

# CORNEAL ULCERS

## What is a corneal ulcer?

The cornea is the transparent, shiny membrane which makes up the front of the eyeball. Think of it as a clear window. To understand a corneal ulcer, you must first understand how the cornea is constructed.

The cornea is comprised of three layers. The most superficial layer is the epithelium. This layer is comprised of many very thin layers of cells. Below the epithelium is the stroma, and the deepest layer is Descemet's membrane. Because all of these layers of the cornea are clear, it is not possible to see them without special stains which colour particular cells and highlight them when looked at with a microscope.

An erosion of few layers of the epithelium is called a corneal erosion or a corneal abrasion. A corneal ulcer is an erosion through the entire epithelium and into the stroma. If the erosion goes through the epithelium and stroma to the level of Descemet's membrane, a descemetocele exists. If Descemet's membrane ruptures, the liquid inside the eyeball leaks out, the eye collapses and irreparable damage can occur.

## How does a corneal ulcer occur?

There are several causes for corneal ulcers in dogs. The most common is trauma. An ulcer may result from blunt trauma, such as a dog rubbing its eye on the carpet, or due to a laceration, such as a cat scratch. The second most common cause is chemical burn of the cornea. This may happen when irritating shampoo gets in the eye.

Less common causes of corneal ulcers include bacterial infections, viral infections, and other diseases. These may originate in the eye or develop secondary to disease elsewhere in the body. Examples of other diseases include Epithelial Dystrophy (a weakening of the cornea which can be inherited in breeds such as the Boxer), Keratoconjunctivitis Sicca (drying of the cornea due to abnormal tear formation), which occurs in breeds such as the West Highland White Terrier and diseases of the endocrine system (diabetes mellitus, hyperadrenocorticism, and hypothyroidism).

## **How does a corneal ulcer affect my dog?**

A corneal ulcer is very painful. In response to pain, most dogs rub the affected eye with a foot or on the carpet. To protect the eye, they keep the lids tightly closed. Occasionally, there will be a discharge that collects in the corner of the eye or runs down the face.

## **How is a corneal ulcer diagnosed?**

Superficial corneal abrasions are usually not visible. They can be visualised with the use of special stains such as fluorescein. A drop of this stain is placed on the cornea. The dye will adhere to an area of ulceration and is easily visualised especially with special lights such as Wood's light. This is the most basic test performed and may be the only test needed if the ulcer is acute and very superficial. If the ulcerated area is chronic or very deep, samples are taken for culture and cell study prior to applying the stain or any other medication.

## **How is a corneal ulcer treated?**

Treatment depends on whether there is a corneal abrasion, corneal ulcer, or descemetocoele present.

Corneal abrasions generally heal within 3-5 days. Medication is used to prevent bacterial infections (antibiotic ophthalmic drops or ointment) and to relieve spasm and pain (atropine ophthalmic drops or ointment). Antibiotic drops are only effective for a few minutes so they must be applied frequently; ointments last a bit longer but still require application every few hours. It is suggested that an antibiotic preparation be instilled in the eye 4 to 6 times per day. On the other hand, the effects of atropine last many hours so this drug is only instilled about twice daily.

If a corneal ulcer or descemetocoele is present, measures must be taken to protect the eye and to promote healing. Since dogs do not wear eye patches well, surgical techniques are often used to close the eyelids and cover the ulcer or descemetocoele. These measures protect the eye for several days, then are reversed so the dog can use the eye again.

Ulcers that do not heal well often have an accumulation of dead cells at the ulcer edge. These dead cells prevent normal cells from the corneal surface from sliding over the ulcer edge and filling in the defect to heal it. If this appears to be part of the healing problem, the dead cells are removed from the edges of the ulcer before the eyelids are surgically closed. In some cases, removing the dead cells may be all that is needed to start the healing process, so surgical closing of the eyelids may not be necessary. Often this procedure can be done under topical anaesthesia.

### **Can a corneal abrasion become a corneal ulcer?**

After 2-3 days of treatment, your dog should be re-examined to be sure that healing is progressing properly. If not it may be suggested that surgery should be performed.

### **Are there any side-effects from the eye medications?**

Occasionally a dog will be allergic to an antibiotic that is instilled in the eye. If your dog seems more painful after the medication is used, discontinue it and contact the veterinary surgeon immediately.

A corneal ulcer is extremely painful for the dog so the eye is kept tightly shut. Atropine relieves the pain and spasm but also dilates the pupil widely. In consequence the eye is very sensitive to light and because of this the eye will be held closed in bright lights.

The effect of atropine may last for several days after the drug is discontinued. Do not be alarmed if the pupil stays dilated for several days.

### **My dog began to drool excessively and paw at its mouth after I administered the eye medications. Is that a reaction?**

No. The tear ducts carry tears from the eyes to the back of the throat. The eye medications may go through the tear ducts and eventually get to the throat where they are tasted. Atropine has a very bitter taste which may cause drooling and pawing at the mouth. You are seeing your dog's response to a bad taste, not a drug reaction.

### **Since a corneal ulcer is painful, can I apply a topical anaesthetic to the cornea?**

A topical anaesthetic is often used to numb the cornea so the diagnostic tests may be performed. However, these drugs do delay healing and have to be used with discretion.

### **How do I know when to discontinue medication?**

The best way to tell that the cornea has healed is to repeat the fluorescein stain test.

This will probably be carried out by your veterinary surgeon after 5-7 days of treatment.

## **There appear to be some red streaks near the ulcer. Is that normal?**

The normal cornea has no blood vessels going through it. However, when a corneal ulcer or descemetocele occurs, the body tries to heal it. New blood vessels are created by a process called neovascularisation. The new vessels begin at the sclera (the white part of the eye) and cross the cornea to the ulcer.

Neovascularisation is a good response because it hastens healing. However, after the ulcer is healed, these vessels remain in the cornea. They are not painful, but they do obstruct vision. Therefore, it is desirable to remove them. This is done with the use of ophthalmic drops or ointment containing a corticosteroid (cortisone) which may have to be used for a few days to several weeks, depending on how much neovascularisation has occurred.

It is important that steroids are not in the eye too soon because they will stop healing of a corneal ulcer and may worsen it. Therefore, the fluorescein dye test should be performed before beginning this type of medication. If steroids are used and the eye becomes painful again, discontinue the steroids and contact your veterinary surgeon.