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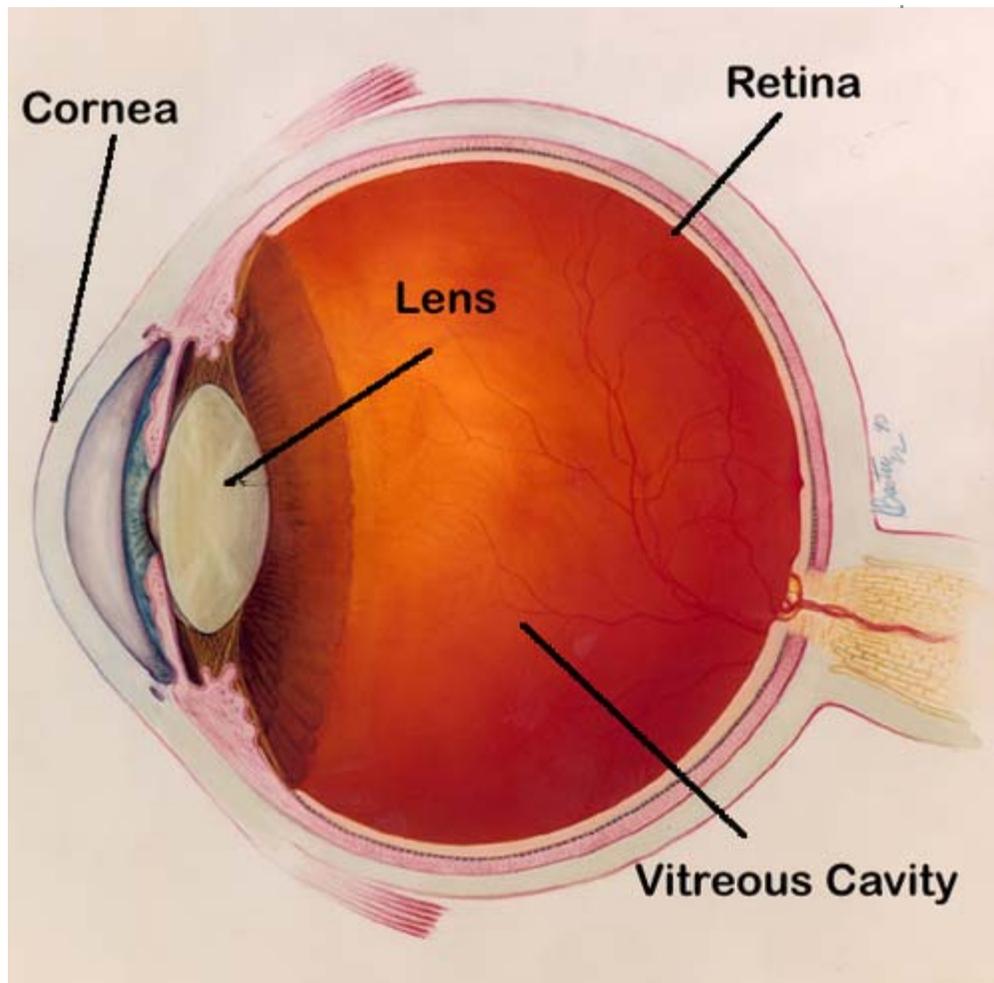
Tails of Seattle: A pets blog

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Veterinary Q&A: Eye problems in aging dogs

Posted by Neena Pellegrini



Dr. Tom Sullivan, a veterinary ophthalmologist at Animal Eye Clinic in Seattle, answers this week's questions about eye problems in aging dogs. It is part of our continuing series about the health issues facing senior dogs.



Question: Eye issues can be prevalent in senior pets and something owners often ignore or underestimate. Why are seniors particularly vulnerable to eye problems, and what are the most common eye issues you see in your older patients?

Answer: Seniors are more likely to have eye problems for a few reasons. First, some disorders are a result of aging and wear and tear. Cataracts, retinal degeneration, for example, are often age-related degenerative conditions.

Second, older animals have had more opportunity to sustain injury to the eyes, which can lead to long-term complications like glaucoma.

Lastly, some eye diseases are a result of systemic conditions -- such as diabetes, high blood pressure, cancers -- all of which are more common in the elderly.

Nuclear Sclerosis: This is a normal change seen in aging lenses. The lens sits behind the iris -- the colored part of the eye. The pupil is simply a hole in the iris through which we see. The lens is transparent, so we normally don't see it when we look at our dog.

The lens continues to grow throughout life and forms rings similar to the growth of a tree. Instead of increasing in diameter, each new ring compresses the central part of the lens more and more. As more and more rings compress that nucleus into a smaller and smaller ball, the compressed lens proteins lose some transparency and begin to reflect light approaching from certain angles.

This reflected light makes the pupil appear cloudy when viewed from the exterior but interferes very little with vision.

This is the cloudy appearance seen in older dogs, and it is a normal change. It generally begins at about 7 years of age, but it doesn't tend to become noticeable until 10 or 11. If you have a dog 10 or older with cloudy looking eyes but no signs of poor vision, it is very likely this.

Nuclear sclerosis gets more pronounced over time and will eventually become truly opaque -- a cataract -- usually in the 15-18 year range.

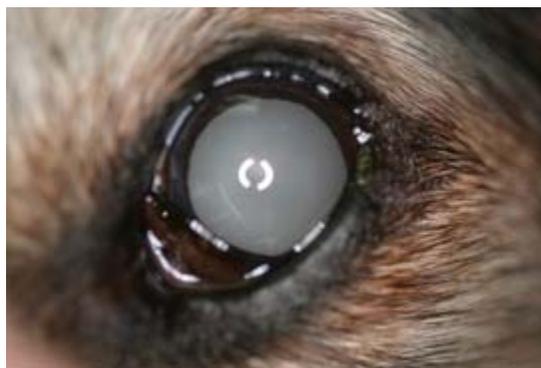
Giant breeds tend to age faster and have a shorter life span than smaller breeds. Even so, their lenses age the same as all dogs -- they'll start to develop nuclear sclerosis at about age 7 and not have that progress to true opacity until 15 to 18.

Cataract: A cataract is when some or all of the lens becomes opaque, or white. The lens is made mostly of protein, and ideally it is transparent.

It is similar in this way to an egg white. When heat is applied to the clear part of a raw egg, it turns white. The loss of transparency is from permanent changes in the arrangement of the proteins caused by the heat.

A cataract is likewise a result of damage to the protein arrangement of the lens material.

Cataracts can occur for many reasons, but the most common reasons in dogs are either genetic (inherited abnormalities in lens function); diabetes (too much sugar, or glucose, gets into the lens and damages the lens; or advanced age. If a dog's pupil appears cloudy/white and vision appears compromised some or all of the time, then that could very well be a cataract.



The only treatment for cataracts is surgery to remove the cloudy lens material and replace it with an artificial-lens implant.

Just as egg white can't go back to transparency after it's been cooked, lens protein opacity is a permanent change, and despite claims to the contrary, no medications will treat cataracts.

Glaucoma: This occurs when pressure inside the eye increases and damages the optic nerve and retina, leading to vision loss.

Fluid is continually produced inside the eye, behind the pupil. This fluid flows forward through the pupil into the front of the eye, where it fills the space between the cornea and iris. This then flows continually out of the eye through a drain into the bloodstream.

Glaucoma occurs when this drain gets plugged, making outflow slower.

Fluid buildup causes increased pressure. This



damages the optic nerve, which connects the eye to brain, leading to vision loss. If it reaches above a certain level, it is painful -- causes a headache sensation.

The most common type of glaucoma in people -- slowly increasing pressure in the elderly -- is very uncommon in dogs.

Anything that plugs up the drain can lead to glaucoma though, including tumors in the eye, previous trauma to an eye, long-standing cataracts (causes inflammation and scarring in the drain). So senior dogs have a higher incidence of glaucoma than younger dogs.

Signs of glaucoma include increased cloudiness (of the cornea, so it would look like the whole eye is cloudy, not just the pupil), bulging appearance to the eye or bloodshot appearance to the white of the eye.

Treatment depends on the cause. Sometimes it can be controlled with drops or surgery, but sometimes the eye needs to be removed to restore comfort.

Dry-eye disorders: As the name implies, this refers to problems with the tear film leading to drying and increased exposure of the ocular surface. You can have a decrease in the amount of tears produced (Kcs-keratoconjunctivitis sicca) or problems with the quality of the tear film.

Normal tears spread across the surface of the eye and maintain a stable film. Problems occur when the tears basically bead like water on a freshly waxed surface. This results in drying of the surface of the eye.

Dry-eye disorders are important for a few reasons.

First, dry eyes are uncomfortable.

Second, tears are very important to the health of the cornea.

The cornea is the "windshield" portion of the eye. One of the reasons it is transparent is because there are no blood vessels within the cornea.

Tears provide a large part of the oxygen and nutrients to the cornea. Decreases in tear volume or quality leads to corneal starvation. This, in turn, results in the surface of the cornea becoming more skinlike as a protective response (similar to a callous), which can appear hazy or cloudy. These changes can lead to vision loss over time.

The cornea can develop open sores (corneal ulcers), and these are much more susceptible to infection in dry-eye disorders and can be disastrous to the eye. Many times the first sign of a dry-eye condition is increased mucous -- the eye attempting to lubricate in response to the drying.

Blindness from retinal disease: There are several different types of retinal diseases in dogs. The one most associated with age would be senile retinal degeneration.

The retina lies against the inner surface of the back wall of the eye. The cornea and lens focus light such that images outside are projected onto the retina like a movie projector and its screen.

Cells in the retina (rods and cones) are stimulated by light, turning the image into electrical signals that are transformed into "vision" by the brain. Rods are stimulated by dim light. Cones are stimulated by bright light and color (yes, dogs see color, but they only have cones for blue and

yellow light, they don't see red).

It is normal to lose retinal cells with age, but some individuals lose more than others.

Many dogs will start having difficulty in dim light or darkness by 11 or 12 years of age. They will stop at the top of stairs or the edge of the bed and wait until lights are switched on before proceeding. This suggests that rods are more affected than cones.

Most dogs (and people) will experience these changes with age, but some seem to start earlier than others and progress more with time.

Factors that can affect this would include genetic influences, possibly nutrition and excessive sunlight exposure, and some systemic diseases (diabetes and high blood pressure, to name a couple).

Asteroid hyalosis: This is an accumulation of cholesterol deposits within the vitreous cavity.

The vitreous is a gel that fills the part of the eye behind the lens. It is transparent to allow vision and acts to keep structures inside the globe stable when the eye is in motion. It basically is like Styrofoam peanuts in a box of fine glassware.

With age, some dogs will develop white cholesterol deposits in the vitreous -- they look like a shaken snowglobe suspended in time. With a few such deposits vision is not affected, but many can result in poor vision, especially in bright conditions, as they scatter light like highbeams in a fog.

This is fairly common, but rarely results in severe loss of vision.

Calcific corneal degeneration: This one is more important. Some older dogs will start to mineralize the surface of the cornea in one or both eyes.

These deposits are gritty and uncomfortable in the beginning, then portions of calcified cornea can slough leading to deep ulcers. These are very slow to heal, in some cases they do not heal at all.

The areas of sloughing are thinner than normal, and in extreme cases the thin spot can rupture, leading to loss of fluid from inside the eye.

Calcific corneal degeneration can be seen with certain diseases (Cushing's disease, kidney failure), but can happen as a consequence of aging alone.



It typically develops in dogs 14 or older. It looks like white spots on the surface of the cornea, and often it isn't noticed until an ulcer develops and persists beyond normal healing time (at which point the patient makes their way to an ophthalmologist).

If caught early this can often be treated and maintained with drops to remove minerals from the corneal tissues.

Question: What can owners do to maintain eye health?

Answer: Basically be aware that eye problems can worsen very rapidly in pets, so if a change is noted seek attention quickly.

Signs of a problem include increasing cloudiness, squinting, discharge (a new onset of tearing, mucous or especially yellow/green, infected-looking discharge), bulging or sinking in of the eye in the orbit, or a decrease in vision.

You want to feed a balanced diet and keep the hair around the eyes trimmed short enough to be able to keep it from irritating the eyes, as well as letting you, the owner, see the eyes clearly enough to notice a problem early. (Groomers often are the first to notice an eye problem in longer-haired breeds.)

Some age-related conditions -- senile retinal degeneration and age-related cataract development in particular -- can result from oxidative stress, a fancy name for the wear and tear of everyday life, such as sunlight, UV exposure and time.

Antioxidant supplementation can help prevent this type of damage if the diet does not contain enough to do the job. Check with your vet about specific supplements and dosages.

These will not help with conditions that are a result of other types of damage, such as diabetic cataracts, inherited retinal diseases or glaucoma.

Dr. Tom Sullivan

Sullivan is a diplomate of the American College of Veterinary Ophthalmologists. He graduated from Cornell University's College of Veterinary Medicine. He has owned and practiced at Animal Eye Clinic in Seattle since 1995. His practice includes all species -- small and large animals, as well as consulting for the Woodland Park Zoo, Seattle Aquarium, Point Defiance Zoo and Aquarium and Paws Wildlife Center.

Photos and graphic courtesy of Dr. Tom Sullivan

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Do you have a question about pet health? Ask now! We'll pose some of your questions to a local vet in an upcoming post.