How to Perform the Ocular Portion of the Pre-Purchase Examination

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1. Introduction
An important yet commonly overlooked portion of the pre-purchase is the ocular examination. It is important for the veterinarian to be able to recognize lesions that may affect vision or function of the horse. Failure to notice characteristic ophthalmic abnormalities can result in frustration for the buyer. Common abnormalities of which the veterinarian should be aware include the following:

- Lid tumors
- Globe size abnormalities
- Exophthalmos/enophthalmos
- Corneal edema
- Corneal opacities
- Aqueous flare, hyphema, hypopyon
- Iris synechiae
- Cataracts
- Vitreous opacities
- Chorioretinal scars
- Retinal detachment

2. Materials and Methods
The veterinarian should come to the pre-purchase examination with the following items:

- Focal light source (example: Finoff transilluminator)
- Direct ophthalmoscope
- Indirect funduscopic lens (example: 20-D or 2.2 Panretinal lens)

Diagnostic Approach

Step 1: Facial Symmetry
The initial part of the examination should include evaluation of globe and facial symmetry. This is best evaluated with the veterinarian standing directly in front of the horse. From this position, it is easy to assess globe position and size as well as ocular comfort. Standing directly in front of the horse is also the ideal position to assess ocular comfort by comparing the symmetry of the upper eyelid cilia. Another important way to assess ocular comfort is by examining the horse’s face closely for signs of either present or past tearing.

Step 2: Palpation
Palpation can be used to investigate any asymmetry noted and to characterize the texture and sensitivity
Step 3: Vision and Normal Reflexes

To determine if the horse is visual, it is important to note how it reacts to its surroundings. However, many horses adapt well to loss of vision and can continue to perform well despite a degree of vision loss, especially if the vision loss is chronic. There are multiple ways to test a horse’s vision, including menace response, dazzle reflex, and maze testing. Maze testing is less commonly performed in equine patients and is usually reserved for cases that are difficult to interpret.

The menace response is commonly used in vision evaluation; however, it is important to keep in mind that vision and the menace response are not directly related. Completion of the menace response requires an intact visual and motor cortex, including cranial nerves II (optic nerve) and VII (facial nerve).2 Keep in mind that this is a protective response that is learned and may not be present in animals younger than 2 weeks. To perform this test, the veterinarian should touch the periocular area once or twice to first stimulate the palpebral reflex. This should be followed by movements that create visible motion without creating stimulation of aural or tactile senses. The menace response should be evaluated throughout the horse’s monocular visual field. For the horse, this extends approximately 150° (starting directly behind the horse), leaving a small section perpendicular to the forehead that requires binocular vision.3

The dazzle reflex is a very simple test that, similar to the menace response, evaluates the function of the retina, CN II, and CN VII. When a focal light source is directed toward the eye, the horse should respond by blinking.

Step 4: Pupillary Light Reflexes

After vision is fully assessed, the focal light source is used to evaluate pupil size and pupillary light reflexes. Pupil symmetry can be evaluated by standing approximately 6 feet in front of the horse with a focal light directed at the center of the horse’s head to visualize both tapetal reflexes simultaneously.2 The normal horse pupil is round when dilated and oval-shaped when constricted, with the horizontal axis being longer than the vertical axis. After pupil symmetry is evaluated, pupillary light reflexes should be evaluated individually. This is done by directing the focal light into each eye from approximately 2 to 3 centimeters. When the light is directed into one eye, both pupils should constrict (direct/indirect response). It is normal for the equine pupil to respond slowly, with vertical movement being more noticeable than horizontal movement.

The palpebral reflex is stimulated when the medial or lateral canthus is touched. A normal response is complete closure of the eyelids. Failure of this reflex occurs if there is damage to either the trigeminal (CN V) or facial nerve (CN VII) or if the eyelids are unable to close properly (example: trauma). Incomplete lid closure for any reason can predispose the horse to exposure keratopathy and other related consequences.2

Step 5: Adnexa

The eyelids and conjunctiva are best examined with a direct focal light. The most commonly seen eyelid abnormalities are tumors (sarcoïds, squamous cell carcinoma) and tarsal margin irregularities.

Step 6: Cornea and Anterior Chamber

The remainder of the examination is best performed in a dimly lit area. The Purkinje-Sanson reflexes can be elicited with the use of a direct focal light source. Reflections can be seen at the cornea, anterior lens capsule, and posterior lens capsule. The clarity and location of these reflections can be altered with disease.3 The presence of corneal opacities should be further evaluated with the use of slit lamp biomicroscopy. It is important to determine if the opacity is part of a larger disease process such as keratitis or uveitis. Even if the corneal opacity is not active or of a recurrent nature, a lesion that is large enough may interfere with vision.

To examine the anterior chamber, the focal light should be directed at a 45° angle (transillumination) to the corneal surface. The presence of cells within the anterior chamber results in internal reflection of the light known as aqueous flare.2

Step 7: Lens

Pharmacologic dilation of the pupil is not typically part of the pre-purchase examination, but without it, the lens cannot be viewed in its entirety. It should be clearly stated in the examination report that the pupil was not dilated, if dilation is not
If the pupil is pharmacologically dilated, the owner or agent should be informed that depth perception may be altered, and thus handling and athletic activity should only be undertaken after accepting the risks of doing so with a horse whose vision may be impaired. Dilation of the pupil with 1% tropicamide can reveal subtle posterior synechiae and is the only way to evaluate the entirety of the lens. Retroillumination is commonly used to evaluate the lens. A focal light source is directed at the lens, starting approximately an arm’s length from the horse’s head. Slowly, the veterinarian moves closer to the horse while searching for opacities. Retroillumination causes opacities to appear dark against a light background.

All cataracts have the possibility of progression; cataract characteristics can help determine the likelihood of progression. Cataracts can be classified according to etiology (primary, secondary), age of onset (developmental, senile), stage of maturity (incipient, immature, mature, hypermature), and location. Age of onset and etiology may be difficult to determine without a complete history. Developmental cataracts are the result of abnormal growth during embryogenesis and are commonly nonprogressive or very slowly progressive cataracts. Common developmental cataracts are seen at the anterior/posterior suture line and within the nucleus. The nucleus is the first part of lens to form in utero and therefore these cataracts are generally congenital. Senile cataracts are a form of nuclear cataracts generally seen in horses more than 20 years old; it is important to differentiate these from nuclear sclerosis. Nuclear sclerosis does not cause vision loss or interference with the tapetal reflection. The equator is the most metabolically active portion of the lens; therefore, cataracts in this location (Fig. 1) tend to be progressive, especially if vacuolation is also seen.

**Step 8: Fundus**

The horse’s fundus can be imaged through the use of either direct or indirect ophthalmoscopy and ideally should be examined with both techniques. Indirect ophthalmoscopy requires a focal light source and handheld lens. This technique provides a wide field of view; however, the image visualized is upside-down and backward. Conversely, direct ophthalmoscopy (diopter wheel set at 0 to −3) provides an upright with a very magnified view (approximately 15 times that of indirect ophthalmoscopy). Either technique can recognize important abnormalities such as retinal detachment, optic nerve atrophy, or chorioretinitis. The nontapetal fundus is often overlooked but is more often affected than the tapetal fundus, with lesions such as chorioretinitis and chorioretinal scarring. Two common patterns of chorioretinal scarring are peripapillary (butterfly lesions) and multifocal (bullet-hole lesions) (Figs. 2 and 3). Sedation is important and often necessary.
to lower the horse’s head so that the nontapetal fundus can be visualized in its entirety.

3. Conclusions

The two most basic parts of the ophthalmic examination are also the most important. The horse’s vision and ocular comfort should be assessed before administration of any sedative agent. The ophthalmic portion of the pre-purchase examination is frequently overlooked, but its importance should not be underrated. Chronic ocular disease can result in temporary or permanent loss of use and frustration for the buyer. On the other hand, it is important that normal variants not be interpreted as lesions of clinical significance. When an unusual abnormality presents itself, it is important to offer referral to a board-certified ophthalmologist to complete the pre-purchase examination.7

References