented in the literature (Erdikmen et al. 2013, Abu-Seida 2014). In a recent retrospective study that included 44 dogs with ocular dermoid, 35 were less than one year old at the time of the diagnosis (Badanes & Ledbetter 2019). In a retrospective study involving cats, the average age at the time of diagnosis was five months (Cathelin et

al. 2022). In the present study, the cat was four months old when diagnosed with a conjunctival dermoid. Although dermoids are present at birth, they are usually only noticed by animal owners when the dermoids cause complications (Badanes & Ledbetter 2019). For this reason, in the present study, dermoid was diagnosed in older animals in some cases. There is no consensus in the literature regarding the sex of patients affected by ocular dermoids. In a study involving ocular dermoids in dogs, 77% of the patients were female (Erdikmen et al. 2013). Another study reported that 63.6% of the canine patients affected by ocular dermoids were males (Badanes & Ledbetter 2019). In the present study, 59.18% of dogs diagnosed with ocular dermoids were male. This finding is similar to previous studies (Abu-Seida 2014, Badanes & Ledbetter 2019). Due to the small number of reported cases in cats, there are no studies regarding sex predisposition to ocular dermoids.

In dogs, the majority of ocular dermoids affect a single eye (Erdikmen et al. 2013, Abu-Seida 2014, Badanes & Ledbetter 2019). In the present study, the majority of dogs with ocular dermoids showed a unilateral presentation. In cattle, bilateral involvement is more common (Barkyoumb & Leipol 1984). All dermoids documented in cats have been unilateral (LoPinto et al. 2016, Cathelin et al. 2022). In the current study, the conjunctival dermoid diagnosed in a cat was unilateral. Dermoids can involve several ocular structures, including the eyelid, the third eyelid and the cornea (Maggs 2008, Badanes & Ledbetter 2019). Furthermore, they can simultaneously affect more than one eye structure (Maggs 2008). In a recent study, 45% of dermoids were diagnosed in the limbal region of dogs (Badanes & Ledbetter 2019). In the present study, the dermoids were divided into seven groups depending on the location, five of which affected only one ocular region (the corneal, bulbar conjunctival, limbal and palpebral regions, and the third eyelid), and two of which affected two regions (the conjunctival and palpebral regions and the limbal and corneal regions). In the present study, the most frequently diagnosed ocular dermoids were in the limbal, corneal and palpebral regions, with no significant difference between these three groups. Ocular dermoids occurred most frequently in the conjunctival (36.8%) and corneoconjunctival (26.3%) regions of dogs (Abu-Seida 2014). Similarly, it was reported that most cases in dogs affected the cornea (Erdikmen et al. 2013). In the present study, there were two dermoids located on the third eyelid. Dermoids located in the third eyelid have only been described in cattle (Silva et al. 2021) and horses (Greenberg et al. 2012, Gornik et al. 2015). Dermoids generally have the characteristics of normal skin, including the epidermis, dermis, glandular tissue, adipose tissue, hair follicles, blood vessels and hair (Saxena et al. 2013, Cathelin et al. 2022). The histopathological findings of the present study are consistent with previous studies (Erdikmen et al. 2013, Gornik et al. 2015, LoPinto et al. 2016).

## CONCLUSION

Ocular dermoids most frequently affect young dogs at the time of diagnosis. The Shih Tzu was the most commonly affected breed. Dermoids were most frequently unilaterally and mainly affected the limbal region and the eyelids. Although rare, ocular dermoids can be diagnosed in cats.

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**Credit author statement.**- João A.T. Pigatto: conceptualization, supervision, writing, and review. Luísa S. Cargnin: conceptualization, methodology, investigation, and writing. Alana P. Melo: methodology, and investigation. Rafaella S. Rocha: methodology, and investigation; Maria E.M. Franceschini: methodology, and investigation; Natália P. Méndez: methodology, and investigation; Maiara P. Seibel: methodology, and investigation; Marina A. Martins: methodology, and investigation; Alessandra F. Silva: methodology, and investigation; Luciana Sonne: conceptualization, supervision, writing, and review.

**Data availability statement.**- The entire dataset supporting the results of this study was published in the article itself.

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