

# Ophthalmic Disorders

## Treatment of eye conditions seen in the dog

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**D**ISTURBANCES of the eye are of more importance in the canine than in any other species of animal. Hence, the following discussion will be directed largely towards the etiology, diagnosis and treatment of the various conditions in the dog.

Conjunctivitis or inflammation of the conjunctiva is probably the most common disease of the eye. As the conjunctival membrane is very vascular, rich in lymph cells and sensitive to outside influences, it is often the seat of inflammatory phenomena which assume different clinical forms. Authors have classified these forms into catarrhal, purulent, parenchymatous, croupous, follicular and exanthematous conjunctivitis, depending upon the type and extent of the symptoms.

There are many causes which may be incriminated in determining the etiology of conjunctivitis. A common cause is mechanical trauma produced by foreign bodies and various kinds of injuries. Cold winds, smoke, irritant gases or light that is too bright, especially that reflected from snow, are also offenders. Serious disturbances are frequently observed following the use of collyria which are too irritant. Conjunctivitis is often associated with or secondary to other diseases such as eczema, distemper, nasal catarrh, bronchitis and some constitutional diseases. Infection may be the cause of primary conjunctivitis as it is constantly present and develops when the local resistance is reduced. Various kinds of organisms have been isolated from ocular discharges but none of them has been proved to be the specific cause. The fact that large numbers of puppies

may be affected, when closely associated, indicates that the disease may be very communicable. Newly born animals may contract the disease from the vaginal infection of the mother at the time of parturition. Certain of the breeds, aged animals and animals kept under bad hygienic conditions are predisposed to the chronic form of the disease. Often this form is associated with cases of eczema and mange or may follow the acute form.

### Symptoms

The symptoms vary according to the etiologic factor, the severity of involvement and the length of existence. Usually there is a congestion of the mucous membrane which may range in color from pink to red. The secretion, at first serous, soon changes to a mucous, mucopurulent or purulent type. This secretion collects around the palpebral margin and may form crusts agglutinating the eyelids. The edges of the lids are found edematous. Photophobia is usually demonstrated. The dog may hold the lids partially or completely closed or may scratch and rub the eyes either with the paws or against objects. In addition to the common symptoms mentioned, some of the conjunctivitis demonstrate symptoms peculiar to their type. Parenchymatous conjunctivitis exhibits a swelling and puffiness of the mucous membrane which is often so marked that the swollen conjunctiva pouches outward over the palpebral borders of the cornea. Croupous conjunctivitis is characterized by the presence of a fibrinous exudate and the absence of general symptoms except as produced by some infectious disease

which the conjunctivitis may attend. Follicular conjunctivitis is characterized by the existence of small granular elevations over the surface of the membrane due to the swelling of the lymph follicles and to connective tissue proliferation, the result of inflammation. Exanthematous conjunctivitis which occurs rarely, often results in suppurative inflammation of the glands along the margins of the lids and of the membrana nictitans. More severe cases of conjunctivitis are accompanied by general symptoms in the form of dullness, anorexia and general weakness.

### Prognosis

The prognosis of all types of conjunctivitis is guarded to unfavorable. Too often the disease becomes chronic or involves the eyeball to such an extent that partial or total blindness results.

Treatment consists of first removing the primary cause if possible. Then wash the mucous membranes thoroughly with a 2 percent boric acid solution. Repeat this 2 or 3 times daily during the first few days. Follow each instillation of the collyrium with an application of a good eye ointment such as merthiolate 1:5000, sulfathiazole 5 percent or zinc sulfate 0.5 percent. The latter is used where an astringent effect is desired. Secure good sanitary conditions, give plenty of nourishing food and supply supportive treatment if indicated. Keep the animal's eyes protected from the light. It is desirable to isolate the animal and disinfect the premises to avoid spreading the disease if it is infectious in nature.

### Keratitis

Keratitis is defined as an inflammation of the cornea. Two general types are recognized, non-suppurative and suppurative. They will be discussed in that order.

The etiology of non-suppurative keratitis contains many of the factors discussed previously under conjunctivitis. Keratitis may occur as the result of wounds of the cornea, foreign bodies, chemical irritants or a spread of infection from the palpebral conjunctiva,

scleral conjunctiva or adjacent structures such as the iris or ciliary body. Often it accompanies canine distemper. Dogs with prominent eyes and those living under bad hygienic conditions are predisposed to this disease.

### Symptoms of Keratitis

The symptoms of keratitis like those of conjunctivitis are variable. Lacrimation and photophobia are early and prominent symptoms. A bluish-white clouding which involves all or part of the cornea occurs as a result of leucocytic infiltration. An epithelial desquamation over the cloudy area produces a dullness. This may be readily demonstrated by flooding the eye with 1 percent fluorescein or with neoprontosil. In more severe types of keratitis due to prolonged and severe irritation there is a gray or white opacity traversed by numerous blood vessels which can be easily seen extending from the margin of the cornea in the form of reddish, radiating lines. Later, when the cause is removed, the new tissue becomes organized and appears as a white opacity of varying density. Occasionally the early clouding of the cornea is followed by small opaque, white, gray or yellow spots which penetrate into the parenchyma of the cornea. Ulceration of one or more turbid areas may take place causing small facets to appear. Commonly the parenchyma of the cornea is the seat of the inflammation. If so there is a diffuse infiltration of the interstitial tissue with a vascularization of the sclera. The cornea becomes turbid, gray or yellow, obscuring normal transparency. A network of fine blood vessels running parallel to each other radiate from the periphery to the center, forming a zone entirely around the corneal limbus.

Suppurative keratitis is caused by an invasion of the cornea by a pus producing organism. The infection may enter through wounds of the cornea produced by injury or undue exposure, or it may follow an infectious disease. In many cases, no doubt, infection is carried by the blood to the cornea, or by the lymph into the cornea.

General eye symptoms as photophobia, lacrimation and congestion of adjacent structures are always present. The cornea at first contains an opaque spot which is usually located at or near the center. As this spot or ulcer progresses, a depression known as a crater forms. The cornea surrounding the ulcer is usually turbid, and secondary ulcers not uncommonly develop. The ulcer may terminate in one of two ways. It may regress by healing and decrease in size, or it may progress and increase in size. In the regressive type of ulcer the walls of the ulcer lose their ragged appearance and become smooth and glistening. The opaque zone around the ulcer becomes transparent. The crater fills with connective tissue and is then covered with epithelium. The progressive type of ulcer becomes larger and deeper. The center of the ulcer is clear and transparent while the edges are cloudy. Frequently the floor bulges outward as the ocular pressure is too great. If the ulcer continues to grow there is perforation, opening the anterior chamber of the eye. When perforation occurs, intraocular pressure forces the aqueous humor through the ulcer. If perforation occurs over the iris, the latter pushes forward and closes the opening. It may become attached to the cornea causing anterior synechia or it may protrude through the ulcer. The entrance of infection is prevented in either case. If perforation takes place over the pupil instead of over the iris, infection is probable as there is nothing to prevent its entrance. When infection does enter, uveitis and panophthalmitis with a resulting loss of vision usually occurs.

#### **Keratitis Treatment**

To treat keratitis in which there is no perforation, first flush the cornea and conjunctiva with a 2 percent boric acid solution. Follow this with one of the eye ointments previously mentioned. If in mild cases this treatment is repeated several times daily, recovery will soon ensue. More severe and acute cases respond well to foreign protein therapy. Sterile milk is the drug of choice but horse serum or

hog cholera serum may be used. The protein is injected in 2 to 5 cc. doses subcutaneously at 48-hour intervals. Usually 5 to 6 such injections are necessary but results are sometimes obtained before that many are completed. If no history of the dog is known, or if the dog has been previously injected with the protein being used, first inject 0.1 to 0.5 cc. of the protein to determine if the animal is sensitive to that protein or anaphylactic shock may occur. If the interval between injections exceeds 10 days there is great danger of shock.

#### **Chronic Cases**

Chronic cases in which connective tissue becomes deposited in the cornea are often greatly benefited by iodide administration. Sodium iodide may be given intravenously once per week at the rate of 8 mg. per lb. or potassium iodide can be administered per os daily in doses of 80 to 225 mg.

Symptomatic treatment is also employed in an attempt to hasten healing. Constriction and control of development of the blood vessels in the cornea is best brought about by dropping 2 or 3 drops of adrenalin chloride 1:1,000 onto the cornea several times a day. Chronic progressive ulcers can be treated by curetting or cauterizing under local anesthesia. A small metal probe with a rounded end dipped in phenol is used in the cauterizing process. If perforation has occurred and the iris is protruding through the ulcer, do not attempt to replace it, but cut it off in 7 to 10 days. If perforation has not occurred but there is evidence of iritis or chorioiditis, apply atropine sulfate ointment 1 percent to the eye to prevent posterior synechia. In all types of keratitis be sure that the animal is enjoying proper hygiene, proper nutrition and is being protected from anything that will cause further irritation of the cornea.

Ectropion is an eversion of either the upper or lower eyelid. The common causes of this condition are: congenital defects, wounds with cicatrix formation, lacerations of the margin of the lid, ulceration and abscess formation of the lid and in-

flammation of the conjunctiva. All of these conditions tend to force the margin of the lid outward. The majority of these cases can be relieved by surgical means.

To facilitate an undisturbed operation, local anesthesia or local anesthesia in conjunction with morphine or some barbituric acid derivative should be used. A 2 percent butyn solution is used as the local anesthetic. A few drops of this solution are instilled into the conjunctival sac with an eyedropper after which a pad of cotton is placed over the eye and held for 5 minutes. This procedure is repeated twice after the initial instillation. The area corresponding with the long axis of the lid should be shaved, cleaned and painted with a skin disinfectant. Surgery is then employed. An elliptical piece of skin is removed from the area located lateral to the outer canthus and at right angles to the border of the lids when the eye is closed. The skin edges are then sutured together with No. 0 catgut, thus tightening the border of the lids. One must be sure that the large part of the elliptical section removed comes at right angles to the lid to be corrected.

### Entropion

Entropion is an inversion of either the upper or lower eyelid. It often results from the cicatrization of wounds, chronic inflammation of the lids and mange. The Chow Chow is particularly subject to this condition.

The condition at times can be corrected in young puppies by the application of collodion to the affected lid, thus keeping it in place for quite a long period of time. To correct surgically, the same anesthesia and pre-operative preparation is employed as used in the ectropion operation. An elliptical piece of skin is incised along the border of the lid, and not more than 2 to 3 mm. away from the edge of the eyelid or sufficiently away from the border of the lid to avoid the tarsal glands and lacrimal apparatus. The widest portion of the elliptical piece removed should occur just at the corresponding place in the lid where most correction is necessary. The wound should be closed with small absorbable in-

terrupted sutures (preferably plain catgut No. 00, 0, or 1).

The Harderian gland or lymphoid tissue

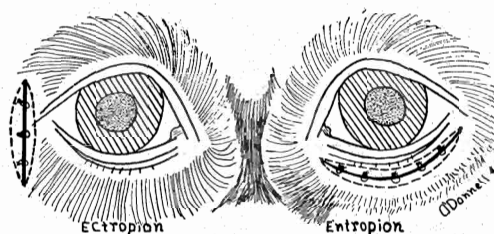


Diagram illustrating the location of incisions in the surgical treatment of entropion and ectropion.

located on the deep face of the membrana nictitans is frequently involved in an acute inflammatory process which usually accompanies or follows some form of conjunctivitis. This condition may be unilateral or bilateral and occurs most often in breeds that have prominent eyes. While an occasional case may respond to medicinal treatment it is not advisable since recurrence usually follows. Thus surgical removal of the lymphoid tissue is a common practice.

Anesthesia for this operation is the same as that used in the ectropion operation. One must be certain, however, that the local anesthetic reaches under the membrana nictitans. In extremely nervous or vicious dogs, ether, nembutal or like agents should be used for the safety of the patient's eyes and to facilitate operation.

### Removal

After anesthesia has been effected, the border of the membrana nictitans is gently grasped and raised with a forceps so that the nodular body on the medial surface can be seen. The nodular body or Harderian gland is grasped with a forceps and the medial portion of the inner membrane is incised with a sharp knife, dissecting it loose from the third eyelid. After it is free, the remaining tissues are clipped with a pair of scissors, care being taken not to injure the margin of the nictitating membrane. It is left as an open wound. In

cases where excessive hemorrhage occurs, a small amount of 1:1000 adrenalin chloride is dropped onto the eye to aid in controlling the hemorrhage. The use of adrenalin is always continued by its use in a lubricating ointment on the eye the day following the operation. Sometimes one will find that a cotton pack, tightly bound over the eye, will be necessary to control the hemorrhage.

### Membrana Nictitans

Removal of the membrana nictitans is indicated when there is an involvement due to chronic inflammation, extensive granulation or a tumor. Anesthesia for this operation is the same as for removal of the Harderian gland. In starting the operation the border of the nictitating membrane is grasped firmly and drawn anteriorly and laterally; then with a pair of fine curved scissors the membrane is cut as close to the base as possible. Hemorrhage is controlled in the same manner as in the preceding operation.

Not infrequently the eye is damaged to such an extent that enucleation of the entire eye is indicated. This operation should be performed under general surgical anesthesia, except when the animal is debilitated. If the animal is debilitated, the lids may be anesthetized with a local anesthetic and a quantity instilled into the depths of the orbit.

The technic usually employed is to suture both lids together, leaving the ends of the suture long enough to employ them in placing traction on the lids when the operation is in progress. Following suturing of the lids, they are incised through the skin just outside the eyelashes down to the conjunctival sac. Tension is then applied to the sutures while the conjunctiva is dissected free and the muscles are clipped until the eye is attached only by the optic nerve and vessels. A ligature is placed around the nerve and vessels as far down into the orbit as possible, and the structures severed. The orbit is quickly packed with sterile gauze or cotton to prevent hemorrhage. If there is infection present in the orbit, packs are used in which bipp or sulfanilamide are

incorporated. If injury to the eye has been such as to reduce its blood supply, packs may not be necessary to control the hemorrhage.

After packing the orbit, the wound edges are drawn together with interrupted non-absorbable sutures. In 24 to 36 hours, depending on the case, the medial 2 or 3 stitches are removed so that the pack can be withdrawn and discarded. If hemorrhage occurs to any great degree, a new pack is placed in the orbit and left 24 to 48 hours. After the hemorrhage is controlled the cavity is flushed with a non-irritating antiseptic to remove the blood clots and other degenerating tissues and their products. If careful asepsis has been observed, the sutured edges will heal by first intention and the orbit should be smooth or only slightly sunken since scar tissue will form in the orbit along with the proliferation of the remaining fatty cushion of the eye.

Following any of the above operations, the patient may not cooperate and will irritate the wound by rubbing and scratching. In these cases padding the feet or construction of a large collar of some light, strong material may be necessary to prevent the dog from disturbing the wound.

### REFERENCES

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### Powdered Milk

Powdered milk is commonly regarded as a modern development. Indeed, World War II has led to its manufacture by the hundred million pounds. But even as far back as 1919, 9 million pounds came out of driers. And if you're interested in tracing it way back, Marco Polo recorded that the Mongols were drying milk back in the 13th century.

Tests have shown between 1800 and 2000 worm ova in a single thimbleful of topsoil in hog lots over which young pigs are allowed to roam.