Vermont Veterinary Medical Association

2025
Winter CE Conference

February 1 and 2

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Basics of Performing a Complete Exam

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Basic of Performing a Complete Eye Exam

Vermont Veterinary Medical Association Winter 2025 CE Conference
February 1st, 2025
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Outline

1) History and general physical examination
2) Evaluation of vision, pupil function, and eyelid function
3) Adnexal and anterior segment examination
    a. Schirmer tear test
    b. Vital stains
    c. Tonometry
4) Posterior segment examination
    a. Direct ophthalmoscopy
    b. Indirect ophthalmoscopy

1) History and General Physical Examination

A complete and thorough history is an essential component of the ophthalmic examination. Initial information to collect includes the animal's signalment and the presenting complaint or complaints. Common presenting client complaints for ocular disease include squinting, ocular rubbing, ocular discharge, vision changes, pupil abnormalities, ocular opacities, and ocular color changes. After this information is determined, historical information obtained is focused and relevant to the primary ocular complaints. A detailed description of the primary ocular complaints is collected including information regarding chronological onset, progression, and duration.

It is essential to identify all concurrent known systemic diseases and systemic abnormalities. All ocular and systemic pharmaceuticals received by the animal should be identified, including over-the-counter medications and medications administered by the client on their own accord. A complete physical examination is warranted for all animals presented for an ocular complaint, including evaluation of body temperature, thoracic auscultation, oral cavity examination, regional lymph node palpation, and abdominal palpation.

2) Evaluation of Vision, Pupil Function, and Eyelid Function

The ophthalmic examination begins with observation of the animal at a distance. Signs of reduced vision or ocular discomfort (blepharospasm or ocular rubbing) can often best be appreciated from a distance prior to manipulation. Note how the animal navigates within the exam room. Skull and periocular structures are examined for size and symmetry. Furthermore, the size, position, and movement of the globes are assessed.

In addition to observations of the animal's ability to navigate in an unfamiliar environment, assessment of vision may be performed by the menace response, cotton ball test, visual placing, dazzle reflex, and obstacle courses. The pupils are evaluated in light and dark environments for size, shape, and symmetry. Direct and indirect pupil light reflexes are then tested with a bright, focal light source. Palpebral reflexes are tested by lightly touching nasal and temporal to the eyelids and observing the elicited blink response.

3) Adnexal and Anterior Segment Examination

Prior to excessive manipulation of the eye or installation of any ophthalmic solutions, assessment of aqueous tear production is performed by the Schirmer tear test (STT). The periocular regions are visually examined and palpated for abnormalities including discharge, redness, alopecia, swelling, and atrophy. The orbit is directly assessed through palpation of the bony orbital rim and indirectly assessed though light globe retropulsion and opening of the jaw.

At this point in the exam, a bright and focal light source is used in a darkened room. In addition, a magnification source (e.g., slit-lamp biomicroscope or magnification loupe) improves examination sensitivity and allows identification of more subtle lesions. Examination of the anterior segment of the eye is best performed in a systematic manner from anterior to posterior.

Eyelids and eyelid margins are examined for position, confirmation, movement, and other abnormalities (e.g., masses, alopecia, abnormal cilia). The nictitating membrane is assessed by gently retropulsing the globe through the upper eyelid to cause its elevation. The palpebral, nictitating membrane, and bulbar conjunctiva are evaluated for color, thickness, inflammation, foreign bodies, masses, and other abnormalities. The sclera, visible under the bulbar conjunctiva, is examined concurrently for abnormalities of color and thickness.

The healthy cornea is transparent and has a smooth surface. Most corneal pathologies predictably result in a loss of clarity and changes in the corneal surface contour. The specific color change, location, depth, and extent of all corneal opacities are recorded. Assessment of the corneal tear film and corneal epithelial integrity can then be performed by application of corneal vital stains (e.g., sodium fluorescein, rose bengal, or lissamine green; details in Table 1).

The anterior chamber is evaluated for transparency, depth, symmetry, and abnormal contents (e.g., hyphema, hypopyon, fibrin, masses). Iris color, position, and appearance are assessed, including pupil size and shape. A complete evaluation of the lens can only be performed following pharmacologic dilation of the pupil. Prior to installing a mydriatic (typically 1% tropicamide), the intraocular pressure (IOP) should be evaluated by tonometry. Following pupillary dilation, the lens is evaluated by direct illumination and retroillumination for transparency, position, size, and shape. The lens capsules should be clear and smooth.

4) Posterior Segment Examination

The posterior segment of the eye includes the vitreous, retina, choroid, and optic nerve. Examination of the posterior segment may be performed following pharmacologic dilation of the pupil by direct or indirect ophthalmoscopy (Table 2).

Direct ophthalmoscopes consist of a power source and coaxial optic system. Light is directed into the animal's eye and reflected back through a lens in the ophthalmoscope to the examiner. Direct ophthalmoscopes contain a rheostat to adjust light intensity, color filters, slit beams, grid beams, and a series of lenses to adjust the dioptric power (depth of focus within the eye). The image produced by a direct ophthalmoscope is real, erect, and magnified several fold. Disadvantages of the direct ophthalmoscope include the short working distance, small field of view (it is easier to overlook lesions and the examination is more time-consuming), lack of stereopsis (depth perception), and greater distortion when the visual axis is partially opaque. Advantages of the direct ophthalmoscope include greater magnification, technical ease of use, available options such as the slit and grid beams, and ability to alter the dioptric power of the ophthalmoscope.

Indirect ophthalmoscopy is a technique performed with a light source and placement of a converging lens between the examiner's eye and the animal's eye. Indirect ophthalmoscopy generates an inverted and reversed image. Disadvantages of indirect ophthalmoscopy include less image magnification and greater clinician skill required to master the technique. Advantages of indirect ophthalmoscopy include the larger field of view, safer working distance, greater ease of examining the peripheral fundus, and shorter examination time.

There are two basic types of indirect ophthalmoscopy, binocular and monocular. Binocular indirect ophthalmoscopy is a technique performed with a light source, mirror to direct the light into the animal's eye, handheld converging lens placed between the examiner's eye and the animal's eye to magnify the reflected image, and two prisms to split and direct the reflected light into the examiner's eyes. Binocular indirect ophthalmoscopy is most commonly performed with a headset containing the light source and ophthalmoscope. Advantages of the binocular technique include stereopsis and freeing of one of the examiner's hands to manipulate the animal.

Monocular indirect ophthalmoscopy is performed with a bright handheld light source and a handheld converging lens. This method does not permit stereopsis and requires the use of both the examiner's hands; however, the other advantages of indirect ophthalmoscopy are maintained. Self-contained monocular indirect ophthalmoscopes are also available that optically correct the inverted and reversed image.

Regardless of the ophthalmoscopy technique employed, the vitreous is examined for clarity, viscosity, and abnormal contents. The fundus is examined in a systematic fashion to ensure a complete evaluation is performed. The optic nerve, retinal vasculature, tapetal fundus, nontapetal fundus, and peripheral fundus are visualized sequentially. Knowledge of the normal fundus appearance and normal variations is essential. Changes in retinal color and transparency (e.g., edema, infiltrates, hemorrhage, pigmentation), retinal position (e.g., detachment, masses, colobomas), tapetal reflectivity (hyperreflectivity or hyporeflectivity), and vasculature (tortuosity, attenuation, dilation) are evaluated. The size, shape, and color of the optic nerve head are assessed.

Table 1. Comparison of select properties of sodium fluorescein, rose bengal, and lissamine green stains.

	Fluorescein	Rose Bengal	Lissamine Green
Staining	Corneal stroma	Healthy epithelium lacking mucin and devitalized epithelium	Devitalized epithelium
Toxicity	Low	High	Low
Irritation	No	Yes	No
Clinical Uses	Detection and evaluation of corneal ulcers, Seidel test, Jones test, Tear film break-up time test	Detection and evaluation of subtle epithelial defects, corneal ulcers, and mucin deficiency	Detection and evaluation of subtle epithelial defects and corneal ulcers

Table 2. Comparison of direct, binocular indirect, and monocular indirect ophthalmoscopy techniques.

	Direct	Binocular Indirect	Monocular indirect
Magnification	High	Low	Low
Image	Real	Inverted	Inverted
Stereopsis	No	Yes	No
Field of view	Small	Large	Large
Technical ease	Simple	Intermediate	Intermediate

Exam time	Long	Short	Short
Equipment cost	Low	High	Low