Ophthalmology

Ocular (eye) problems are a very common presenting complaint in veterinary medicine. A veterinary technician should know basic eye anatomy and be familiar with common eye tests, including how to perform these tests in clinical practice and to know for what they are testing. This PowerPage discusses these tests, basic eye anatomy, and common eye problems in pets.

Eye Anatomy

Basic Eye Structure
- **Orbit** - The hole in which the eye sits surrounded and formed by the maxilla, zygomatic, frontal, and ethmoid bones.
- The proper term for eyelids is **palpebrae**.
- **Eyelashes are cilia** (small hairs) which line the palpebrae on the upper and lower lids.
- **Conjunctiva** is the membrane that lines the insides of the eyelids and eye itself. It secretes mucus which helps to lubricate the eye.
- The **lacrimal gland makes tears** which are secreted through the lacrimal duct. It is also connected to the nasal passage via the nasolacrimal duct.
- The **third eyelid is the nictitating membrane**. It is located near the medial canthus and sometimes protrudes if the eye is painful, from trauma, or if the animal is sedated.

Anatomy of the Globe
- The **sclera** is the white part of the eye.
- The **cornea** is clear and retracts light. It has no vessels. It is made up of 10 layers and forms the anterior portion of the eye.
- The **uvea** is the vascular tunic made of the choroid, ciliary body, and iris. The iris is the colored part of the eye, the ciliary body helps to focus the eye, and the choroid helps guard against glare.
- The **pupil** is in the central part of the iris. Light passes through the pupil.
- Images are formed in the **retina**, which is made of rods and cones. (Mostly rods in dogs, which are best suited for night vision)
- The **tapetum** is the reflective layer at the back of the eye which helps animals to see in dim light.
- The **fundus** is part of the posterior eye segment that is viewed with the ophthalmoscope. The fundus is made up of the optic disc (head of the optic nerve), the neurosensory retina, retinal pigment epithelium, and choroid.
- The **lens** is a circular and transparent disc made of protein with no blood supply. The shape of the lens is moderated by the ciliary muscle which helps with focus and distance. Cataracts are deposits on the lens.

Chambers of the Eye:
1) **Anterior chamber** - located between the front of the lens and cornea. It is filled with aqueous humor (fluid) which is directly related to the intraocular pressure.
2) **Posterior** chamber - located between the iris, lens, and ciliary body.
3) **Vitreous** - located between the retina and iris. It has vitreous humor which has more of a jelly-like consistency instead of fluid to help **keep the retina intact**.

### Eye Testing

Eye tests are often needed to make a diagnosis and should be done in the following order:

1) **Schirmer Tear Test** - **tests tear production**. A small strip of designated STT paper is placed under the lower lid of each eye. The dye in the paper will begin to turn color as tears are produced. **Normal tear production is greater than 15 mm in 60 seconds. This is the test for Keratoconjunctivitis Sicca (KCS)**.

2) **Fluorescein Dye Test** - a small amount of yellow fluorescein stain is applied to the eyes. If there is a corneal defect or scratch, the dye will glow under a blue light. **This is the test for a corneal ulcer or abrasion**.

3) **Tonometry** - a Tonopen is used to measure intraocular pressures. **Normal pressures are less than 25 at less than 5% error**. The reading should be taken 3 times or more to ensure accuracy. **High pressures suggest glaucoma. This is the test for glaucoma**. A low pressure suggests uveitis, or inflammation in the eye.

### Other Ocular Terms to Know:

- **Miosis** - a small or constricted pupil
- **Mydriasis** - a dilated pupil
- **Anisocoria** - different sized pupils (one pupil is larger or smaller than the other). May suggest trauma or neurologic disease.
- **Pupillary Light Reflex (PLR)** - pupils should constrict in light and dilate in dark
- **Enucleation** - surgical eye removal (removing the globe)
- **Proptosis** - an eye that has popped out of the socket
- **Hyphemia** - blood in the anterior chamber of the eye
- **Hypopion** - pus in the anterior chamber of the eye
- **Entropion** - rolling in of the eyelids
- **Cherry eye** - prolapsed gland of the third eyelid. The gland should never be removed surgically or dry-eye will occur. The gland is typically replaced or “tacked down” surgically back under the third eyelid.
- **Canthus** - refers to the corner of the eye. Medial canthus is the corner toward the nose; the lateral canthus is the corner toward the ear.

### Reference: