

The Complete Ophthalmic Examination

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Components of the Anterior Segment Ocular Exam

The eye is unique in that most of its structures can be visualized and clinicopathologic diagnoses frequently are possible from the complete ophthalmic exam. You will need to have a basic knowledge of gross and histologic anatomy of the eye and orbit in order to make a diagnosis and provide a prognosis. Minimal equipment is necessary to perform a complete ophthalmic exam. The practitioner is encouraged to always strive to acquire the "minimum ophthalmic data base" to best diagnose and treat his/her ophthalmic patients. Rarely, an aspect of the complete ophthalmic exam will be forfeited (example: tonometry should not be performed on an eye with a descemetocoele due to risk of globe rupture). Components of the minimum ophthalmic data base include: menace response, direct and consensual pupillary light reflex, palpebral reflex, Schirmer tear test, fluorescein stain, and tonometry. Additional diagnostics typically performed in an awake patient include: conjunctival/corneal cytology and/or culture and sensitivity, conjunctival biopsy, and nasolacrimal flush.

Pupillary Light Reflex

The direct pupillary response is done by simply shining a bright light into each eye.¹ Dim or extinguish the exam room lights and stand back far enough so that you can see both pupils via the fundus reflection when you look through the direct ophthalmoscope set at '0' diopters. Have an assistant shine a light first in one then the other eye while you observe the response in the non-illuminated eye.² A more simple method does not require an assistant or extinguishing of exam room lights. First establish that each eye has a direct response. Then shine your light in the right eye. When the pupil constricts (or after a second or two, if the pupil does not constrict), quickly swing your light to the left eye. If there had been a constriction on the left side, the left pupil should still be in a constricted state if you have swung the light quickly enough to the left eye. (If you were not quite quick enough, the left pupil will be slightly dilated and will, if normal, constrict directly in response to your light.) Repeat the procedure for the left eye.

Corneal/Palpebral Reflex

This reflex involves trigeminal (fifth; sensory) and facial (seventh; motor) nerves - any painful stimulus to or touching of cornea or eyelids leads to reflex closure of palpebral fissure through action of orbicularis oculi muscle.

Menace Response

You may see this sometimes referred to as the "blink reflex" and it involves optic (second; afferent) and facial (seventh; motor) nerves. It is a "learned response" such that the patient responds to sudden stimulation of visual system (such as foreign

body moving toward eye) by closure of palpebral fissure and sometimes turning of head away from the stimulus. It is learned, and therefore more appropriately referred to as a response (not a reflex).

Schirmer Tear Test

The Schirmer tear test I (STT) is a method of measuring basal and reflex tear production in animals when deficient tear volume (aqueous component) is suspected. It is performed by inserting a sterile filter paper strip into the lower, middle conjunctival fornix of each eye. The strip is inserted and left in place for 60 seconds, then removed and the length of the filter paper that has been moistened by the tear fluid is measured on a mm scale. Normal values for dogs are 15 mm/min or greater while normal values in cats may be considerably less, possibly as low as 5 mm/min. STT measurements should be made at the beginning of the examination prior to application of topical agents or to any manipulation of ocular tissues.

Fluorescein Staining

Fluorescein dye is used diagnostically in veterinary ophthalmology for a number of reasons. The most common and important reason for placing fluorescein stain onto the eye is to detect a corneal ulcer. Recall that the corneal stroma is hydrophilic and, therefore, the water soluble fluorescein has a marked affinity for exposed stromal tissue. An area of positive staining will be noted by a bright yellow-gold appearance under room light conditions or using a focal white light. A cobalt blue filter on the tip of a hand-held transilluminator or an ultraviolet (UV) light will excite the fluorescein and any area of positive staining will appear bright green. Keep in mind that fluorescein does not stain epithelial surfaces or Descemet's membrane. Fluorescein may also be used to determine patency of the nasolacrimal (NL) drainage ducts (Jones test). Open the package of an individually wrapped, single, fluorescein strip and withdraw the sterile strip. Place a drop of diluent (sterile eye wash or sterile saline) onto the end of a sterile, individually packaged, fluorescein strip. As a bolus of stained fluid pools on the end of the strip, instill one drop of stain into each eye. Do not allow the strip to touch the surface of the cornea, or you may cause a corneal ulcer. Apply a cotton swab to the medial canthus, lower the animal's head slightly and flush the eye with diluent. Gently blot the medial canthus with a cotton swab to remove excess fluid. The eye is scanned with a focused light (with or without a cobalt filter or UV light). A short time later, usually in 3–5 minutes, the nares are inspected using the focused light to determine if fluorescein has passed through the nasolacrimal ducts. If dye has not drained into the nostrils by 5–10 minutes after instillation, obstruction of the duct is suspected and NL irrigation may be indicated.

Tonometry

Intraocular pressure measurement, or tonometry, is important for diagnosing glaucoma (elevated pressure) and uveitis (low pressure) and in assessing response to therapy when treating these conditions. Applanation tonometry (Tono-Pen) provides accurate and reproducible intraocular pressure readings in veterinary patients and is becoming increasingly used in general practice. Applanation tonometers have several advantages over the Schiøtz tonometer. They are highly accurate, their readings are less affected by corneal disease, they can be used to measure intraocular pressure in vertically as well as horizontally positioned corneas, and are very easy to use, making them the instrument of choice for measuring intraocular pressure in domestic animals. The TonoVet® is a newer, handheld veterinary tonometer which allows measurement typically without anesthetic. With TonoVet®, a very light probe is used to make momentary contact with the cornea.

Ophthalmoscopy

Either direct or indirect ophthalmoscopy may be used to examine the posterior portion of the eye (i.e., the vitreous and fundus). The monocular direct ophthalmoscope is routinely available for use in general practice for examining the back of the eye. Pharmacologic pupillary dilatation is needed to adequately examine all intraocular structures deep to the iris (recall, pharmacologic dilation is contraindicated in patients with glaucoma). Generally, 1% tropicamide is used in most species for routine mydriasis; it is a synthetic atropine derivative and acts by blocking the use of acetylcholine, therefore blocks parasympathetic action and pupil dilates due to sympathetic tone. The pupil dilates in about 15 minutes in small animals, (20–25 minutes in large animals) and will remain dilated for approximately 4–8 hours.

There are dials on the direct ophthalmoscope head piece - one dial will control the size and shape of the light beam and another will control the focal point of the light beam. The horizontal dial is set to project a large circular white light beam and the vertical dial is adjusted to focus on the structure(s) of interest (e.g., start at 0 for viewing the fundus). By adjusting the focusing distance of the direct ophthalmoscope, the examiner may use the instrument to examine all visible intraocular structures. Its most common use is in examination of the posterior portion of the globe. When the vertical dial is set on 0, subtracting diopters (i.e., -1, -2, -3, etc.) moves the focal point away from the viewer. Conversely, when diopters are added (e.g., +1, +2, +3, etc.) the focal distance is brought closer to the viewer. The vitreous should be in focus when the diopter dial is set between +6 to 0 for most animals and the fundus is in focus between 0 and -2 diopters. Note: if the examiner normally wears corrective eyewear, and removes his/her glasses when performing direct ophthalmoscopy, the refractive power of the examiner will need to be adjusted for (thus, the diopter power needed to achieve focus for various ocular structures may vary slightly from person to person).

Indirect ophthalmoscopy involves using a focused light and a condensing lens (typically 20–28 diopters in small animal) to view the fundus. A head-mounted light source combined with a set of prisms may be used and provides the viewer with a binocular view. A hand-held light may also be used. A Finoff transilluminator is recommended as a focal light source for performing monocular indirect ophthalmoscopy. The vitreous is examined for congenital remnants (retained hyaloid structures) and other opacities (degenerative materials, hemorrhage or exudates).

References

References are available upon request.

SPEAKER INFORMATION

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