**OPHTHALMOLOGY OVERSIGHTS**

**A CLEARER PATH FOR VETERINARY TECHNICIANS**

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**Taking a History**

Acquiring an accurate history is an extremely important part of the ophthalmic examination. It should include signalment, primary complaint, current treatment, other medical conditions, and any additional medications. Other important questions should be onset of problem, duration of problem, vision deficits, behavioral changes and the patient’s travel history. It is important to listen carefully and not “spoon feed” the owner answers you want to hear. Asking if there is a specific time of day or circumstance that the animal has difficult seeing is much better than asking “Does he have trouble seeing at night?” This encourages the owner to elaborate on their pet’s problem instead of giving one-word answers.

**Basic Rules**

An ophthalmic examination should always be performed in a quiet room away from the noise and activity of the hospital. This allows the animal to be less distracted and will reduce unwanted ocular movement during the examination. It is important to adequately darken the room since a good portion of the exam is performed in the dark. A small night-light can be useful in providing sufficient illumination for performing your exam and positioning the patient. It is a good idea to warn clients with small children when you are turning off the lights.

The ocular examination should always be performed in a systematic manner, starting superficially with the ocular adnexa and working from the anterior to the posterior segments of the eye. This will avoid missing relevant lesions. Always examine both eyes even if the problem is limited to one eye. The “good eye” can be a reference for what is normal in that patient. Always use a bright source of focal illumination. The Finoff Transilluminator is the tool of choice for most ophthalmologists and attaches to a standard Welch Allyn handle. A good light source is needed to obtain a complete pupillary light response (PLR).

**Initial Observations**

Initial observations can give you clues to the patient’s visual status. How does the patient ambulate when called into the exam room? Does the patient make eye contact with you or it’s
owner when spoken to? Does the patient seem disoriented with new surroundings? The answers to these questions can give you a good start on establishing whether or not your patient is visual. Observing the animal from several feet away can also give you pertinent information. This is called a “No Touch” exam.

The patient should be evaluated for bilateral symmetry of the globes, eyelids, brows and lateral canthus. Blepharospasm, hyperemic conjunctiva, chemosis, and epiphora can often be noticed at a distance and should be recorded prior to performing diagnostic tests. Many patients squint when initially touched by the examiner. Observing from a distance helps distinguish a true blepharospasm from a reflex response.

Restraint
When restraining a patient for an ocular exam “less is more” seems to be the best approach. Allowing the patient to rest its chin in one hand while your other hand is placed gently, but firmly on the back of the head works well for most patients. Avoid “scruffing” the patient as this may change the conformation of the lids on animals with very loose skin, or in some instances proptose the globe of a brachycephalic patient. Heavy restraint around the neck should also be avoided. A collar that is too tight, or an overzealous owner holding too firmly around the neck often result in a false increase in intraocular pressure due to occlusion of the jugular vein. Light sedation can be used for unmanageable patients, but keep in mind that enophthalmos and elevation of the third eyelid may occur making an ocular exam more difficult to perform.

Assessment of Vision
Assessing a patient’s vision can often be a challenge. A good history from the owner will give you hints about how well the animal can see. Additional vision tests described below can be performed to help determine visual status. Combining the results of all of these tests will give you the best estimation of how visual your patient is. Keep in mind that animals blind in one eye adjust extremely well and can deceive you into thinking both eyes are visual.

One of the easiest ways to test vision is with an obstacle course. A course can be set up with a number of items; chairs or trashcans are often items that are readily available. Children’s soccer cones work wonderfully and are fairly inexpensive. The cones can be stored easily and will not hurt the patient when bumped. Ten to twelve cones are usually sufficient to set up a good course. The cones should be placed with ample space between them depending on the size of your patient. Have the owner stand at one end of the course while you stand with the dog at the opposite end. The owner should call the dog once or twice at most, and how the dog navigates the maze should be recorded. Keep in mind if the owner calls repeatedly the dog may go by sound rather than sight. A blind dog will tend to use his nose and will often be much more tentative. If the test is done more than once the cones should be rearranged since most dogs will learn the course in one or two tries. This test should also be performed in a dim light situation to
assess night vision. With some retinal diseases or syndromes, night vision is affected first and the loss is evident when vision testing is performed in the dark.

Unfortunately cats are usually “uninterested” in the obstacle course and would rather find the quickest way out of the exam room. Therefore other tests must be used to judge their vision status. Horses can be walked up and down a hallway or aisle with bales of hay placed strategically to make up a suitable obstacle course.

The menace reflex is a blink that occurs with a sudden hand movement toward the eye. A false positive can often result from the corneal sensation of the air current.

Holding a closed hand several inches from the patient’s eye and then suddenly opening your fingers may give you a more accurate response.

Care should be taken not to touch any eyelashes or whiskers when performing this test. Keep in mind that the lack of a menace response in animals under four months of age is normal.

Visual tracking is another clue to visual status. Tossing an object such as a noiseless cotton ball in front of or to the side of the patient helps assess central and peripheral vision. Swinging a shoelace or string can work for cats. Again you must remember that some animals are uninterested and don’t follow the stimulus even though they are visual.

Visual placing can be done in small dogs and cats. A visual animal when held and brought towards a table will pick up its feet and try to place them prior to the feet hitting the table edge. A blind animal must feel the table before realizing it must pick up its feet for placement.

**Pupillary Light Reflexes**
The pupillary light reflex is the response elicited from the pupils when stimulated by a bright light source. This test should be done in a dark room after the patient has adjusted to the dark and prior to instilling any mydriatics into the eye. The normal response is composed of both direct and indirect responses. Constriction of the pupil on the same side as the light stimulus is called the direct response. Constriction of the pupil on the opposite side is called the indirect or consensual response. First, perform the direct test by shining the light into the test eye and note any change in the pupil. Next, swing the light to the opposite eye to test the indirect response. Only shine the light in the second eye long enough to note the pupil is already constricted.

After examining the first eye, allow a few seconds for the pupils to readjust to the dark before examining the response in the opposite eye. Dogs and cats have a fairly brisk response that results in a miotic pupil. Herbivores have a slower response and the pupil doesn’t constrict as completely as in small animals. This should not be mistaken as an abnormality. If you notice any problems with the pupillary light response a veterinarian should examine the animal before any mydriatics are placed in the eye. Common reasons for an abnormal PLR are a weak penlight, and
a nervous or excited animal. Cats especially can have extremely dilated pupils and little response to light stimulus when they are frightened. In these instances giving the patient some time to acclimate to the surroundings may help.

**Schirmer Tear Test**
The Schirmer tear test is used to measure reflex tear production and should be performed on any patient showing signs of ocular disease, especially patient predisposed to Keratoconjunctivitis Sicca (KCS). Some of the more common breeds predisposed to KCS include Shih Tzus, Lhasas, Yorkshire Terriers, West Highland Terriers, English Bulldogs and Pugs. The Schirmer tear test should be performed prior to any topical medications being instilled into the eye. Don’t clean or “wash out” the eye prior to performing this test and make sure the owner has not medicated prior to entering the exam room. As long as there has been at least 1-2 hours since the last medication application, the Schirmer tear test should be valid. The test is performed by placing a standardized commercial strip of absorbent paper in the lower lateral conjunctival fornix for 60 seconds. Care should be taken not to touch the notched end of the paper strip and the results should be read immediately upon removal of the test strip from the eye. Normal Schirmer tear test values are 18 to 25 mm of wetting for dogs and 10mm of wetting or greater in cats. A result of less than 15mm in dogs combined with clinical signs is suggestive of KCS.

**Fluorescein Staining**
Fluorescein is a water soluble dye used to assess the integrity of the cornea and the flow of tears through the nasolacrimal system. If the corneal epithelium has been damaged due to an erosion or corneal ulcer, the exposed corneal stroma allows retention of the fluorescein dye. The fluorescein dye is available in a multi-use solution and as impregnated individual use strips. The strips are preferred over the solution to minimize chance of contamination from patient to patient. The stain is applied by first moistening the end of the strip with a drop of sterile eyewash. The strip is then lightly touched to the dorsal bulbar conjunctiva. The patient is allowed to blink a couple of times to disperse the stain. The eye is flushed with sterile eyewash to remove excess stain and examined with a cobalt blue light or Wood’s lamp. If the corneal epithelium has been damaged a bright apple green retention of stain will be visible. If the staining results are positive the location and shape of dye retention should be documented and drawn on the medical record. In this case, tonometry should be avoided and the veterinarian alerted. To assess patency of the nasolacrimal system a Jones test is performed. The fluorescein dye is applied as above but instead of rinsing out the eye, a drop of sterile eye wash is instilled in the eye and left for 5–10 minutes. The stain should be visible from the nostril within 5–10 minutes proving patency. However, the absence of dye does not always mean obstruction. Examining the back of the patient’s throat will often show presence of dye revealing alternate duct openings within the oral cavity. Presence of dye is recorded as a positive Jones test and absence of dye is recorded as a negative.
**Tonometry**

At this point in the exam process tonometry can be performed as long as the cornea is not compromised with severe disease or an ulcer. Tonometry is the measurement of intraocular pressure and can be performed using a Schiotz tonometer, (indentation tonometry) or a Tono-Pen XL (applanation tonometry). A drop of topical anesthetic should be instilled into the eye prior to doing this test. The drop takes about 20 seconds to take affect and lasts for approximately 15 to 20 minutes.

**Indentation tonometry** – This determines intraocular pressure by indenting the cornea. The Shiotz tonometer is what most practitioners have on hand and is fairly economical. Although it looks somewhat archaic, when cleaned and used properly it is a very accurate instrument. Knowing how to operate this piece of equipment will make you an invaluable employee. There are a few disadvantages to using this instrument. First a second person is needed to restrain the patient properly. Second, it is difficult to use in patients with tiny eyes or small eyelid openings. Thirdly, it can only be used in horses or large animals if they are laterally recumbent. The Shiotz tonometer consists of a plunger that glides through a cylindrical chamber and has a footplate at one end. A needle moves across a millimeter scale on the other end.

There is a handle for easy manipulation of the device. Different weights can be added if the intraocular pressure is high and the standard 5.5 weight is not enough to indent the cornea. The Shiotz tonometer should be calibrated before each use and cleaned after every patient. The patients’ eye must be positioned vertically looking directly at the ceiling so the tonometer can be placed on the center of the cornea. The restrainer must tip the dogs’ nose up and make sure there is no pressure on the jugular vein to avoid artificially increasing intraocular pressure. Once the topical anesthetic has taken affect the tonometer is held vertically over the cornea and placed centrally letting all the weight rest on the cornea for 1–2 seconds. The scale can be turned toward the restrainer who can call out the readings to the examiner. A total of three good readings should be taken and the measurements averaged. Make sure to avoid the sclera and the third eyelid. Placing the footplate in these areas will result in poor measurements. Once the measurements are averaged refer to the conversion chart using the proper weight column for your reading. Typically with a 5.5 weight the normal readings for a dog are between 3 and 7. On the conversion chart that would mean an intraocular pressure between 17 and 26mm/Hg. Using a Schiotz tonometer requires practice and patience. Including this test in a general physical exam for breeds predisposed to glaucoma is not only good medicine but also an excellent way to master the skill.

**Applanation Tonometry** - This determines the intraocular pressure by flattening the cornea. A Tono-Pen XL is the instrument most commonly used by ophthalmologists. The main disadvantage to this instrument is the cost. Compared to $150 for a Schiotz tonometer, the Tono-Pen is approximately $3,000. The Tono-Pen is a small portable electronic device with a
replaceable sterile cover over the end. When held at the proper angle and lightly touched to the
central cornea several times, this instrument takes multiple readings and when a long beep is
heard the intraocular pressure is displayed on the digital screen. The Tono-Pen can be used with
the patients’ head in various positions so an additional restrainer is not usually necessary.
Making sure there is no additional pressure on the jugular vein due to restraint, or a tightly fitting
collar is important in obtaining accurate readings. The normal range for intraocular pressures
with this instrument in a dog is 12–20mm/Hg. In cats the range is 14–25mm/Hg. If pressures of
over 30mm/Hg are recorded, mydriatics are contraindicated and the veterinarian should be
alerted immediately.

**Lens and Retina**
In order to examine the lens and the retina properly the patients’ pupils must be dilated. The
veternarian usually performs this section of the exam. The technician can instill the mydriatic as
long as the pupillary light responses, intraocular pressures and appearance of the iris in both eyes
was normal. In the case of abnormal results in any of these three tests the veterinarian needs to
examine the patient prior to the instillation of any mydriatics. The mydriatic most frequently
used is 1% Tropicamide. Mydriasis is complete in approximately 20–30 minutes and can last for
up to 12 hours. When using this medication on cats it is not uncommon for the cat to salivate and
foam at the mouth for a short period of time due to its extremely bitter taste. It is a good idea to
warn the owner of this possibility.

**Client Education**

Client education is by far one of the most important responsibilities of a veterinary technician.
The more a client understands about their pet’s condition and its management, the more likely
they are to comply with your instructions. Once you have explained medication directions to the
owner, following up with specific written instructions gives the owner something to refer to and
reinforces the importance of medicating properly. Demonstrating how to apply or give the
medications helps alleviate any questions about medicating. If the patient has been diagnosed
with a condition that is *controllable* but not *curable* such as keratoconjunctivitis sicca, glaucoma,
or pannus, this point must be stressed and explained to the owner. Many owners want to believe
once the medication is gone their pet will be cured and they will no longer need to medicate.
When discussing these lifelong diseases with the owners, describing warning signs for disease
progression helps get the patient in sooner when a problem occurs. This is especially important
with the treatment and management of glaucoma where a matter of hours can make the
difference between a visual dog and a blind dog. When a patient is diagnosed with a blinding
disease or is already blind but the owner was unaware, the news is often devastating to most
owners and counseling and reassurance are usually needed. With some owners the first instinct is
to have the dog euthanized. It’s our job to educate them on how well blind dogs do as long as
they are comfortable and in familiar surroundings.