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Ocular examination - how to do it?

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An ophthalmic examination should not be a scary experience! Though admittedly interpretation of the findings may sometimes be challenging, the examination itself follows a logical, anatomical order. Furthermore, it does not require expensive equipment. In fact, the most important items required are non-ophthalmic in nature: a room that can be darkened, a good source of focal light and a magnifying loupe. A hand held lens, a direct ophthalmoscope, a Schiotz tonometer and some disposable items (stains, solutions, etc) complete the list of equipment. As with any other system, the clinician should pay particular attention to the signalment. Numerous ocular diseases may be breed- or age-related. Since many ophthalmic disorders may be manifestations of systemic diseases, a general history should be taken and a comprehensive physical examination should be conducted. Similarly, if neuro-ophthalmological abnormalities are present (blindness, strabismus, anisocoria, etc.), the neurological system should be evaluated, as these may be signs of a neurological disease.

Gross inspection

The patient should be observed as it walks into the room, as this is an unfamiliar environment which may highlight visual deficits; these will be further evaluated later on. Following the anamnesis and physical examination, the ocular assessment begins by careful observation of the patient from a distance, without touching the patient. While observing, ask yourself:

- Are both eyes open normally? Is there evidence of pain or photophobia? Is the animal blinking normally?
- Are the eyes of normal size and position? Is there evidence of entropion or ectropion (usually of the lower lid)? Is the upper lid prolapsed? Is the 3rd eyelid elevated?
- Is there ocular discharge? What is its nature?

Next, the orbital area is palpated to detect any fractures, abnormal swellings, etc. Use the opportunity to press on the globe through the upper lid. This serves both as a retropulsion test (which indicates the presence of a retrobulbar mass), and to proposte the 3rd eyelid, allowing inspection of its outer surface. It is not an effective way of evaluating intraocular pressure (IOP).

Inspect (grossly) the eyelids. Examine their skin surface, the mucocutaneous junction, and evert them slightly to visualize the palpebral conjunctiva and the two punctas. Use the opportunity to test the blink reflex in response to touching of the canthal skin. Continue by examining the bulbar conjunctiva and the cornea surface.

Assessing vision

Menace response

This involves making a sudden threatening gesture which is supposed to elicit a blink response. It is important to note that the menace response involves cerebral cortical integration and interpretation and therefore is not a reflex. Rather, it is a cortical response that requires the entire peripheral and central visual pathways, as well as the visual cortex and the nucleus of cranial nerve VII, to be intact.

To avoid false positive responses from the visual, contralateral eye, the menace response should be evaluated in one eye, while the other eye is covered. Be careful not to touch the eyelashes/hair of the patient, or cause air movement, as these may also elicit false positive response. False negative responses may be caused by facial nerve paralysis. Therefore, in the absence of a menace response always test the blinking reflex by touching of the skin at the canthus. Remember that the menace response is absent in very young (<10-12 weeks) animals, and may also be affected by the mental state of the patient.

Additional visual tests

Vision can be assessed using an obstacle course. The course may be navigated in light and dim environments, and with one eye patched. Be consistent in the obstacle course that you construct, and make sure it can be navigated by normal animals!

The visual placing response is useful when results of the obstacle course and menace response are equivocal. Lift the animal towards the table, allowing it to see the approaching surface. A normal animal will extend its leg towards the surface before its paw touches the table.

The pupillary light reflex (PLR) & dazzle reflex

Unlike the menace response, the PLR is a subcortical reflex. Therefore, it does NOT test vision, and a normal PLR may be found in a cortically blind animal. Furthermore, the PLR is usually present (though it may be diminished or slow) in animals suffering from PRA, cataracts, and other causes of subcortical blindness. Nevertheless, the PLR is a very important test, which helps localize the lesion. The dazzle reflex is another subcortical reflex. It is...
manifested as a bilateral, partial blink reflex in response to a bright light. The anatomical pathway responsible for this reflex is poorly understood. However, this test is a very useful substitute for the PLR in cases when the pupils can’t be seen, such as in cases of severe corneal edema or hyphema.

Examination in the dark
After the light has been dimmed, the dilation of the pupils should be evaluated. Use a dim light (to prevent constriction), and stand at a distance so you can visualize both pupils simultaneously, using the tapetal reflection. The tapetal reflection also serves to highlight (by means of retro-illumination) any ocular opacities, particularly in the lens or vitreous. Next, use a bright light to evaluate the Pupillary Light Reflex (PLR). Unlike the menace response, the PLR is a subcortical reflex. Therefore, it does NOT test vision, and a normal PLR may be found in a cortically blind animal. Furthermore, the PLR is usually present (though it may be diminished or slow) in animals suffering from outer retinal degeneration (PRD), cataracts, and other causes of subcortical blindness. Nevertheless, the PLR is a very important test, which helps localize the lesion which causes loss of vision. If one of the pupils does not react to light, or if it can not be visualized (e.g., in cases of severe corneal edema or hyphema), the consensual PLR should be checked. Alternatively, you can check the dazzle reflex. This is also a subcortical reflex, which is manifested as a bilateral, partial blink in response to a bright light. Magnification is required for the next stages of the examination. Once again, the lid margins, conjunctiva and corneal surface are examined. Use the magnification to check for aberrant eyelashes (trichiasis, distichiasis); these can be best visualized against the white background of the conjunctiva, by slightly pulling the eyelid. Following the anatomical order, next inspect the anterior chamber (looking for opacities in the aqueous), the iris surface and the anterior segment of the lens.

**Ophthalmoscopy**
This part of the examination is the one which clinicians usually dread the most. Part of this undoubtedly stems from the large range of normal variations in the appearance of the canine (and, to a lesser extent, the feline) fundus. Admittedly, if you are not in the habit of examining fundi, you will find it difficult to diagnose abnormalities. You should therefore make a habit of examining, however briefly, the fundus of every patient that you see. Your clients will appreciate the extra touch, and you will gain the required proficiency. Due to the high cost of an indirect ophthalmoscope, only a direct ophthalmoscope is available in most general practices. This instrument provides a high magnification (x16 in an average dog). The unfortunate consequence of the high magnification is a small viewing field (4°), extending the time required to examine the entire fundus. A quick overview of the fundus may be obtained using a bright light source and a handheld lens (20-30D), providing a means of monocular direct “ophthalmoscopy”. The direct ophthalmoscope comes with several features:

- A grid (graticule) - use it to compare the size of the lesion to the size of the optic disc
- Red-free filter (emits green light) - helps evaluation of hemorrhage and blood vessels, which appear black.
- Apertures of varying diameter - use the largest one that is appropriate for the patient’s pupil
- Changing lenses permits the examiner to evaluate the size/depth of a lesion, or to examine more anterior structures, such as the lens. A raised lesion will come into focus by adding convex/converging lenses (+). A depression/coloboma will come into focus by adding concave/diverging lenses (-). In dogs, each diopter you add is equivalent to 0.28 mm.
- Use of a narrow beam allows to evaluate depressions and elevations of fundus lesions.

Ophthalmoscopy should be conducted in a dark room, following dilation of the pupil. First evaluate the tapetal reflection from a distance, to detect any lenticular or vitreous opacities. As you approach the patient, focus on successively more posterior structures - cornea, iris, lens and vitreous-till you are focused on the fundus. Carefully inspect the entire fundus, evaluating changes in the tapetum, non-tapetum, blood vessels and optic disc. It is best to stay in stationary position and let the patient’s eye movements bring the structures to you, instead of trying to ‘chase’ them.

**Additional tests**
- Schirmer tear test is used to evaluate tear production and diagnose keratoconjunctivitis sicca. It should be conducted at an early stage of the examination, as any ocular manipulation may induce reflex tearing.
- Fluorescein staining is used to diagnose corneal ulcers. Superficial ulcers may be stained with Rose Bengal
- Samples for bacteriology, mycology and cytology may be taken as indicated. The first two should be taken before any drops are put in the eye, as solutions frequently contain preservatives.
- Nasolacrimal patency is evaluated by passage of fluorescein from the eye to the nose, by cannulating the nasolacrimal system and by dacryocystography.
- Ultrasound is frequently used in ophthalmology. The main indications are imaging of the retrobulbar area, and imaging of the posterior segment when it can not be visualized (e.g., due to hyphema or cataract). CT and MRI techniques may be used in certain cases.

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• Additional tests, including gonioscopy (evaluation of the iridocorneal angle as part of the diagnosis of glaucoma) and electroretinography (recording electrical responses of the retina to flashes of light, to determine retinal function) may be available in referral centers.

Recommended Reading


