Eyelid diseases can be congenital or inherited, secondary to trauma, inflammatory, or neoplastic. When eyelid diseases occur, they not only involve the eyelid but can also cause irritation to the cornea or other nearby structures. Treatment can help prevent further damage and scarring.

Dogs have upper eyelashes but do not have lower lashes. Normal hairs on the face that rub on the cornea are called trichiasis. Trichiasis can be caused by entropion, nearby folds, or traumatic injury causing the hair to grow inappropriately. Correction of these problems should lead to resolution of the trichiasis.

Distichia are hairs that grow from the Meibomian glands and out the gland openings in the eyelid margin. These hairs can be asymptomatic if soft and floating in the tear film. For example, nearly 100% of Cocker Spaniels have distichia that are often asymptomatic. They can also be very stiff and cause significant irritation and/or corneal ulceration. If this is the case, removal of the hairs is recommended. Ophthalmologists most commonly use liquid Nitrogen to freeze the follicles and prevent hair regrowth. Cryoepilation is very safe to the eyelid margin and surrounding normal tissue and has an approximately 90% success rate. Cautery is not as effective as cryoepilation and can cause significant eyelid margin damage.

Ectopic cilia are hairs that arise from the Meibomian glands but grow through the eyelid instead of out of the gland opening and rub directly on the cornea. These are most commonly seen in young females and are usually seen in the middle of the upper eyelid. Lower eyelids can also sometimes be affected. These tend to cause much more pain and ulceration than distichia, and they have a recurrent course. Resolution of the growing follicle is best achieved with a combination of follicle removal and cryoepilation.

Entropion is inward rotation of the eyelid margin. This causes corneal irritation, ulceration, and scarring. Treatment for puppies is performing a temporary eyelid tacking until the dog is closer to a mature size and then surgically correcting the entropion if they do not grow out of it. Correcting entropion too early can result in ectropion after they grow to an adult size. It can also occur after maturity secondary to chronic allergies and blepharitis.

In brachycephalic breeds, they often have macropalpebral fissure along with medial entropion and trichiasis from the nasal folds. Most dogs have at least a very mild form of the disease. However if significant keratitis and pigmentation develops, surgical correction is necessary. The favored procedure is a medial canthoplasty as it corrects all conditions. Removal of nasal folds can reduce the trichiasis but usually does not resolve the entropion or exposure. Most owners also find it less cosmetically appealing.

Ectropion is outward rotation of the eyelid margin. This typically is not associated with as significant keratitis but can cause a chronic conjunctivitis. If the ectropion is significant, it can cause the remaining half of the eyelids to actually roll in and cause a
keratitis. In this case lid shortening and entropion procedures help to resolve the condition.

Blepharitis (inflammation of the eyelids) most commonly develops due to allergies or infection. Allergic blepharitis is seen in atopic dogs and can lead to entropion and periorcular alopecia. An acute allergic reaction can lead to rapid blepharoedema and needs to be treated with benadryl and steroids. An allergy can also develop in response to topical medications with Neomycin and result in diffuse redness and conjunctivitis. Removing the medication can result in improvement.

Infectious blepharitis is most commonly seen as either mucocutaneous pyoderma or meibomian gland adenitis. Both of these conditions are reaction to bacteria on the skin/eyelid margin (most commonly Staphylococcus) that result in inflammation and ulceration. With meibomian gland adenitis, the infection is centered inside the gland resulting in multiple stye formations. Both of these conditions can be painful and chronic. Treatment is use of systemic steroids and antibiotics, as well as topical antibiotic steroid ointment. Hyposensitization can be achieved in some cases by use of Staphage lysate injections. An alternative form of therapy is cryotherapy, which can result in resolution or near resolution and minimal need for medications.

Eyelid neoplasia is quite common in dogs and the most common tumor seen is benign Meibomian gland adenoma. These tumors arise from the Meibomian glands and can slowly grow to cause irritation. If conjunctivitis or keratitis occurs, then removal of the tumor is recommended. This can be achieved by wedge resection of the eyelid, or preferably by cryoablation. There is a decreased recurrence rate with cryoablation and also fewer complications occur with this procedure (ie, no suture to rub). With cryoablation, the tumor is debulked down to the eyelid and 2-3 freeze-thaw cycles are performed to kill the remaining tumor cells.

Other common causes of eyelid neoplasia include papilloma, mast cell tumor, melanoma, histiocytoma, and squamous cell carcinoma. About 74% of eyelid masses in dogs are benign and respond well to cryoablation, which is my favored technique for cure. However if the mass appears atypical, then I would recommend biopsy first to determine if large resection and blepharoplasty is necessary to remove a malignant tumor.

Lacrimial System

The most common lacrimal disorder is KCS, in which the tear glands underproduce the aqueous portion of the tears. This results in conjunctivitis, increased mucoid discharge, and corneal neovascularization with fibrosis and/or pigmented keratitis. The most common cause of the disease is an immune mediated infiltration of the glands resulting in decreased production. Other causes include toxicity from Sulfa drugs and Etogesic and radiation, congenital lack of small gland, or decreased innervation of the gland.

Classic therapies include use of T-cell suppressors and the most well known is Optimmune, or Cyclosporine. As Optimmune is the commercially available labeled drug for KCS, therapy with Optimmune should be used initially. Approximately 85% of canine patients respond well to Optimmune. If they do not respond to Optimmune, then other treatment options include 1% or 2 % Cyclosporine or 0.02% Tacrolimus.
Tacrolimus is the most effective therapy for KCS and can be made in an aqueous solution, which is easier to deliver and does not cause irritation as the oils for compounded Cyclosporine can cause. The T-cell suppressors suppress the autoimmune attack on the gland so that it can function normally. They will also cause direct tear production in normal animals and the mechanism of action for this is unknown.

Uncommonly, KCS does not respond to traditional lacrimostimulants. In neurogenic KCS and some poor responding KCS cases, Pilocarpine can work to stimulate the tear gland. Topical administration of dilute pilocarpine (add 1ml of 2% pilocarpine to 15ml of artificial tears making a 0.125% solution) has been successful in some cases but is much less successful than cyclosporine or tacrolimus. In addition oral administration has been successful. A safe initial dose is 1 drop of 2% topical pilocarpine per 10kg body weight twice daily. The dose is increased by one-drop increments until signs of systemic toxicity develop (ie salivation, vomiting, diarrhea). The dose is then lowered to the previously tolerated dose.

Additional medications for KCS include tear replacements, antibiotics, and anti-inflammatories. Tear replacements that we recommend include Hylashield, Celluvisc, Genteal, and Puralube, although there are many others to choose from. The antibiotics most commonly used are triple antibiotic and gentamicin. These can be combined with topical anti-inflammatories, such as NeoPolyDex and Gentamicin-Betamethasone. The steroids need to be used cautiously as KCS patients are prone to ulceration.

Surgical therapy for KCS is still the Parotid Duct Transposition. This surgery is about 85% successful, but very expensive due to the intricacy of the surgery. Due to the difference in mineral content between saliva and tears, mineral deposits on the cornea and periocular tissues is common and may necessitate the use of a chelating solution of 1% or 2% calcium EDTA. Therefore since medical therapy may be life long even with surgery, medical therapy is attempted first.

Cornea

The most common corneal disease is ulcerative keratitis. Treatment of the ulcerations is dependent on the type of corneal ulcer and the depth of the ulcer within the cornea. Clinical symptoms of corneal ulcers include increased tearing, blepharospasm, conjunctival hyperemia, corneal edema, photophobia, and possibly miosis with or with aqueous flare. Diagnosis of corneal ulcers can easily be achieved with fluorescein stain. Fluorescein is a water based stain that binds only to the hydrophilic corneal stroma. This is why descemetoceles have a green ring of stain uptake with no stain uptake in the depressed center.

Superficial corneal ulcers are seen as loss of the corneal epithelium. An uncomplicated superficial corneal ulcer should heal in 24-48 hours. Therefore I generally start the patient on a standard broad-spectrum antibiotic (BNP or Gentamicin) and then recheck them in a few days. If it is not showing significant signs of healing, then there is something inhibiting the healing. Things that can slow healing include continued mechanical abrasion (usually entropion, distichia, ectopic cilia, or foreign body under third eyelid), infection, or decreased healing potential (most commonly seen as indolent ulcerations).
When you are not sure what caused the ulcer, look at its location for clues to look for an underlying cause. A central superficial ulcer is likely due to external trauma; dorsal central corneal ulcers are usually due to ectopic cilia (most commonly seen in young female dogs and have a history of recurrent ulcers); dorsal or ventral corneal ulcers may be due to distichia or entropion; and ventromedial ulcers are either due to medial entropion or a foreign body behind the third eyelid. Finding and treating the underlying condition will help resolve the ulcer as well.

Indolent corneal ulcer is a non-healing form of ulcer usually seen in middle-aged to older dogs (Boxers especially) where the corneal epithelium does not adhere normally to the stroma. These ulcers appear to have a “skin” like an onion that grows over the ulcer, so the stain uptake can be variable. The cause of the non-adherence is the formation of a membrane between the outer two layers of the cornea which gets thicker and thicker with age. This membrane prevents the adherence of the epithelium to the stroma with its hemidesmosomes, resulting in persistent ulceration. Over a period of weeks to months, corneal neovascularization will occur to try to heal the ulcer but will result in a significant scar. Therefore treatment to speed the healing is recommended to lessen the scar formation.

In my experience, the most effective therapy is to perform a corneal debridement and grid keratotomy. I prefer this procedure as it can be done with just topical anesthetic and I have an approximate 85-90% success rate with the procedure. You can sedate as well if that is easier. I topically anesthetize with proparacaine and 0.1ml Lidocaine subconjunctivally and apply 1 drop of dilute Betadine solution (1:20). Then I debride the ulcer with dry cotton swabs until I get normally adhered cornea. You need to be aggressive with the debridement in order to know the entire extent of the ulcer and to have the best chance for healing it on the first try. You cannot remove normal epithelium with a cotton swab, which is why I use this. You can use a scalpel blade but this can cause more debridement than you need and is less safe in an awake animal. Then I take a 25-gauge needle and using needle drivers, I bend the bevel backward to have a small hook and then grid the entire ulcer bed and go 1-2 mm into normal cornea.

After performing the grid, I warn owners that they will generally be a little more uncomfortable for a few days and that there may be more corneal edema and/or some blood in the tears if there are corneal vessels in the area that you have performed the grid keratotomy. I keep the dog on a topical antibiotic (BNP if no infection, tobramycin or ofloxacin if suspicious or steroids have been used, no gentamicin as it slows corneal wound healing) TID-QID, atropine BID for 3 days and then SID as needed for pain (if no signs of glaucoma and if IOP is normal), and oral pain medications (NSAID and Tramadol for 1 week).

There are times when I won’t do the grid to heal the ulcer. If the ulcer is not superficial, then it is not indolent and should not have a grid keratotomy. Also I do not do it if I suspect there is an active infection, as you can seed the infection deeper. I also never do the procedure in cats, as you can cause a corneal sequestrum to develop.

There have been reports of adjunctive therapy that will aid in healing as well. A soft contact lens will improve healing rates by 10%. I use Acuvue Oasys (not canine) and many of these stay well and do not cause irritation. I leave them in for 2 weeks and then take them out when I recheck the patient. Adequan in tears has also been used to speed healing as well. Adequan is a polyunsulfated glycoaminoglycan which may work by
decreasing proteolytic activity. Since only a small portion of dogs with indolent ulcers have proteolytic activity, it does not heal all ulcers. In addition, serum does not appear to speed healing as well, since most cases do not have proteolytic activity. Another therapy is the use of tissue glue. Tissuemend II has been reported to have very high success rates for healing corneal ulcers. It is applied after debridement and ointment is applied immediately after to speed drying. Although the success rate with this procedure is high, it tends to take longer to heal the corneal ulcer.

With indolent ulcerations, it is important to educate owners that this disease can require multiple treatments to result in healing, so that you can minimize their frustration in dealing with treatment. In addition, inform the owners that once it is healed in one location, it will no recur in the same location. However, as it is a healing problem, it can occur in a different location in the same eye, or on the other eye.

Corneal stromal ulcerations tend to occur after either a more significant trauma or where there has been infection that has caused proteolysis of the cornea. These need to be treated more aggressively to prevent further degradation of the cornea, or melting of the cornea. With these ulcers, I start aggressive topical antibiotics (I prefer Ofloxacin) every 2-3 hours (more frequently if melting), oral antibiotics (Clavamox, Baytril), topical serum to prevent melting (QID), and pain medications (Atropine, oral NSAIDs, Tramadol). I recheck them frequently to make sure they are healing appropriately. If the ulcer goes greater than 70% through the cornea, I recommend a conjunctival graft to prevent rupture of the cornea.

With descemetoceles or corneal rupture, I recommend surgery (conjunctival graft) as soon as possible. If there is melting occurring, then surgery should be delayed if possible until the melting can be controlled. If the corneal rupture is large or if there is intraocular infection, then enucleation may be a more appropriate choice of surgery. With many small ruptures (especially those that have already been on antibiotics), conjunctival graft may still result in healing and retention of vision.

If surgery cannot be performed due to financial issues, then I treat with aggressive antibiotics and pain medications and have had quite a number of patients eventually heal with neovascularization and still quite a few that retain vision. I recommend trying medical therapy over enucleation as long as overt intraocular infection is not evident.

For all corneal ulcers, I recommend antibiotics (how aggressive depends on the degree) and pain relievers. I do not recommend steroid therapy even if you are trying to get a reduction in corneal neovascularization. I have seen many infected corneal ulcers after the use of steroids. Also you can get variable staining with indolent ulcers that can make you feel that it is healed, when in fact it is not. The corneal vessels will resolve on their own without steroids once the cornea is healed, so this is not necessary anyway.

Another corneal disease is that you will commonly see is endothelial corneal degeneration and this disease can develop ulcerations later in the course of the disease. This disease is usually seen in older dogs and Boston Terriers, Chihuahuas, and Dachshunds are the most common breeds that are affected. The cornea appears bluish-white in appearance and stippled, resembling ground glass. Conjunctival hyperemia is common as well. Later in the course of the disease, corneal bullae and ulceration is common, which makes this disease more painful.

Treatment in the early stages is with topic hypertonic saline (5%) BID-TID and topical NSAID’s to reduce the inflammatory response to the degenerating cells. When
corneal ulcers are present, then a broad-spectrum antibiotic is also recommended. Corneal debridement and grid keratotomies are often needed to help the ulcer heal as well because this usually occurs in older animals.

Surgical treatment involves corneal transplantation, which is not a very feasible option in dogs due to the lack of availability of fresh corneas and due to the high rate of rejection seen in dogs compared to people. Newer techniques are currently under investigation to see if progression of the degeneration could be halted. Most commonly it starts in the temporal region of the cornea. Early intervention with a specialized conjunctival graft, known as a Gunderson flap, has shown promise in preventing further degeneration in early cases but is not as effective in cases with diffuse degeneration. Another salvage procedure, known as thermal keratoplasty, has shown anecdotal evidence of preventing progression but which procedure is most effective remains to be seen.

Corneal lipid dystrophy or degeneration is another relatively common corneal disease seen in dogs. With lipid dystrophy, most cases are seen in purebred younger adult dogs and they occur bilaterally in the center of the cornea. With this type of dystrophy, most cases do not have elevated triglycerides or lipid in the bloodstream and are not hypothyroid. Most of the time, surgical removal will not cure the problem as it is a metabolism disorder of the cornea and it will recur after surgery. Although not reported to beneficial, I have had some varying success with Optimimmune. In fact some cases have resolved completely, although the mechanism of resolution is unknown.

With peripheral lipid degeneration, I would recommend checking bloodwork for elevated triglycerides, cholesterol, and lipid. I would also recommend ruling out hypothyroidism and Cushing’s disease. If these diseases are present, then treating them may result in resolution. If there is hyperlipidemia or hypertriglyceridemia, I recommend changing the diet to a fat restricted diet as well. If there are blood vessels in the vicinity of the degeneration, I would add in topical steroids to reduce their presence and therefore their deposit of the lipid.

A senile form of corneal calcium degeneration is also seen. This occurs in older dogs and is often associated with corneal ulceration as the deposits can exfoliate leaving large divots present. I have had good luck using calcium EDTA and Optimimmune, as well as a broad-spectrum antibiotic when an ulcer is present. Some cases can be very deep and conjunctival grafts are recommended, however many will heal with medications and due to the advanced age of these dogs, is most often recommended.

Finally, pannus or chronic superficial keratitis is seen with regularity in our canine patients. The most common breeds that are affected are German Shepherds, German Shepherd crosses, and Greyhounds. It starts as episcleral injection in the ventrolateral aspect of the sclera and progresses to corneal neovascularization, fibrosis, and pigmentary keratitis. This disease is generally worse in dogs that are in higher altitudes and in sunlight more frequently. The cause of the disease is likely UV radiation causing changes in corneal proteins, resulting in an autoimmune attack on the cornea. Atypical cases include infiltration of the third eyelids as well.

Treatment relies on reducing UV light exposure and preventing the immune attack on the cornea. Topical steroids and immunosuppressants (cyclosporine and tacrolimus) are most commonly used. In more severe cases or with pets that are resistant to topical medication (ie aggressive to owners), periodic subconjunctival injection of
methylprednisolone (8-12mg) can be successful in treating and speeding control of the disease. This disease can be controlled but cannot be cured, therefore owners need to be educated as to importance of chronic medications.