

Disease and Surgery of the Equine Lens



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KEYWORDS

• Lens • Cataract • Intraocular lens • Phacoemulsification

KEY POINTS

- Examination of the lens is a key portion of the ophthalmic examination.
- Pharmacologic dilation is necessary to adequately evaluate the lens.
- Phacoemulsification is the only treatment option for cataracts impairing vision.

INTRODUCTION

The lens is a transparent, biconvex structure positioned behind the iris and anterior to the vitreous. The lens fine focuses light on the retina.¹ The lens is suspended by zonular fibers that extend from the lens equator to the ciliary body. The equator is the outer edge of the lens hidden by the iris, whereas the lens axis is directed anterior to posterior. The lens is surrounded by an external capsule that encloses a peripheral cortex and inner nucleus.¹ If the lens is imagined as a hard-boiled egg, the shell would be the capsule, the egg-white would be the cortex, and the yolk would be the nucleus. The lens capsule is the basement membrane of the single, outer layer of lens epithelial cells. At the equator of the lens, epithelial cells elongate to form lens fibers. The lens fibers stretch from anterior to posterior and meet to form the anterior and posterior sutures.¹ The anterior suture is Y-shaped to slightly irregular, the posterior suture is Y to triradiate in shape, and both can normally be visualized.² The lens fibers form the lens cortex. As each new layer forms, the lens fibers are pushed centrally. The mature fibers form the adult portion of the nucleus. The central portion of the nucleus formed during embryologic development.^{1,3} With age, the continual addition of new lens fibers compresses the nucleus and changes the degree that light is bent while passing through the lens. The nucleus becomes visible as a grayish, central sphere. This normal aging change is termed nuclear or lenticular sclerosis.²

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Differentiating nuclear sclerosis from a cataract

Retroilluminate the eye from a distance.

Nuclear sclerosis DOES NOT block the tapetal reflection.

A cataract DOES block the tapetal reflection.

PATIENT EVALUATION OVERVIEW

Assess Vision

A complete ophthalmic examination is needed to accurately identify cataracts and determine their significance. Before administration of any type of sedation, vision should be assessed using the menace response:

- Ensure the horse has a positive palpebral reflex.
- Be sure not to touch the vibrissae or create air currents that could result in a false-positive response while performing the menace test.
- Move a hand from several directions to appraise the entire visual field.

The horse can be observed navigating a maze test constructed of straw bales, shavings bags, or other obstacles to further evaluate vision. In the author's experience, horses with partial vision loss may spook or be more distressed than horses with complete vision loss on 1 or both sides. The owner should be questioned about specific visual or behavioral concerns, such as spooking or shying on a particular side or in certain situations. For the remainder of the examination, a darkened area facilitates visualization of focal or subtle lesions.

Assess Pupillary Light Reflexes

The pupillary light reflexes (PLRs), both direct and consensual, are then evaluated using a Finoff transilluminator. If a transilluminator is not available, an LED or halogen penlight can be used. A bright, focused light source is needed to ensure adequate retinal stimulation to cause pupillary constriction. No matter the size or density of the cataract, the pupil should constrict. Absence of a PLR should prompt further examination to identify other ocular pathology. If the pupil is dilated and nonresponsive, but the eye is visual and/or a consensual PLR is present, the owner should be questioned about potential administration of topical mydriatics, such as atropine.

Dilate the Pupil

The intraocular pressures (IOPs) should then be assessed. As long as the IOP is within the normal range (see Tammy Miller Michau's article, "[Glaucoma](#)," in this issue for further details), the pupil should be pharmacologically dilated to allow maximal visualization of the lens and retina. Tropicamide 1% ophthalmic solution should be applied topically to both eyes. Mydriasis occurs within 20 minutes to 30 minutes.³ Tropicamide is used instead of atropine because of tropicamide's faster onset and shorter duration of action.³

Sedation

Once mydriasis occurs, the examination can proceed. Depending on a horse's temperament, sedation may be required to fully assess the globe. Xylazine is typically sufficient, but detomidine or romifidine alone or in combination with butorphanol may be necessary in some horses. If blepharospasm is significant, an auriculopalpebral nerve block can be performed to facilitate opening of the eyelids.

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