

Ophthalmic Examination. It should not be expensive. It should not be complicated.

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BADANIE OKULISTYCZNE ZWIERZĄT. CZY MUSI BYĆ KOSZTOWNE I SKOMPLIKOWANE ?

Badanie okulistyczne jest ważnym badaniem w życiu zwierząt. Istnieje wiele chorób oczu, które łatwo rozpoznać nawet prostym badaniem. Wystarczy logicznie myśleć i znać anatomię i fizjologię gałki ocznej. Do podstawowego badania potrzebne są: ciemne pomieszczenie, silne źródło światła, soczewki powiększające, bezpośredni oftalmoskop, aplanacyjny tonometr oraz barwniki. Problemem może być interpretacja zaobserwowanych nieprawidłowości. W tym przypadku potrzebne jest duże doświadczenie osoby przeprowadzającej badanie.

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, an applanation tonometer (or the cheaper Schiottz 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 manifestation 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 (as this may cause distortion of palpebral fissure). While observing, ask yourself:

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- 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 exophthalmos or buphthalmos? Are the pupils of equal size?
- Is the eyelid conformation normal? 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 retrobulbar mass test (which indicates the presence of a retrobulbar mass), and to proptose 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. The afferent arm of the response consists of the retina, optic nerve axons, and the optic tract and radiations. The efferent component of the response includes the primary motor cortex, cerebellum, and the nucleus of cranial nerve VII (facial nerve).

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 facial nucleus and cranial nerve, to be intact. Also, remember that the menace response is a very crude test of vision, and in fact requires visual acuity of only 6/600!

The menace response should be evaluated in one eye, while the other eye is being covered. Be careful not to touch the eyelashes/hair of the patient, or to cause wind movement, as this may lead to a "false positive" response; consider making the menace gesture behind a glass partition (Figure 1).

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1. The menace response is evaluated by making a threatening gesture and watching the animal blink in response.

**The test may be performed behind a glass shield to avoid trigeminal stimulation.
The untested eye should be covered to avoid a false positive response.**

Likewise, "false negative" results (lack of a menace response in a visual animal) are also possible. One possible reason is facial nerve paralysis, which is ruled out using the blinking reflex. The menace response is absent in very young (<10-12 weeks) animals, and may also be affected by the patient's mental state.

Additional Tests of Vision

Vision can also be evaluated using an obstacle course. You should be consistent in the obstacle course that you construct, and make sure it can be navigated by normal animals! Test the patient in light and dim conditions, and consider patching one eye.

Another test is the visual placing response, which is useful when results of the obstacle course and menace response are equivocal. It is conducted by lifting 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.

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 (PRA), cataracts, and other

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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 (Figure 2).



**2. A dazzle reflex is elicited using a strong source of light.
The blinking observed is a subcortical reflex, and does not necessarily imply vision**

Next, using magnification and a focal light source, the anterior structures of the eye are examined in an anatomical order.

Eyelids & Eyelashes

Evaluate the size of the palpebral fissure, looking for a narrowed or enlarged fissure. Carefully examine the skin, looking for discharge and for signs of dermatological disorders, such as dermatitis, alopecia, scaling, swelling, crusting, ulceration, etc. Pay particular attention to the eyelid margin. In a normal animal, you should see the entire margin in close contact with the globe. Lack of contact may be due to ectropion (drooping lid). On the other hand, if you can not see the margin, or parts of it, the lid may be everted (entropion). Eyelash abnormalities may be better visualized if the lid is slightly retracted. Dark lashes can then be highlighted against the background of the white conjunctiva. Also use the opportunity to examine the punctas located at both lid margins, near the nasal canthus, as these are the only visible part of the nasolacrimal drainage system.

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Third Eyelid & Conjunctiva

At rest, the 3rd eyelid should be mostly retracted, and hardly visible. Look for increased prominence at rest, scrolled margin, or "cherry eye" and other masses. Gently press on the globe (though the upper eyelid) to elevate the third eyelid (Figure 3).



- 3. To visualize the outer, palpebral aspect of the third eyelid, the examiner pushes the globe into the orbit by gently pressing on the upper lid. At the same time the lower lid is everted to observe the palpebral and bulbar conjunctiva, and the lower puncta**

Examine its outer surface for irregularities of the margin, changes in color (e.g., anemia, icterus), congestion and surface moistness. The inner aspect of the 3rd eyelid margin may be examined after application of topical anesthetic and eversion of the lid with fine forceps. Look for foreign bodies or hyperplasia of lymphatic follicles.

Similarly, examine the conjunctiva lining the inner aspect of the eyelids and globe (palpebral and bulbar conjunctiva, respectively) for change in color, congestion, edema, prominent vessels, masses, thickening, discharge, moistness or subconjunctival hemorrhage.

Cornea & Sclera

The normal cornea should be smooth and transparent. Any deviation from these characteristics represents pathological changes. Look for loss of transparency due to edema, pigmentation, vascularization, cellular infiltration, lipid or mineral deposition, or fibrosis. Look for

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surface irregularities which may be due to ulceration, perforation and iris prolapse, granulation tissue or keratoconus. Evaluate the corneal diameter. An enlarged diameter may indicate glaucoma, while a reduced diameter will indicate a phthisical or microphthalmic eye.

Examine the anterior portion of the sclera for changes in thickness and surface irregularities that will indicate thinning (staphyloma), thickening (scleritis) or globe rupture. Changes in contour (globe rupture) or color should be evaluated. If excessive amounts of sclera are showing, exophthalmos should be suspected. The posterior parts of the sclera may be seen ophthalmoscopically in albinotic animals.

Anterior Chamber

Assess the depth of the anterior chamber (best visualized from the side), as it may be increased or decreased in various intraocular diseases. In normal animals, the aqueous filling the anterior chamber should be clear. Look for any opacities or masses such as blood, fibrin, hypopyon, aqueous flare, luxated lens, persistent papillary membranes, iris cysts or vitreous strands.

Iris & Pupil

Look for alterations in pupil shape, which may be due to adhesions, or iris atrophy, hypoplasia or coloboma. Changes in the color of the pupil may indicate cataract, hemorrhage or retinal detachment. The size of the pupil may be altered in uveitis, glaucoma and various diseases of the retina or the nervous system.

Examine the surface of the iris for any masses or changes in color. These may be due to inflammation, hemorrhage or neoplasia. Fluttering of the iris may indicate lens luxation.

Lens

The lens may be examined with direct visualization, or by retroillumination, using tapetal reflection. The two main pathologies are luxation or opacities, which would indicate cataract. A comprehensive lens examination requires dilation of the pupil.

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 fundii, 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 (Figure 4).

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4. Direct ophthalmoscopy in an ibex.

This instrument provides a high magnification ($\times 16$ 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 depth/height 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 vitreal 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.

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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 (Figure 5).



5. Schirmer tear test, to evaluate tear production, in a lion

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- Fluorescein staining is used to diagnose corneal ulcers (Figure 6).



6. A corneal ulcer stained with fluorescein

- 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 dacryocystorhinography.
- 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.
- 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

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