





## OPHTHALMOLOGY

# Diagnosis and Treatment of Eyelid Tumors

*Braidee C. Foote, DVM, DACVO*

*University of Tennessee College of Veterinary Medicine*

Eyelid tumors are commonly diagnosed in geriatric veterinary patients and can lead to secondary ocular complications, local invasion, and/or metastasis. Eyelid tumors can dramatically differ in behavior and treatment strategies between dogs and cats.

The primary roles of the eyelids are to protect the globe, produce glandular secretions from the meibomian glands and conjunctival goblet cells, and distribute tears across the cornea. An irregular eyelid margin secondary to an eyelid tumor can lead to complications that impair these functions. When the examiner first observes an eyelid tumor, the following things should be considered for planning the type and timing of treatment:

- Patient species
- Size of the mass
- Duration of the problem and speed of growth
- Location of the base of the mass (i.e., eyelid margin, dermis, or conjunctiva)
- Ability of the patient to blink fully (to determine need for lubricant to protect the cornea)

- Evidence of local irritation (e.g., ulceration of the dermis, bleeding, conjunctival hyperemia, ocular discharge, corneal vascularization, or corneal ulceration)
- Evidence of metastasis to lymph nodes or elsewhere (indicates need to stage the neoplasia before surgical planning)

## EYELID MASSES IN DOGS

The most common eyelid tumors in dogs are sebaceous (meibomian) adenomas (29% to 37%), sebaceous (meibomian) epitheliomas (17% to 34%), sebaceous (meibomian) hyperplasia (18%), sebaceous (meibomian) adenocarcinomas (5% to 15%), papillomas (2% to 17%), melanocytomas/melanomas (2% to 21%), and histiocytomas (1% to 4%).<sup>1,2</sup> Note that some, but not all, pathologists differentiate sebaceous hyperplasia from sebaceous adenomas.<sup>3</sup> Note also that adenocarcinomas are considered rare, and older data probably misclassified epitheliomas into this category, resulting in increased reporting of adenocarcinomas. Overall, eyelid tumors of dogs

### WATCHFUL EYE

Eyelid tumors are common in dogs but are often benign. On the other hand, eyelid tumors are more rare in cats but are often malignant.



are at least 3 to 8 times more likely to be benign than malignant.<sup>1,4</sup>

Meibomian gland tumors are usually first noticed arising from the eyelid margin because they travel the path of least resistance to the meibomian gland orifice, but they can also erupt through the palpebral conjunctiva (**FIGURE 1**). They commonly have a cobblestone surface and can be pink, tan, gray, or black (**FIGURE 2**).<sup>5</sup> Sebaceous gland tumors can include meibomian gland tumors as well as accessory gland tumors arising from the periocular skin.<sup>3</sup> Papillomas are often distinctive due to their exophytic nature, arising from the eyelid margin (**FIGURE 3**), the adjacent dermis, or the conjunctiva; their origin can be viral or nonviral (squamous).<sup>5,6</sup> Melanocytic tumors of the

eyelid can be divided into 3 distinct types: a pigmented pedunculated mass arising from the dermis, which can be excised without concern for margins and is associated with a low rate of recurrence; a pigmented mass arising from the eyelid margin and expanding in both directions, which is more locally invasive than the dermal version and thus benefits from adjunctive treatment such as cryotherapy; and a pigmented or nonpigmented mass arising from the conjunctiva, which is malignant and requires more aggressive treatment.<sup>4</sup>

A differential diagnosis for an eyelid swelling in a dog is a chalazion caused by blockage of the meibomian gland duct (often but not always caused by a meibomian gland tumor) and inspissation of meibum, sometimes resulting in gland rupture, causing a lipogranuloma (**FIGURE 4**).<sup>7</sup>



**FIGURE 1.** Pigmented meibomian gland tumor of the lower eyelid of a dog, which erupted through the eyelid margin as well as the palpebral conjunctiva.



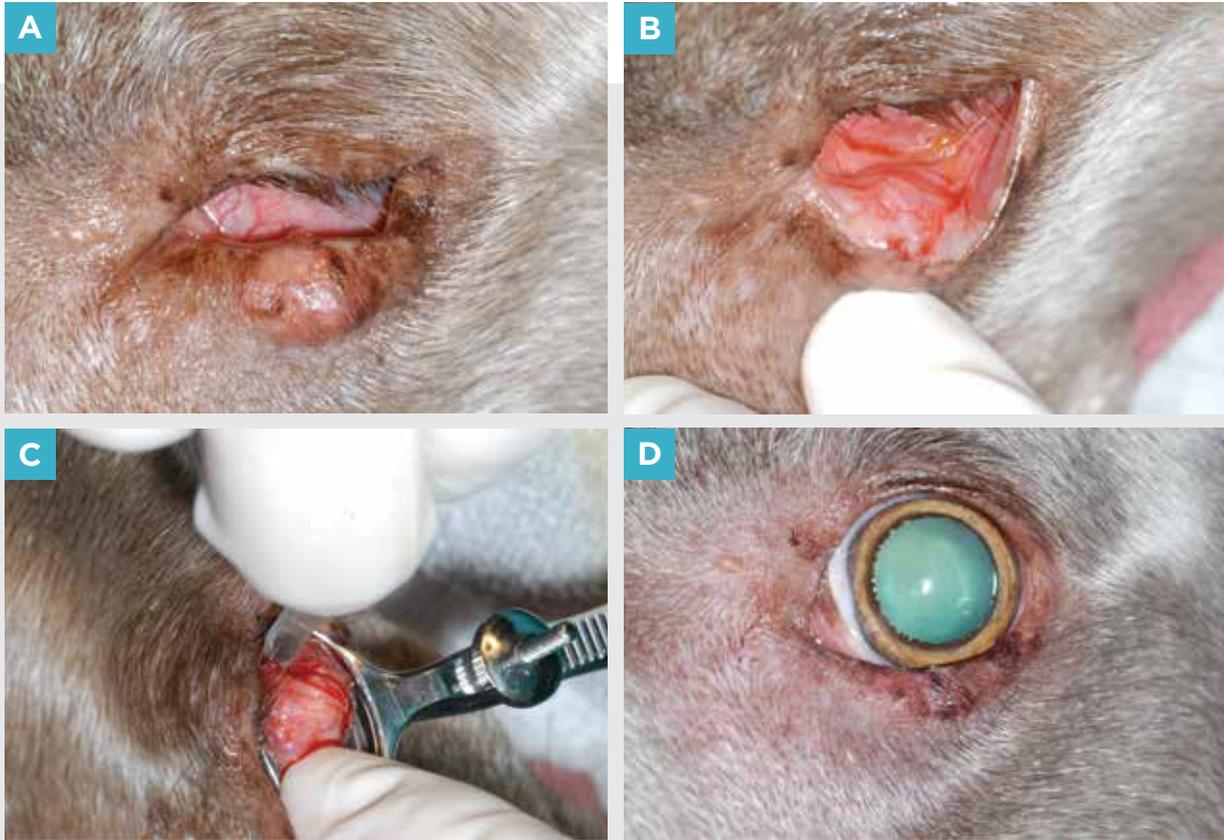
**FIGURE 2.** Gray meibomian gland adenoma with a broad base along the upper eyelid margin of a dog. This mass was a regrowth of the same tumor excised with debulking and cryotherapy 2 years earlier; thus, it was subsequently excised with a pentagonal excision with clean margins.

### EYELID MASSES IN CATS

Up to 91% of eyelid tumors in cats are malignant;<sup>8,9</sup> thus, they require a more urgent diagnostic and treatment plan. The most common eyelid tumors of cats are squamous cell carcinomas (28% to 65%), mastocytomas (3% to 26%), hemangiosarcomas (2% to 14%), lymphomas (7% to 11%), adenocarcinomas (4% to 9%), peripheral nerve sheath tumors (7%), fibrosarcomas (5%), and apocrine hidrocystomas (3% to 7%). *Squamous cell carcinomas* develop secondary to ultraviolet light exposure; they start off as an erythematous region of the eyelid margin, progress to ulceration with a crusted surface (**FIGURE 5**), and then progress further to a deep erosion (**FIGURE 6**). Local invasion can be extensive if



**FIGURE 3.** Papilloma along the lower eyelid margin of a dog, excised with a pentagonal excision with extra care due to the proximity of the nasolacrimal puncta.



**FIGURE 4.** (A) Chalazion characterized by a small meibomian gland tumor and (B) a swelling through the eyelid stroma noted on the dermal surface and under the conjunctiva. After excision of the conjunctiva, a large amount of inspissated meibum was expressed (C), the mass was debulked at the level of the eyelid margin, and the conjunctiva was treated with cryotherapy. (D) Two weeks postoperatively, the eyelid appeared normal.

not addressed early in the disease process, and tumor recurrence is very common.<sup>10</sup> *Mast cell tumors* appear as single, pink, hairless, raised, and sometimes ulcerated masses near the eyelid margin.<sup>11</sup> *Hemangiosarcomas* of the eyelid appear as a red fleshy mass, sometimes with

an ulcerated surface.<sup>12</sup> *Peripheral nerve sheath tumors* are low-grade subcutaneous spindle cell tumors that are locally invasive but unlikely to metastasize.<sup>10</sup> *Apocrine hidrocystomas* appear as black round periocular masses, most common in Persian cats.<sup>10</sup>

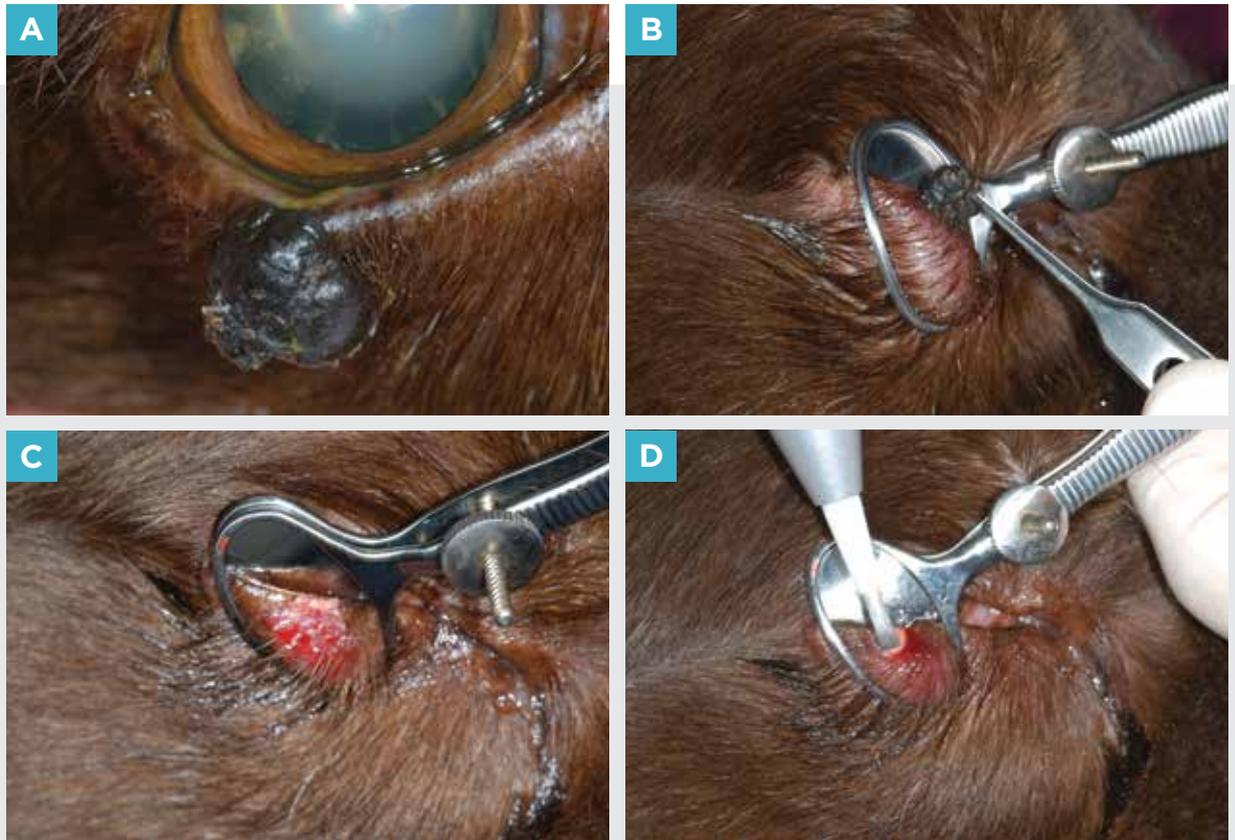
Far right: Courtesy Iowa State University College of Veterinary Medicine



**FIGURE 5.** White-faced cat with ulcerated crusting lesions on the medial and central portions of the lower left eyelid and on the right side of the nose, presumptively diagnosed as squamous cell carcinoma at the time of examination and confirmed with histopathology.



**FIGURE 6.** Advanced deep, erosive squamous cell carcinoma of the medial canthus of the left eye in a poorly pigmented cat.



**FIGURE 7. (A)** Eyelid margin melanocytoma on the central lower right eyelid of a dog with **(B)** a narrow base at the eyelid margin. After a chalazion clamp was placed, the mass was excised while still preserving the eyelid margin **(C)** and then treated with cryotherapy over the base of the mass **(D)**. No regrowth was noted at 6 months.

## CONJUNCTIVAL MASSES IN DOGS AND CATS

For either species, the prognosis for tumors arising from the conjunctiva (including the third eyelid) is generally worse than that for their counterparts of dermal and sebaceous gland origin due to local invasion, high recurrence rates, and likelihood of metastasis.<sup>13,14</sup> One exception is the conjunctival papilloma in dogs, which, similar to papillomas of dermal origin, behaves benignly.<sup>6</sup> Other common conjunctival tumors include squamous cell carcinomas, mast cell tumors, hemangiosarcomas, adenocarcinomas, lymphomas, and melanomas.<sup>14-17</sup>

## DIAGNOSIS

Most eyelid tumors are associated with clinical features and characteristics that can support a presumptive diagnosis and guide the clinician to the next step. However, sometimes a fine-needle aspirate or punch biopsy can be helpful for formulating a diagnostic and treatment plan, especially for masses that do not have a

typical appearance or are suspected to be malignant. Thus, these diagnostics are most often used for cats or for tumors arising from the dermis or conjunctiva in dogs before formulating a surgical plan. Because only histologic examination can reveal the definitive diagnosis, all resected tumors should be submitted for histopathology, even if suspected to be benign.

## TREATMENT

Therapy should be tailored to ocular examination findings (location, degree of irritation to the skin and cornea, rate of growth); the presumptive or cytologic diagnosis; the patient's systemic status; previous responses to therapy, if applicable; available equipment; and the client's concerns. Treatment for eyelid tumors usually consists of resection en bloc (including the skin and eyelid margin) with appropriate margins for the expected mass or resection plus cryotherapy or other adjunctive therapy.

## Eyelid Surgery

In general, eyelid neoplasia is best treated early, when the tumor is small, because the amount of tissue that can be removed without extensive reconstruction is finite. Typically, 25% to 33% of the eyelid length can be removed while still enabling primary closure; however, this percentage is highly variable, depending on the breed conformation.<sup>18</sup> Before surgery, eyelids should be washed to remove dirt, after which a 1:50 dilution of povidone-iodine solution can be applied to

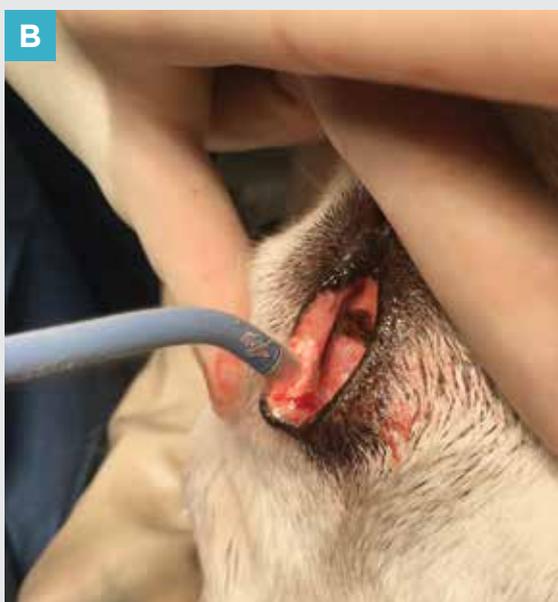
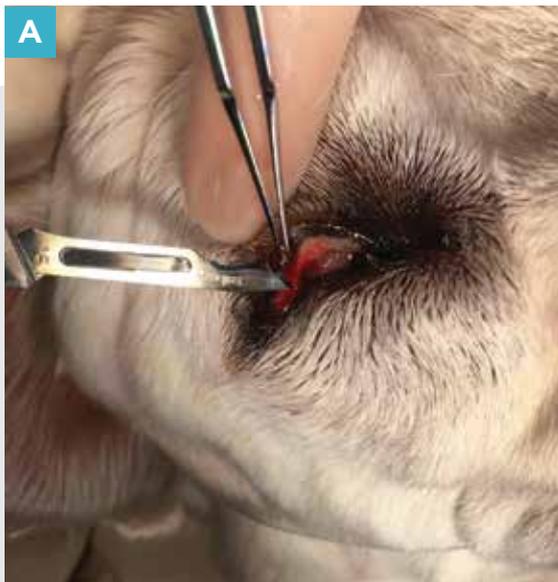
the eyelids and conjunctival fornix with cotton-tipped applicators. The patient should be in sternal position with the head straight and the palpebral fissure horizontal. Drapes should be secured in such a way that they do not distort the eyelids. During closure, suture material should never pass through the conjunctiva, all knots and tags should point away from the eyelid margin and palpebral conjunctiva, and 5-0 or 6-0 soft sutures (e.g., silk or polyglactin 910) should be used. Use of an Elizabethan collar is essential to prevent self-trauma, which can lead to loosened sutures, wound dehiscence, and/or infection.<sup>4</sup>

### Dogs

In dogs, eyelid margin masses are best treated with simple full-thickness surgical excision or removal of the mass to the base (debulking) followed by cryotherapy. Generally, if the tumor is pedunculated, debulking and cryotherapy are sufficient; however, if the tumor is mainly within the stroma of the eyelid, then a wedge or pentagonal (“house”) resection is preferred. Surgical excision should include 0.5- to 1-mm margins around the mass, followed by closure.

Debulking and cryotherapy involve sedation (or general anesthesia) plus approximately 0.2 to 0.3 mL of local anesthetic; a chalazion clamp to aid in stabilization, hemostasis, and the desired “slow thaw”; excision of the mass as close to the base as possible; +/- partial-thickness excision over the adjacent conjunctiva to curette the inspissated sebaceous debris (chalazion) and/or mass material with cotton-tipped applicators or a curette cup; and application of the cryoprobe on the conjunctiva at the level of the meibomian gland (3 mm distal to the eyelid margin) or on the skin if the mass was predominantly dermal. Cryotherapy involves 2 to 3 cycles of rapid freezing (approximately 25 to 40 seconds) until an ice ball is formed up to the level of the eyelid margin, followed by slow thawing (at least 60 seconds) (FIGURES 7 AND 8).<sup>4,19</sup>

Cryotherapy treats the remaining tumor within the eyelid stroma that cannot be visualized. Debulking without cryotherapy has limited benefit and is not recommended. The benefits of debulking and cryotherapy include a shorter procedure, use of sedation and local anesthesia only, and lack of need for sutures (thus, no postoperative need for an Elizabethan collar). In addition, liquid nitrogen delivery systems are inexpensive and have a good return on investment. Disadvantages of cryotherapy include postoperative



**FIGURE 8. (A)** Eyelid margin meibomian gland adenoma treated with sharp excision preserving the eyelid margin, **(B)** followed by cryotherapy of the conjunctival surface over the meibomian gland to kill remaining tumor within the eyelid. No regrowth was noted at 1 year.



swelling, temporary tissue depigmentation, and unwanted damage to normal tissue.<sup>4,7</sup> Recurrence rates for wedge resection versus debulking and cryotherapy of eyelid margin tumors are similar (approximately 11% to 15%).<sup>19</sup> Surgical removal of eyelid margin masses with a CO<sub>2</sub> laser has also been reported but can lead to a defect in the eyelid margin. Thus, the laser is best for masses with a small base; if the base is larger, the laser can serve as the blade and the defect can be closed primarily as a wedge resection.<sup>4</sup> Dermal and conjunctival tumors may require removal of larger margins and more involved planning. Any removed mass should always be submitted for biopsy. The histopathology will help determine treatment of a recurring mass (e.g., a different surgical approach or removal of larger margins).

### Cats

In cats, a squamous cell carcinoma is best managed by complete excision with wide (4 to 5 mm) surgical margins, which can sometimes dictate enucleation of a visual, healthy eye.<sup>10</sup> Ways to help manage the missing tissue include creating a lip-to-lid subdermal plexus flap, a local transposition flap, or a caudal auricular axial pattern flap.<sup>20-22</sup> When resection alone will not slow tumor progression, debulking combined with adjunctive therapy can be used. Adjunctive therapies include cryotherapy, beta radiation therapy (local strontium-90), photodynamic therapy, and electrochemotherapy;<sup>10,14,23</sup> however, none of these treatments penetrates deep into the tissue. Peripheral nerve sheath tumors usually require removal of wide surgical margins, involving removal of the eye, because nearly all conservatively treated tumors will recur.<sup>10</sup> Fortunately, mast cell tumors often respond well to surgical removal, even with incomplete margins.<sup>11</sup> Apocrine hidrocystomas can be incised, drained, and then treated with cryosurgery or photoablation if the masses are causing irritation to the patient. Alternatively, drainage and injection with povidone-iodine can be effective. Although these tumors are benign, recurrence or formation of new cysts is common; thus, benign neglect is an option for masses not causing a clinical concern.

### Advanced Procedures

Among tumors that are more difficult to treat are those at the level of the medial canthus, near the lacrimal puncta. The author recommends that while excising the mass, the canaliculi be marked by cannulating the puncta with a 24-gauge IV catheter. If the base of the

mass plus the margins desired are more than 33% of the total length of the eyelid or if there is too much tension at the primary closure site, a reconstructive blepharoplasty surgery should be chosen. Several procedures, beyond the scope of this article, can be considered if a larger area needs to be excised, including the “house-inverted-triangle”; sliding H-figure blepharoplasty; and other rotation, sliding, or full-thickness skin or myocutaneous grafts.<sup>4,7,24</sup>

### SUMMARY

In dogs, eyelid tumors are very common; fortunately, most are likely to be benign. Debulking plus cryotherapy, CO<sub>2</sub> laser, and surgical pentagonal excision are all appropriate treatments for removing eyelid margin masses in dogs. For masses that are smooth and within the eyelid dermis or conjunctiva, a fine-needle aspirate or punch biopsy is helpful for determining a treatment plan. In cats, eyelid tumors are not nearly as common but are often malignant. For all eyelid tumors, early intervention and histopathologic examination are advisable. **TVP**

### References

1. Wang S, Dawson C, Wei L, Lin C. The investigation of histopathology and locations of excised eyelid masses in dogs. *Vet Rec Open*. 2019;6(1):e000344. doi: 10.1136/vetreco-2019-000344
2. Krehbiel J, Langham R. Eyelid neoplasms of dogs. *Am J Vet Res*. 1975;36(1):115-119.
3. Dubielzig RR, Ketring K, McLellan G, Albert D. Diseases of the eyelid and conjunctiva. In: Dubielzig RR, Ketring K, McLellan G, Albert D, eds. *Veterinary Ocular Pathology: A Comparative Review*. St. Louis, MO: Saunders Elsevier; 2010:143-199.
4. Stades FC, van der Woerd A. Diseases and surgery of the canine eyelid. In: Gelatt KN, Gilger BC, Kern TJ, eds. *Veterinary Ophthalmology*. Vol 1. 6th ed. Ames, IA: John Wiley & Sons; 2021:923-987.
5. Labelle AL, Labelle P. Canine ocular neoplasia: a review. *Vet Ophthalmol*. 2013;16(suppl 1):3-14. doi: 10.1111/vop.12062
6. Beckwith-Cohen B, Teixeira LBC, Ramos-Vara JA, Dubielzig RR. Squamous papillomas of the conjunctiva in dogs: a condition not associated with papillomavirus infection. *Vet Pathol*. 2015;52(4):676-680. doi: 10.1177/0300985814556185
7. Bettenay S, Mueller RS, Maggs DJ. Diseases of the eyelids. In: Maggs DJ, Miller PE, Ofri R, eds. *Slatter's Fundamentals of Veterinary Ophthalmology*. 6th ed. St. Louis, MO: Elsevier; 2018:127-156.
8. Newkirk KM, Rohrbach BW. A retrospective study of eyelid tumors from 43 cats. *Vet Pathol*. 2009;46(5):916-927. doi: 10.1354/vp.08-VP-0205-N-FL
9. McLaughlin S, Whitley RD, Gilger BC, et al. Eyelid neoplasms in cats: a review of demographic data. *JAAHA*. 1993;29(1):63-67.
10. Glaze MB, Maggs DJ, Plummer CE. Feline ophthalmology. In: Gelatt KN, Gilger BC, Kern TJ, eds. *Veterinary Ophthalmology*. Vol 2. 6th ed. Ames, IA: John Wiley & Sons; 2021:1665-1840.
11. Montgomery KW, van der Woerd A, Aquino SM, et al. Periocular cutaneous mast cell tumors in cats: evaluation of surgical excision (33 cases). *Vet Ophthalmol*. 2010;13(1):26-30. doi: 10.1111/j.1463-5224.2009.00751.x
12. Hartley C, Ladlow J, Smith KC. Cutaneous haemangiosarcoma of the lower eyelid in an elderly white cat. *J Feline Med Surg*. 2007;9(1):78-81. doi: 10.1016/j.jfms.2006.05.011



13. Hartley C, Hendrix DVH. Diseases and surgery of the canine conjunctiva and nictitating membrane. In: Gelatt KN, Gilger BC, Kern TJ, eds. *Veterinary Ophthalmology*. Vol 1. 6<sup>th</sup> ed. Ames, IA: John Wiley & Sons; 2021:1045-1081.
14. Maggs DJ. Diseases of the conjunctiva. In: Maggs DJ, Miller PE, O'Friel R, eds. *Slatter's Fundamentals of Veterinary Ophthalmology*. 6<sup>th</sup> ed. St. Louis, MO: Elsevier; 2018:158-177.
15. Pirie CG, Dubielzig RR. Feline conjunctival hemangioma and hemangiosarcoma: a retrospective evaluation of eight cases (1993-2004). *Vet Ophthalmol*. 2006;9(4):227-231. doi: 10.1111/j.1463-5224.2006.00472.x
16. Dees DD, Schobert CS, Dubielzig RR, Stein TJ. Third eyelid gland neoplasms of dogs and cats: a retrospective histopathologic study of 145 cases. *Vet Ophthalmol*. 2016;19(2):138-143. doi: 10.1111/vop.12273
17. Schobert CS, Labelle P, Dubielzig RR. Feline conjunctival melanoma: histopathological characteristics and clinical outcomes. *Vet Ophthalmol*. 2010;13(1):43-46. doi: 10.1111/j.1463-5224.2009.00758.x
18. van der Woerd A. Adnexal surgery in dogs and cats. *Vet Ophthalmol*. 2004;7(5):284-290. doi: 10.1111/j.1463-5224.2004.04044.x
19. Zibura AE, Henriksen M de L, Rendahl A, et al. Retrospective evaluation of canine palpebral masses treated with debulking and cryotherapy: 46 cases. *Vet Ophthalmol*. 2019;22(3):256-264. doi: 10.1111/vop.12585
20. Dias FC, Danielski A, Forster K, Williams DL. Use of a subdermal plexus flap to reconstruct an upper eyelid following radical tumor resection in a cat. *JAVMA*. 2017;250(2):211-214. doi: 10.2460/javma.250.2.211
21. Pavletic MM. Skin flap options for cutaneous defects of the eyelid regions. In: Pavletic MM, ed. *Atlas of Small Animal Wound Management and Reconstructive Surgery*. 4<sup>th</sup> ed. Ames, IA: John Wiley & Sons; 2018:660-661.
22. Stiles J, Townsend W, Willis M, et al. Use of a caudal auricular axial pattern flap in three cats and one dog following orbital exenteration. *Vet Ophthalmol*. 2003;6(2):121-126. doi: 10.1046/j.1463-5224.2003.00275.x
23. Simčić P, Pierini A, Lubas G, et al. A retrospective multicentric study of electrochemotherapy in the treatment of feline nasal planum squamous cell carcinoma. *Vet Sci*. 2021;8(3):1-16. doi: 10.3390/vetsci8030053
24. Hunt GB. Use of the lip-to-lid flap for replacement of the lower eyelid in five cats. *Vet Surg*. 2006;35(3):284-286. doi: 10.1111/j.1532-950X.2006.00145.x



### Braidee C. Foote

Dr. Foote is a clinical assistant professor of ophthalmology at the University of Tennessee. She received her DVM degree from the University of California-Davis. Dr. Foote completed rotating small and large animal ophthalmology internships before pursuing specialty internships in small animal at BluePearl in Tampa, Florida, and large animal at New Bolton Center at the University of Pennsylvania. She continued her education with a comparative ophthalmology residency at Iowa State University. Her special clinical interests include corneal diseases in all species. Her research interests include ophthalmologic side effects of clinical therapies, innovative surgical techniques, and surgical outcomes.

## boot the scoot!™



Join us at **VMX booth 3709**  
for a **FREE clinic sample** or  
visit [sample.glandex.com](http://sample.glandex.com)

# glandex®

## Anal Gland Supplement for Dogs & Cats

Glandex's patented formula uses all-natural ingredients including pumpkin seed, probiotics, digestive enzymes, and omega fatty acids to support healthy anal gland function.



**Vetnique®**  
+labs