How To Perform An Eye Examination

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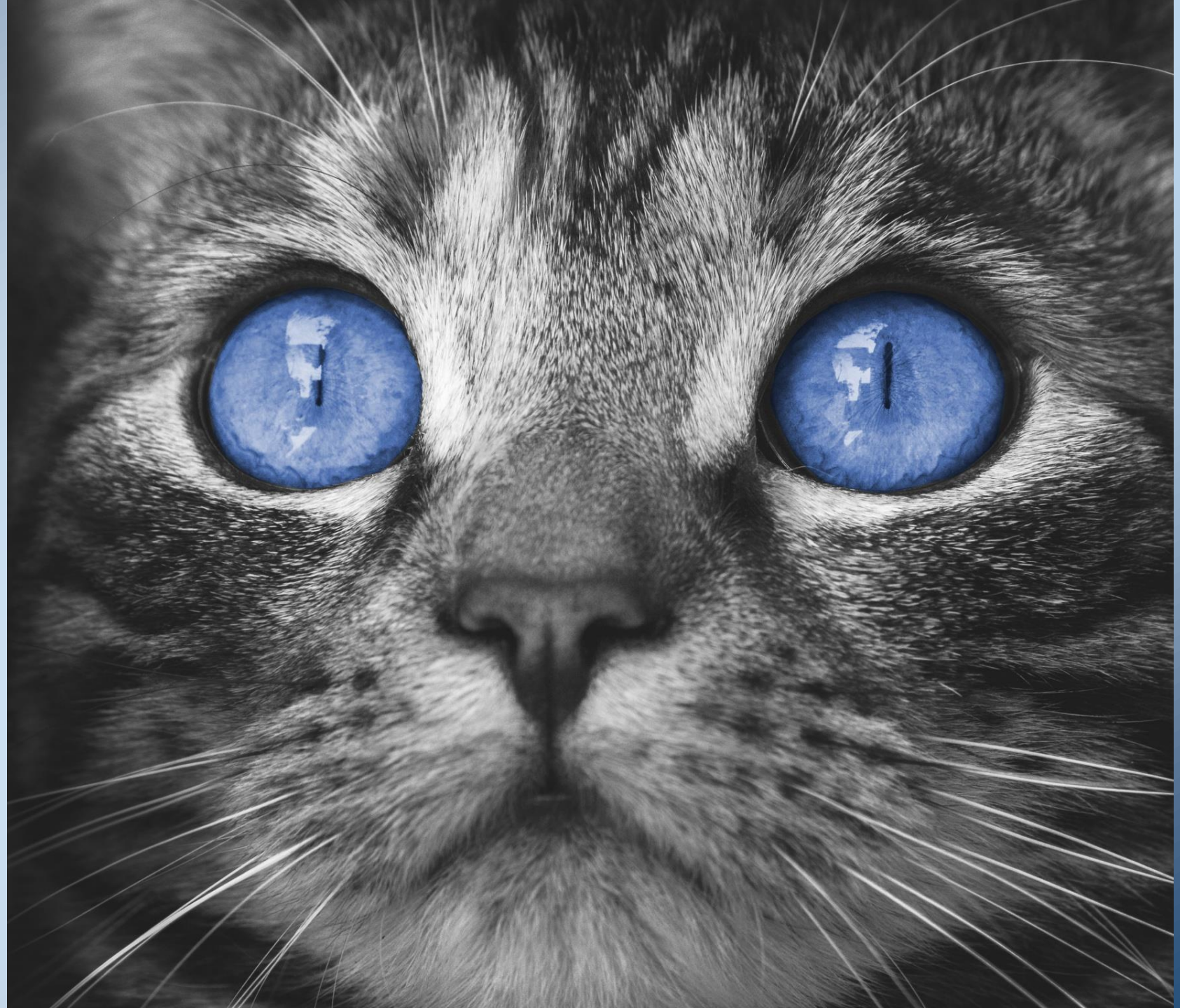
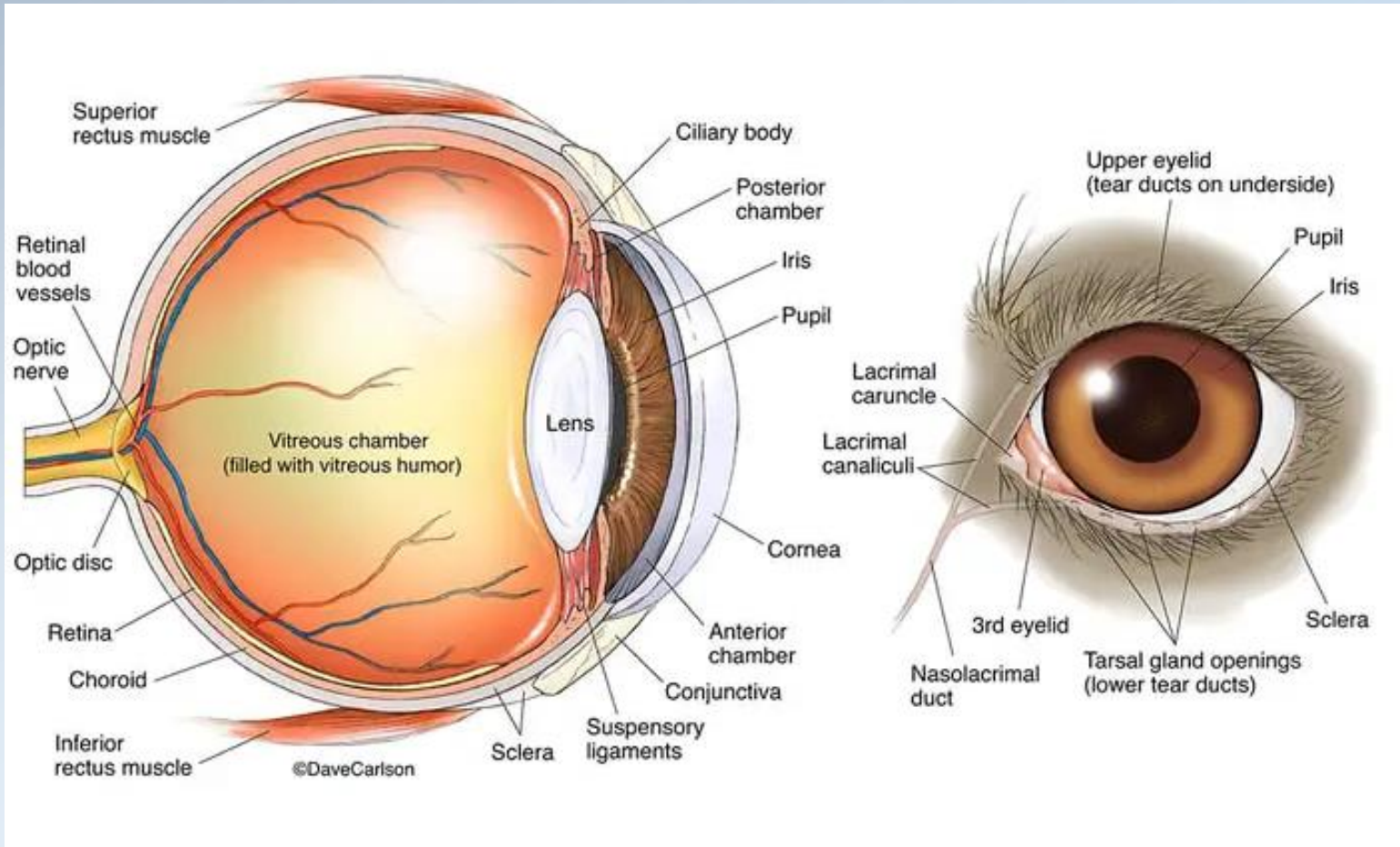
Vision Vet

www.vision-vet.co.uk





Courtesy of IFFAT KAWSAR, DVM, MS

Our goals:

- Is it **unilateral or bilateral** condition, always examine both eyes
- Is it a **primary ocular issue or secondary** to a systemic issue
- **Diagnose** what is the issue with the eyes
- **Treatment** plan
- What is the **outcome**

Eye equipment needed for an ocular examination:

- A room that can be darkened
- Examination table
- A bright focal light source
- Magnifying loupes
- Direct ophthalmoscope
- Indirect ophthalmoscope such as binocular or monocular indirect ophthalmoscope
- Indirect funduscopic lens (A 2.2 panoptic or 30 dioptre lens is a good starting lens for small animals)
- Slit lamp
- Tonometer e.g. Tono-Pen, TonoVet, Schiotz tonometer
- Gonioscopy

Courtesy of The University of Florida: EXAMINATION OF THE EYE: METHODS OF DIAGNOSIS AND INSTRUMENTATION

Eye equipment needed for an ocular examination:

- Schirmer Tear Test (STT) strips
- Cotton wool
- Fluorescein dye
- Sterile cotton buds
- Fine non-tooth forceps
- Saline or sterile eyewash
- Local anaesthetic such as Proxymetacaine 0.5%
- Mydriatic such as Tropicamide 1%
- Swabs for bacterial culture and virus isolation
- Lacrimal cannula (usually plastic preferable)
- A camera or smartphone to take photos

A GUIDE TO THE POWER SETTINGS FOR DIRECT OPHTHALMOSCOPY

ALWAYS CHECK AND COMPARE BOTH EYES

Courtesy of TVM Ophthalmology Guidelines

Ocular Structure	Usual Dioptre Setting	Dioptre Range
Fundus and Retina	0	-2 to +2
Vitreous chamber	+5	+2 to +10
Lens	+10	+8 to +15
Iris and Anterior chamber	+15	+15 to +20
Cornea	+20	+20 to +30
Eyelids	+25	+25 to +30

History

- A thorough history should include questions about the primary ocular complaint, the animal's lifestyle and general physical health
- The signalment of the patient (age, breed and sex) should also be noted as many ocular conditions are 'breed related' or inherited
- Duration of problem
- History of trauma

History

- Breed
- Age
- General medical health
- Concurrent medications
- In-contact animals
- Travel history
- Vision
- Change in appearance
- Duration

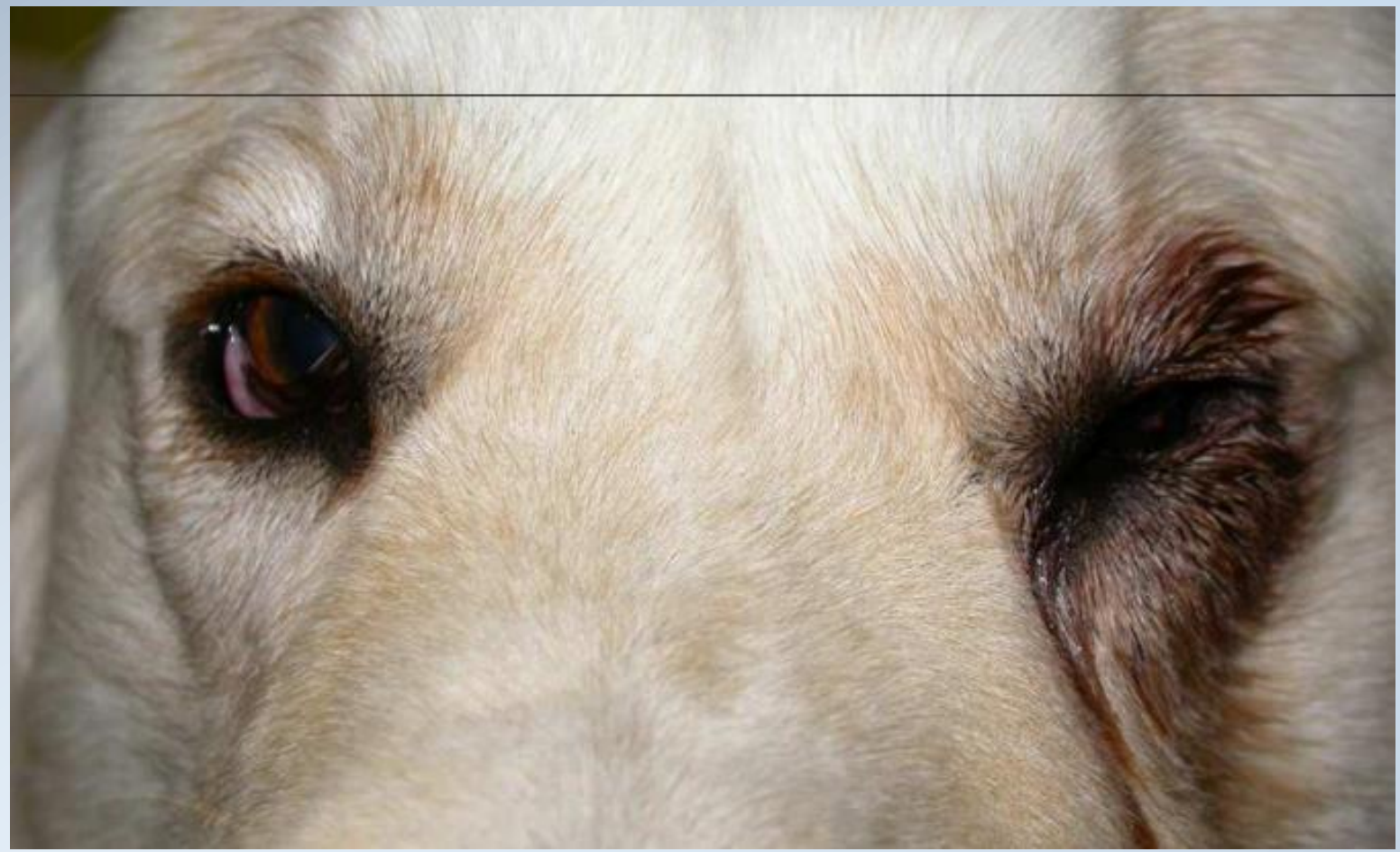
Distant examination

- Observe the patient as it walks into the room. While taking a history, if possible, allow the patient to wander freely around the consultation room and watch their behaviour in an unfamiliar environment
- Patient demeanour
- Patient movement
- Vision

Close ‘hands-off’ examination

Observe from a distance

- Facial and orbital **symmetry** and/or conformational changes
- Ocular **discomfort** (blepharospasm, increased blink frequency, epiphora)
- Ocular **discharge**
- **Palpebral length** and **position** relative to the globe
- **Third eyelid position** and **appearance** including colour
- **Globe position** within the orbit
- **Globe size, colour, specular light reflection**



Courtesy of Dr Guillaume Payen; Alfort Veterinary School

Schirmer Tear Test

- This test should be done first
- **Do not** apply any solution/ointments to the eye or flush out any debris prior to the test
- **Do not perform the test** on a ruptured cornea, descemetocele or melting ulcer, check the healthy eye
- Corneal irritation can increase tear production

Schirmer Tear Test

- **Always measure both eyes**
- Don't **touch** any part of test strips other than the very end (oil on the finger may change the result)
- Bend the end of the strip over the middle to the lateral third of the lower lid
- Measure for 1 minute

STT 1 (before local anaesthetic)

- Measure basal and reflex tear production
- Dog **15-25** mm/minute
- Cats **15 to 20** mm/minute
- Rabbit **2–11** mm/minute

STT 2 (after local anaesthetic)

- Measure basal tear production (only used academically)

Courtesy of Dr Davis The Animal Eye Clinic

Reading in mm/minute	Interpretation	Action required
0-10	**Insufficient tear production**	Treatment is required
10-15	**Lower than normal**	Treatment may be required, monitoring is very important
15-25	Normal	
>25	**Normal or excessive**	Occasionally needs investigation

Schirmer Teat Test in Dogs and Cats

Note – cats have variable results and a value of <10mm wetting per minute is considered significant in the presence of ocular surface disease.

Menace response

- This response involves the **retina, optic nerve, chiasm and optic tract (afferent) as well as facial nerve (efferent)**
- Care must be taken not to touch the whiskers or vibrissae, nor create an air current that could stimulate the cornea
- **Each side should be tested independently by covering one eye with the examiner's hand**. A positive menace response allows the examiner to determine **that at least some vision is present**, but cannot assess the quality or completeness of vision
- Kittens and puppies do not develop a menace response until approximately **12 weeks of age**

Vision and neuro-ophthalmic tests

Menace response

Courtesy of Veterinary Neurology clinical menace response in the dog

Palpebral reflex

- Gently tapping the eyelids at the medial and lateral canthi and observing a blink
- The palpebral reflex tests the **ophthalmic (medial canthus) and maxillary (lateral canthus) branches of the trigeminal nerve (afferent) as well as the facial nerve (efferent)**

Vision and neuro-ophthalmic tests

Palpebral reflex

Courtesy of Tara Richard

Dazzle reflex

- Blinking in response to a bright light source such as a Finoff transilluminator being quickly shone on the eye
- This reflex is **subcortical and is thus not a test of vision**. The pathway **retina, optic nerve, chiasm, optic tract, rostral colliculus and facial nucleus** and nerve are intact
- A dazzle reflex can be elicited at a much younger age than a menace response, essentially **as soon as the eyelids open**

Vision and neuro-ophthalmic tests

Dazzle reflex

Courtesy of Lindsay Seyer

Pupillary Light Reflex

- Using a Finoff transilluminator, hold the light off the eye, then quickly move it onto one eye and observe the PLR of both eyes. Wait a few seconds for the pupils to return to resting size and repeat on the other eye.
- The PLR results in constriction of the pupil in response to stimulation by light (**direct reflex**), accompanied by a weaker constriction of the contralateral pupil (**indirect reflex**).
- **The PLR is not a test of vision**, but does test the pathway that includes **retina, optic nerve, chiasm, optic tract, pretectal nucleus in the midbrain, oculomotor nerve, ciliary ganglion and iris sphincter muscle.**
- The PLR will be present in kittens and puppies at the time the eyelids open

Vision and neuro-ophthalmic tests

Pupillary Light Reflex

Courtesy of Lindsay Seyer

Distant Direct Ophthalmoscopy

- **Symmetry of pupil size and shape** is evaluated with a light source held at arm's distance and the light directed towards the animal forehead so that both pupils are equally illuminated by the tapetal reflection (retroillumination)
- This should be performed in **normal room light**, followed by **dimming of the room lights**, and is the best way to recognize subtle anisocoria (difference in pupil size)
- Any opacity in the visual axis will be shown as a dark shadow
- **True cataracts** will appear as a **dark shadow**
- **Nuclear sclerosis** will appear as a circular ring at the junction of the lens nucleus and cortex

Vision and neuro-ophthalmic tests

Distant Direct Ophthalmoscopy

Courtesy of Pet eye care NZ

Cotton Ball Test

- Whereby a cotton ball is dropped near the cat's or dog's face, **their behaviour indicating whether the pet sees the object is observed.**
- Each eye can be tested independently.
- **Visual placing is also useful in cats**. Holding the cat, slowly advance it towards the exam table and watch for placement of a forelimb prior to contact with the table.

Maze Test

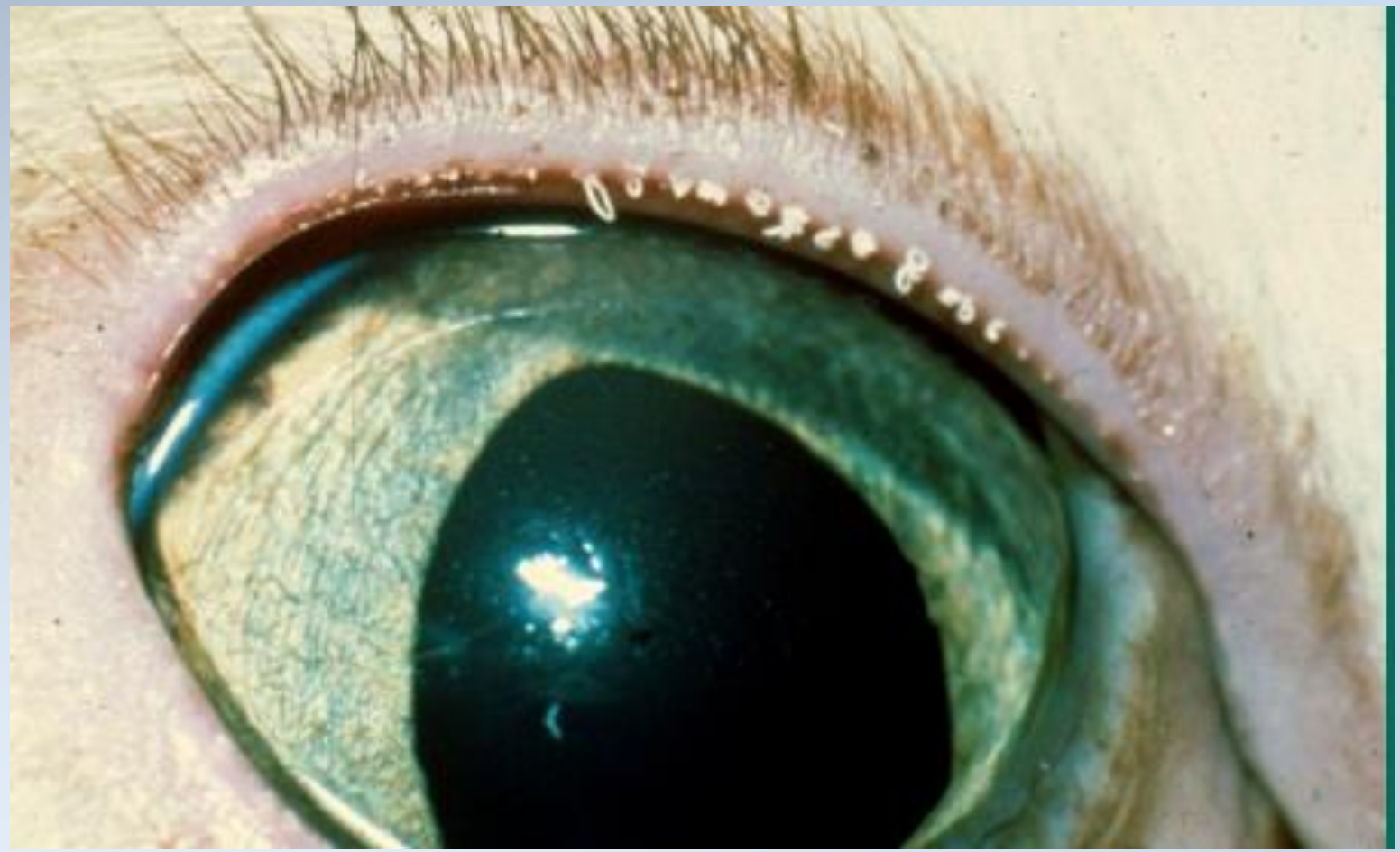
- "Maze test" may be used to determine whether the **vision is present**
- Traffic cones, foam cylinders or even examination room furniture may be constructed for standardized testing
- The dog should be placed at the opposite end of the maze from its human companion, who is asked to call the dog's name only once, which keeps the dog from following voice cues to manoeuvre.
- **Vision should be evaluated in normal light and then dim light** (after dark adaption) and obstacles should be adjusted between tests to avoid memorization and mapping
- To assess night vision, dim the ambient illumination

Adnexal and Anterior Segment Examination

- The **adnexa** consists of the eyelids, third eyelid and conjunctiva
- The **anterior segment** includes the cornea, anterior chamber, iris, ciliary body (which cannot be visualized) and lens
- All these structures can be adequately examined with a **transilluminator, magnifying loupes (x 3.5 magnification) and a direct ophthalmoscope**
- A slit lamp biomicroscope is the ideal instrument for anterior segment examination

Eyelids and Conjunctiva

- Using transilluminator, magnifying loupes, direct ophthalmoscope or a slit lamp
- First examine the **eyelids** for abnormal contour or thickness, entropion, hair contacting the cornea (trichiasis), ocular discharge or masses
- Next examine the **conjunctival** surfaces for hyperemia, chemosis, discharge, follicles or masses
- Evert the eyelids to look at the **palpebral conjunctiva**
- The **anterior face of the third eyelid** can be examined by gently retropulsing the globe
- The **posterior face** can be examined by instilling a topical anaesthetic and then using a fine non-tooth forceps to reflect the third eyelid



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Cornea

- The cornea should be **transparent, free of any opacity or blood vessels and have a moist glistening appearance**
- Examine the cornea from different angles of view and by moving the light into different positions
- Pay particular attention to the innermost layer (endothelium) of the ventral cornea, as this is where keratic precipitates will be deposited in a cat with uveitis. These collections of cells are often quite small and easy to miss

Courtesy of The University of Florida: EXAMINATION OF THE EYE: METHODS OF DIAGNOSIS AND INSTRUMENTATION

Anterior Chamber

- Examine the presence of abnormal components of the aqueous humor of:

- **Hyphema** (blood)
- **Hypopyon** (neutrophils) will often settle to the ventral-most aspect of the anterior chamber
- **Fibrin** may stick to the iris or lens, or settle ventrally

Anterior Chamber

- **Aqueous flare** is seen as a cloudiness to the normally clear aqueous humor
- The slit beam on the direct ophthalmoscope can be used to look for flare, **holding the beam so that it is shining on the lower half of the cornea only and sharply focused on the cornea**
- This requires that the direct ophthalmoscope is held close to the cornea
- A second light beam will be visible on the iris or lens depending on where it is directed
- With the room lights out, observe the top of the light beam on the cornea from the side of the eye
- **In a normal eye the light is not visible in the anterior chamber. In an aqueous flare the light beam will be visible**

Aqueous flare

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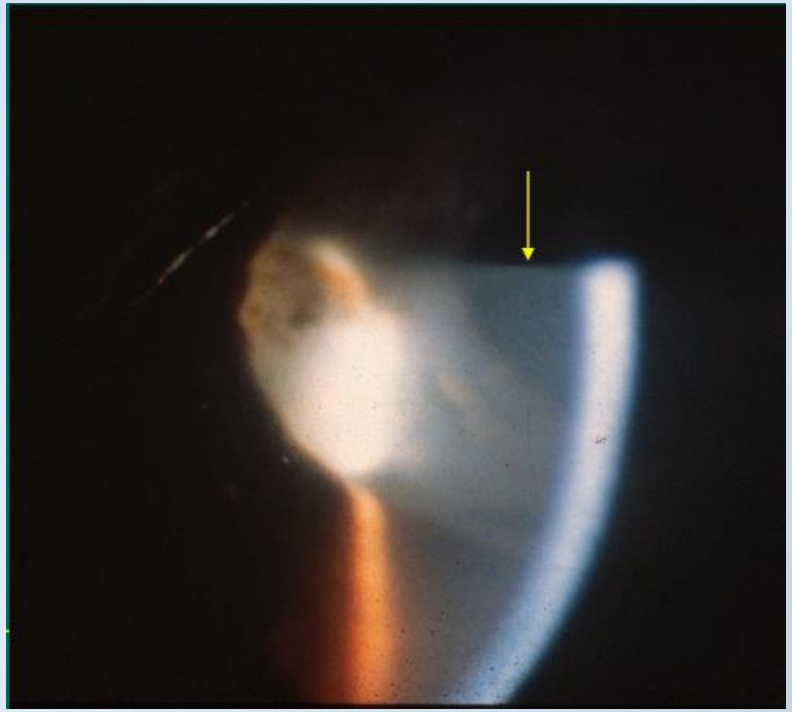
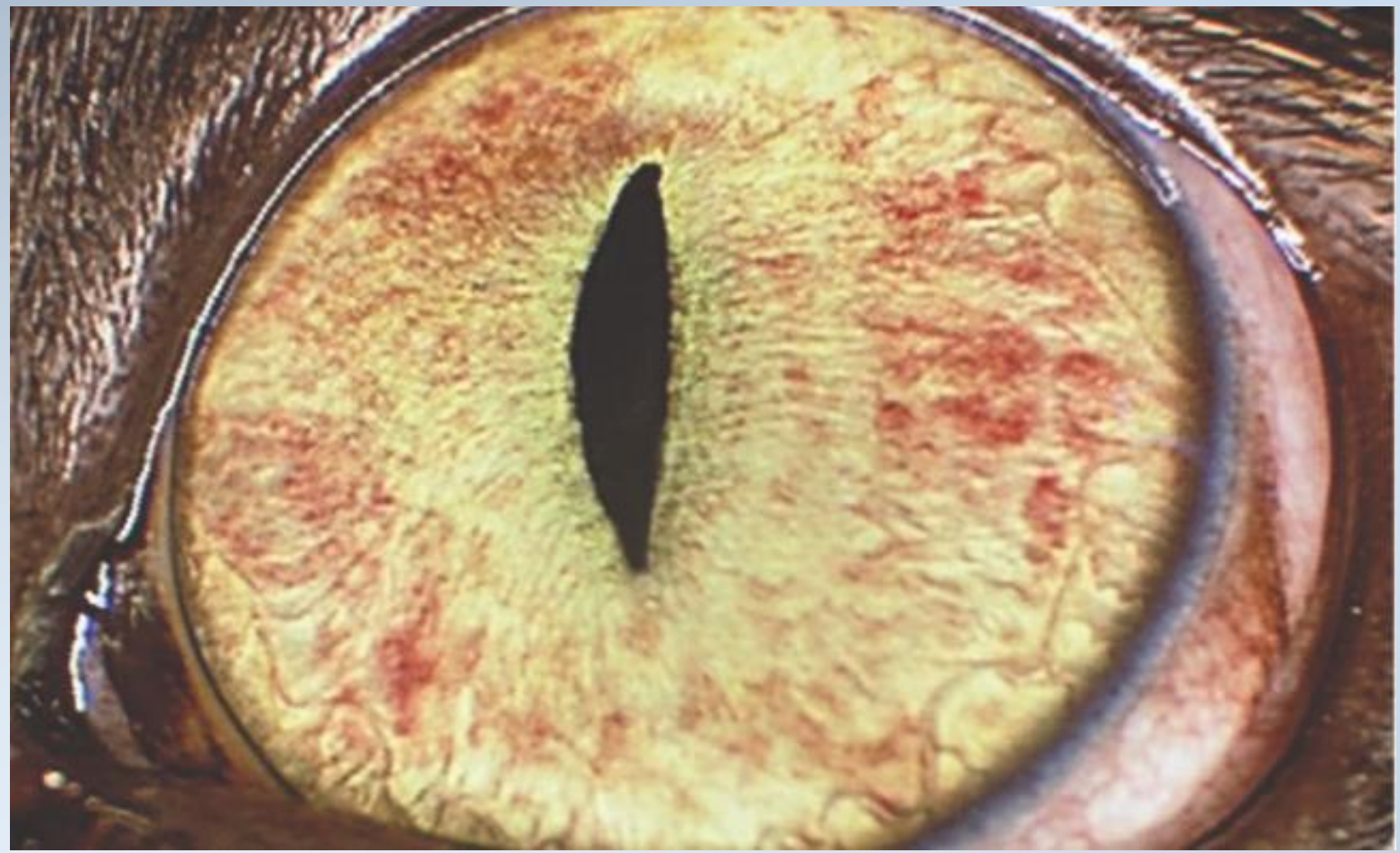


Anterior Chamber

- The **anterior chamber depth** can be evaluated with the slit beam and one eye compared with the other
- A shallow anterior chamber with a normal cornea and iris may indicate lens instability or aqueous misdirection syndrome
- A shallow anterior chamber with a corneal wound may indicate a perforated, leaking eye

Iris

- **Colour**
  - Fine capillary growth across the iris surface (rubeosis iridis) is abnormal and a sign of chronic uveitis
  - Another sign of chronic uveitis is the presence of grey, slightly raised iris nodule
  - Pigmented areas within the iris. These range from copper coloured to dark brown
- **Masses**
  - Lesion can be flat or raised (melanosis or melanoma)
  - Iris cyst
- **Adhesions**
  - Synechiae are adhesions between the iris and other structures in the eye. They are the result of inflammation in the iris and are particularly common with anterior uveitis and trauma to the eye
- **Persistent pupillary membranes (PPM)**
  - Strands of pigmented tissue which arise from the iris collarette and attaches to another surface of the iris, or lens or cornea

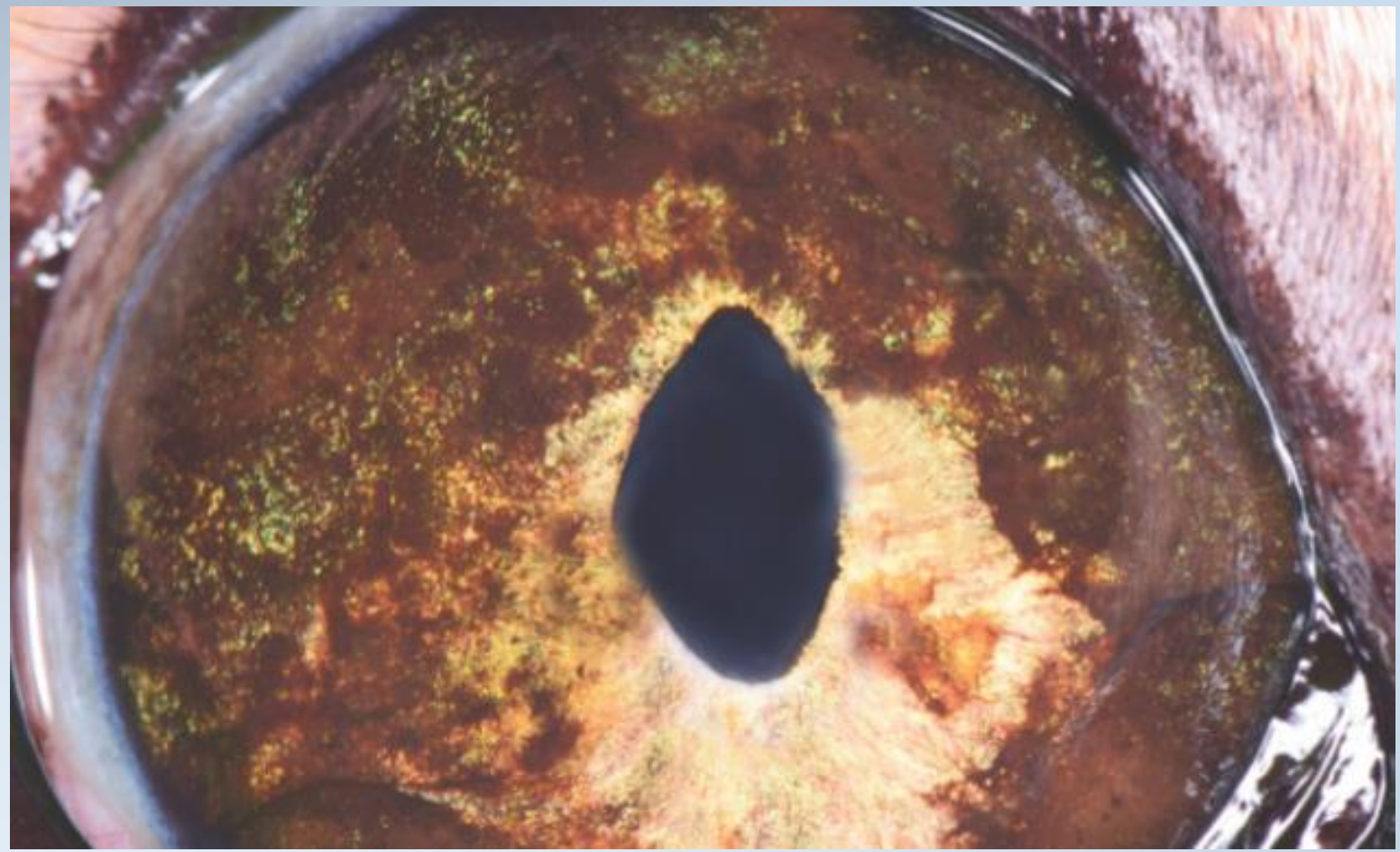


Rubeosis iridis, or neovascularization on the iris surface, in a cat with chronic uveitis

Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt; Courtesy of Michigan State University Ophthalmology Service

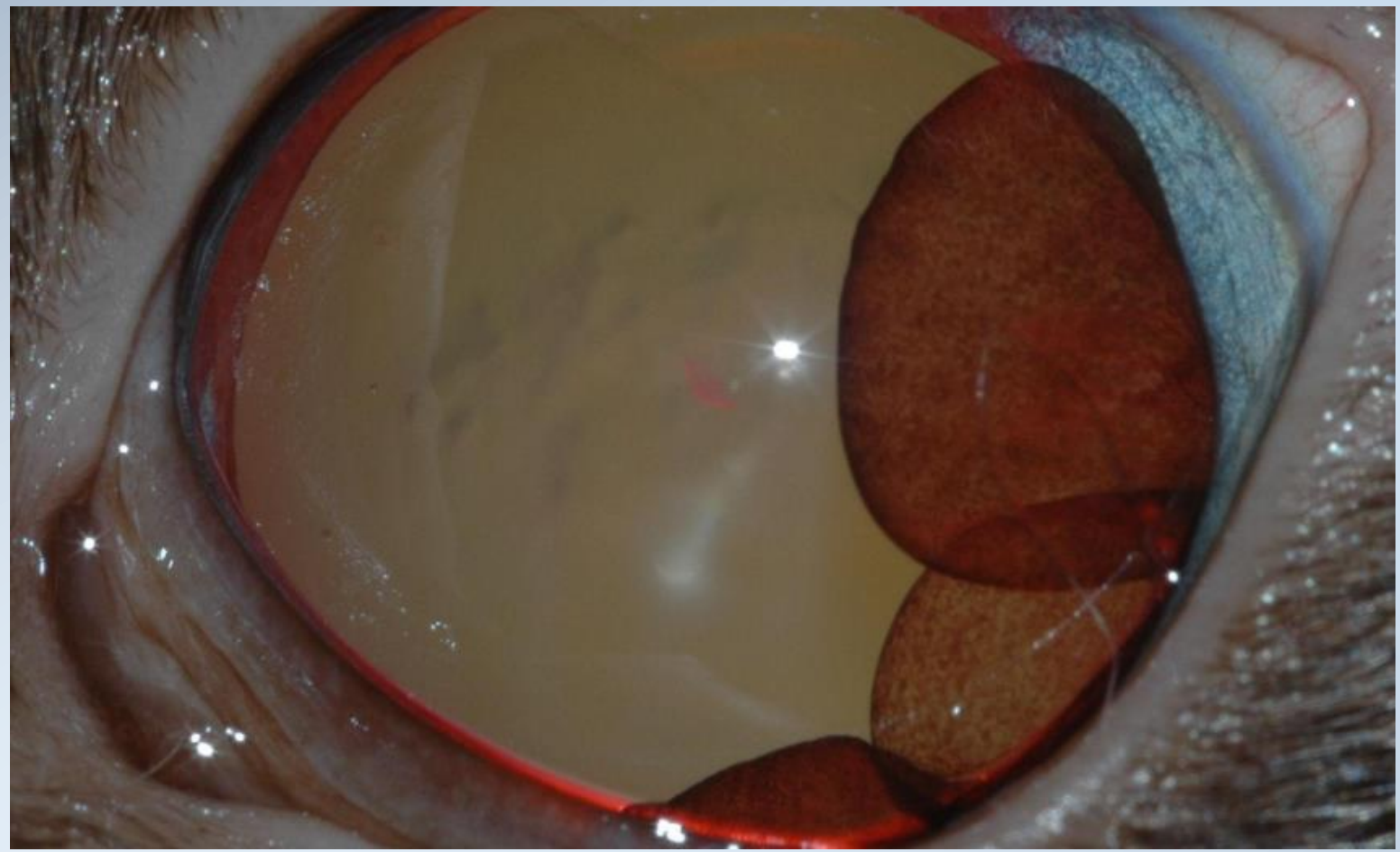
Iris melanosis. Note the individual areas of hyperpigmentation that are flat with the iris surface

Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt



Iris melanoma in a cat, a potentially life-threatening neoplasm. Note the extensive hyperpigmentation with areas raised from the iris surface

Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt



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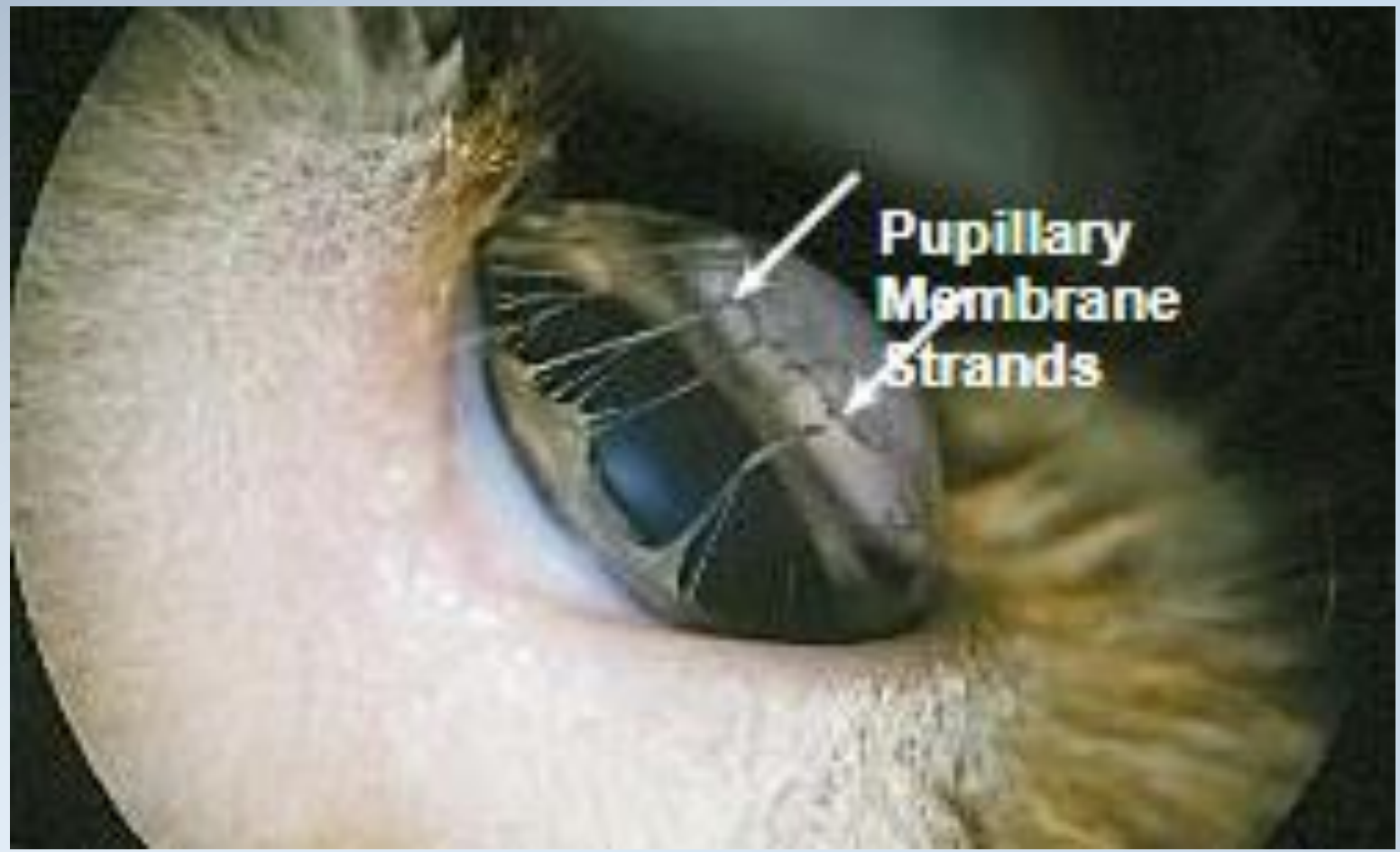

Courtesy of Pet Meds Online

Courtesy of Veterian Key

Lens

- The lens is examined for optical clarity
- The presence of opacity **in** the lens is cataract

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Indirect Ophthalmoscopy

- Indirect ophthalmoscopy produces an image that is **upside down and inverted** but with a magnification of only about x 3, **making visualization of large portions of the fundus possible.**
- **Monocular indirect** ophthalmoscopy using a Finoff transilluminator and a 20-diopter indirect lens.
- **Binocular indirect** ophthalmoscopy uses head-mounted light source.
- A transilluminator should be held next to the **observer's eye**. To start, rest the hand holding the lens gently on the pet's head with the lens pointed away from the eye. **Attain the best tapetal reflection possible**, **then drop the lens into place to observe the fundus.**
- **The observer's eye, the light beam, the lens and the pet's eye should all be aligned in a straight line.** The indirect lens should be held with the observer's arm fully extended.
- The lens needs to be at the correct distance from the cornea, so that the image of the fundus fills the lens entirely. If eyelids or iris are seen within the lens, then the lens is too close (usually) or too far from the cornea.

Indirect Ophthalmoscopy

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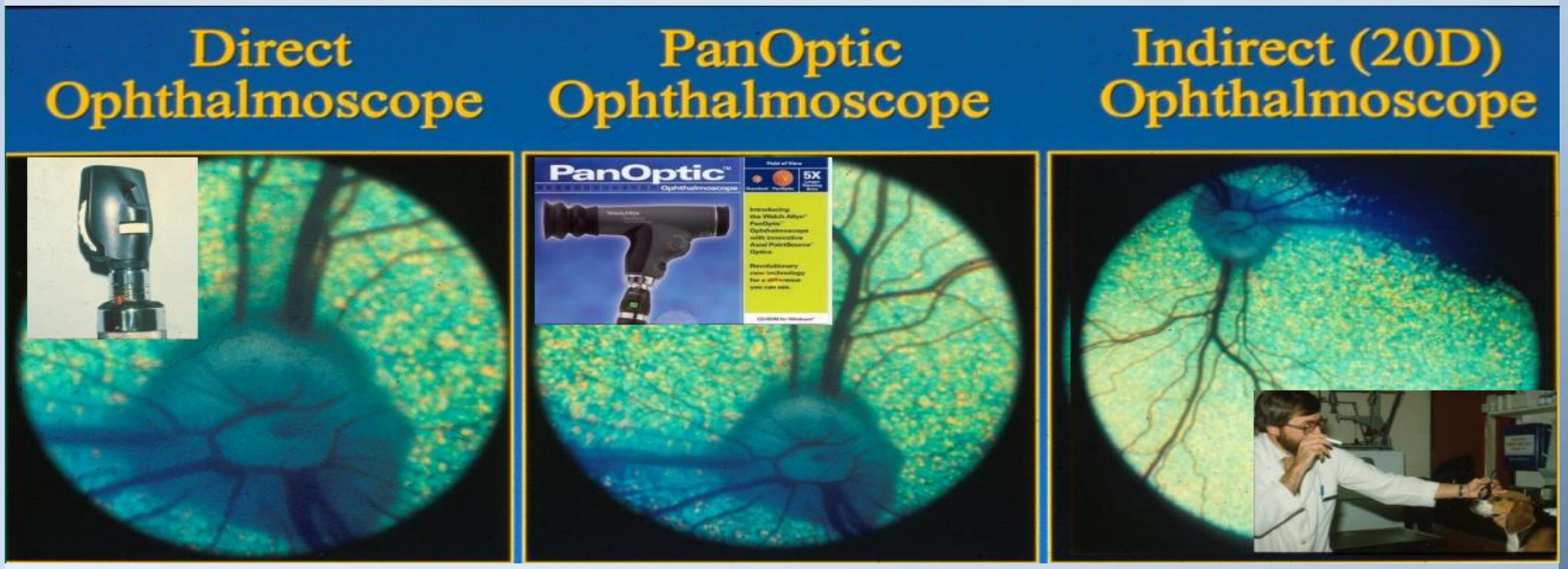

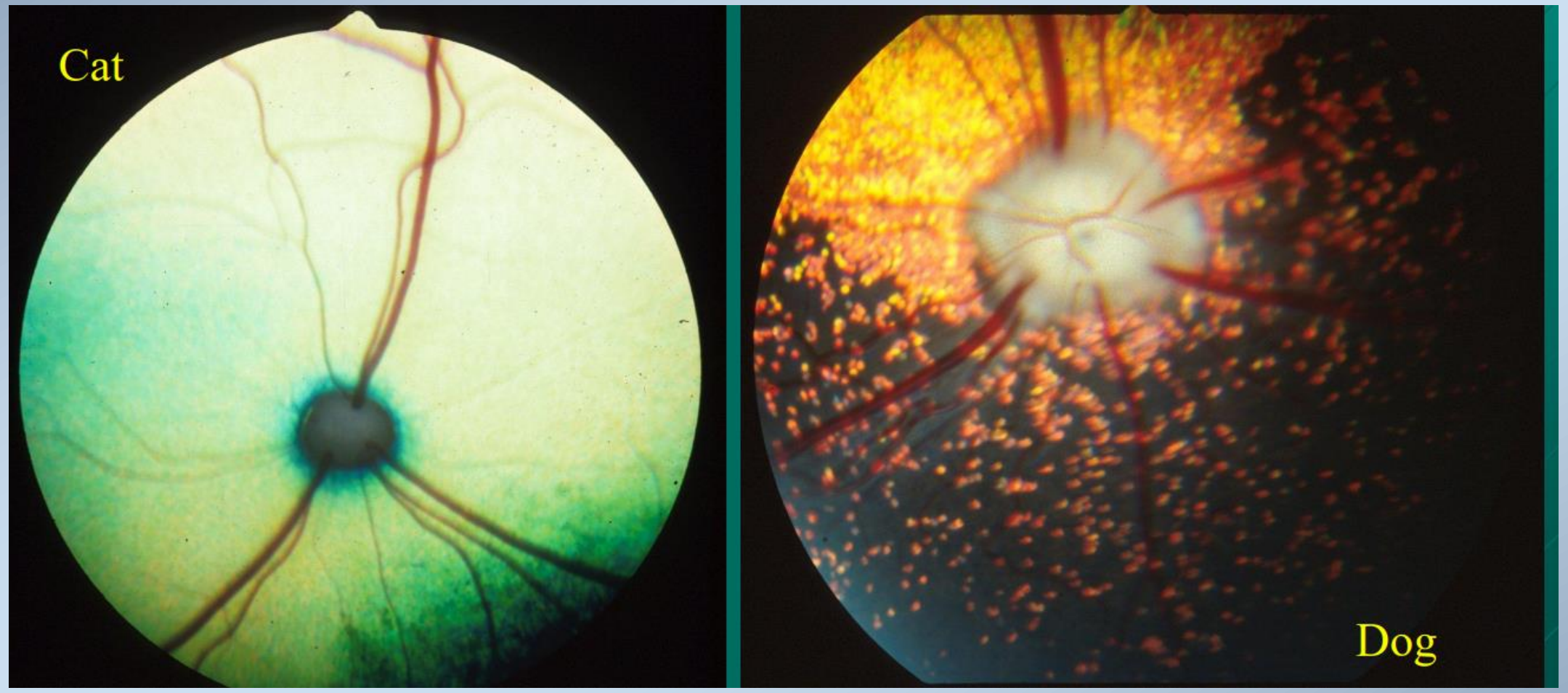

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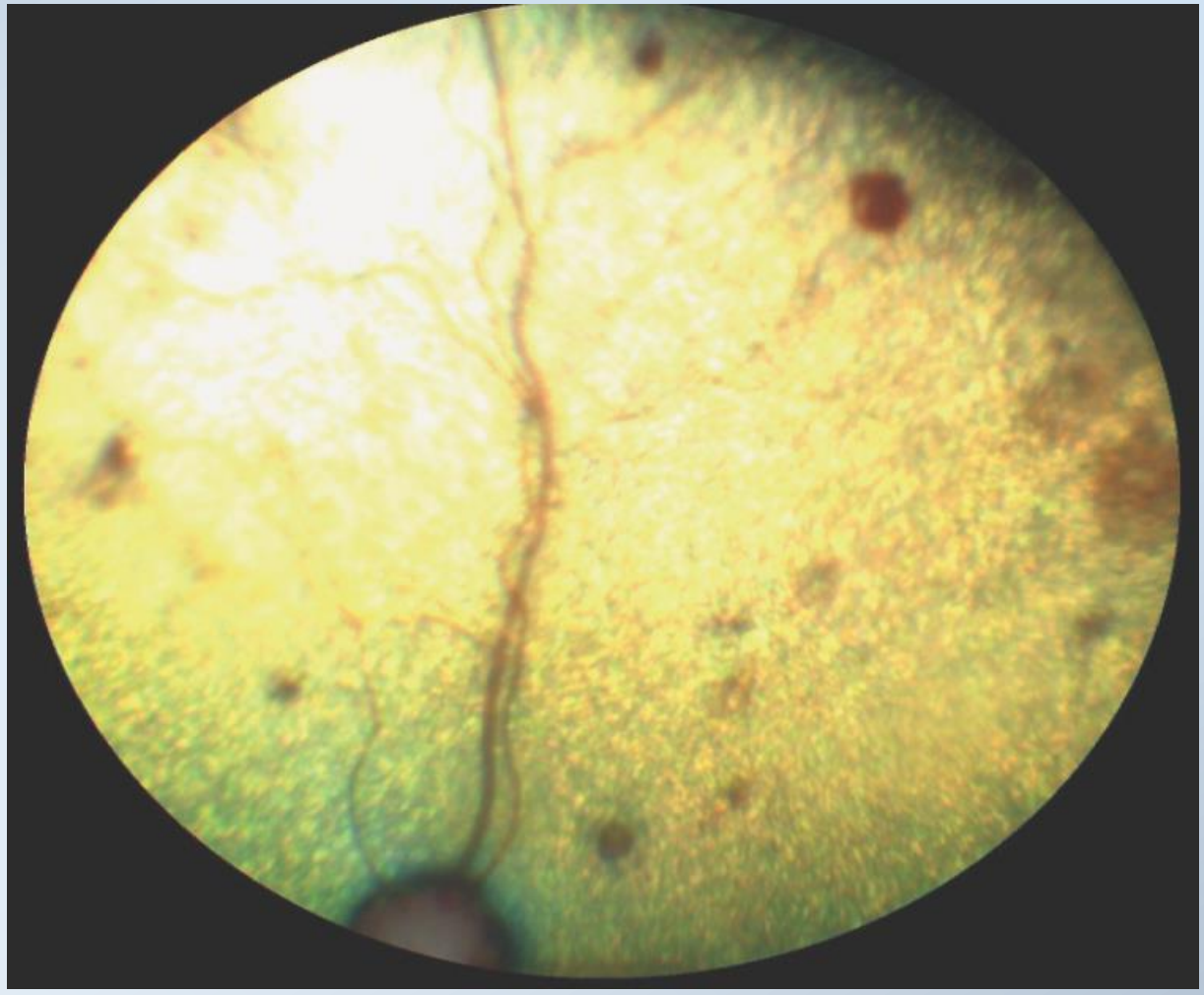
Indirect Ophthalmoscopy

Multifocal small retinal haemorrhages in a cat with systemic hypertension and hypertensive retinopathy

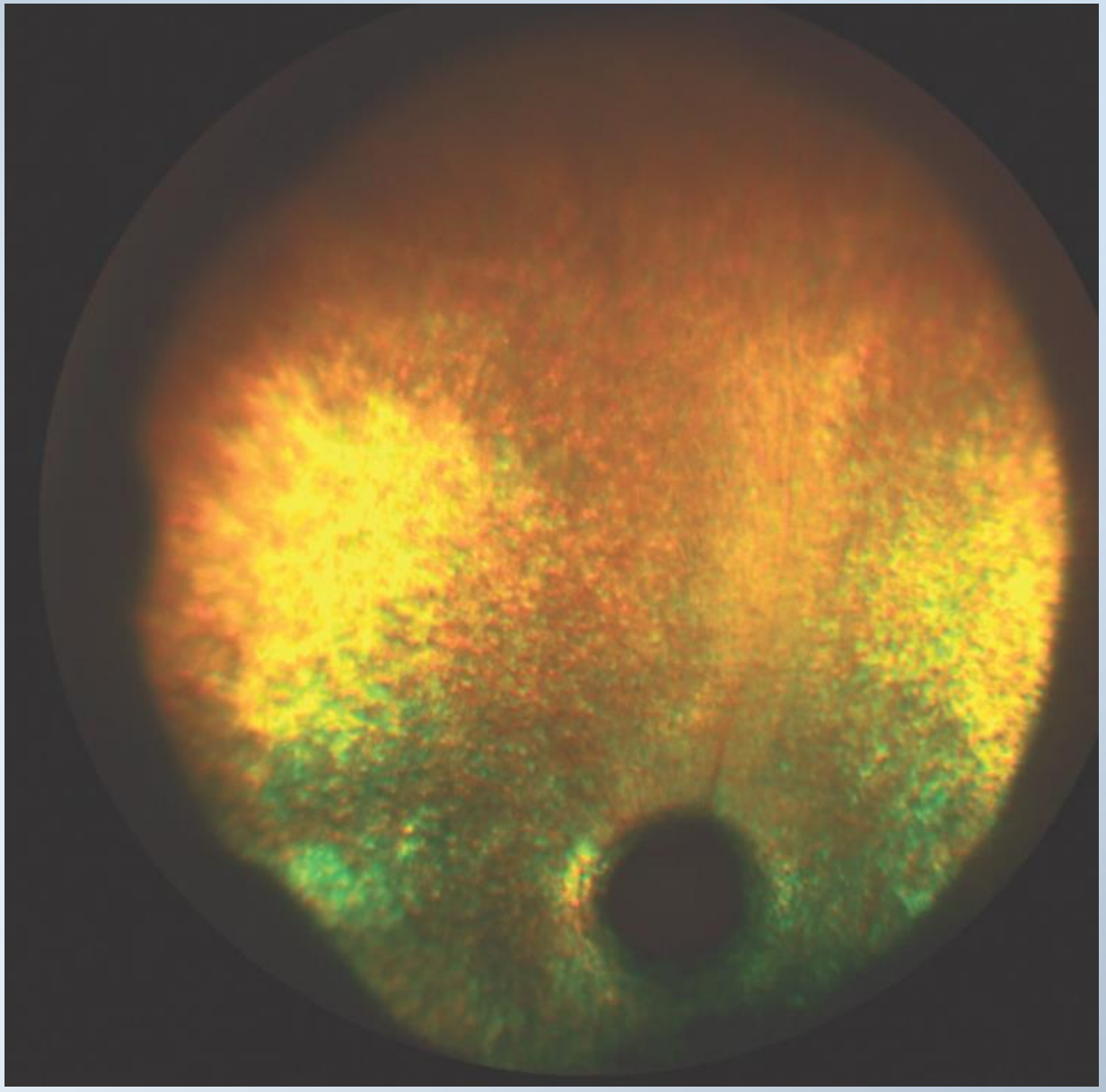
Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt



Indirect Ophthalmoscopy

Advanced retinal degeneration in a cat. Note the tapetal hyperreflectivity, loss of retinal blood vessels and optic nerve degeneration.

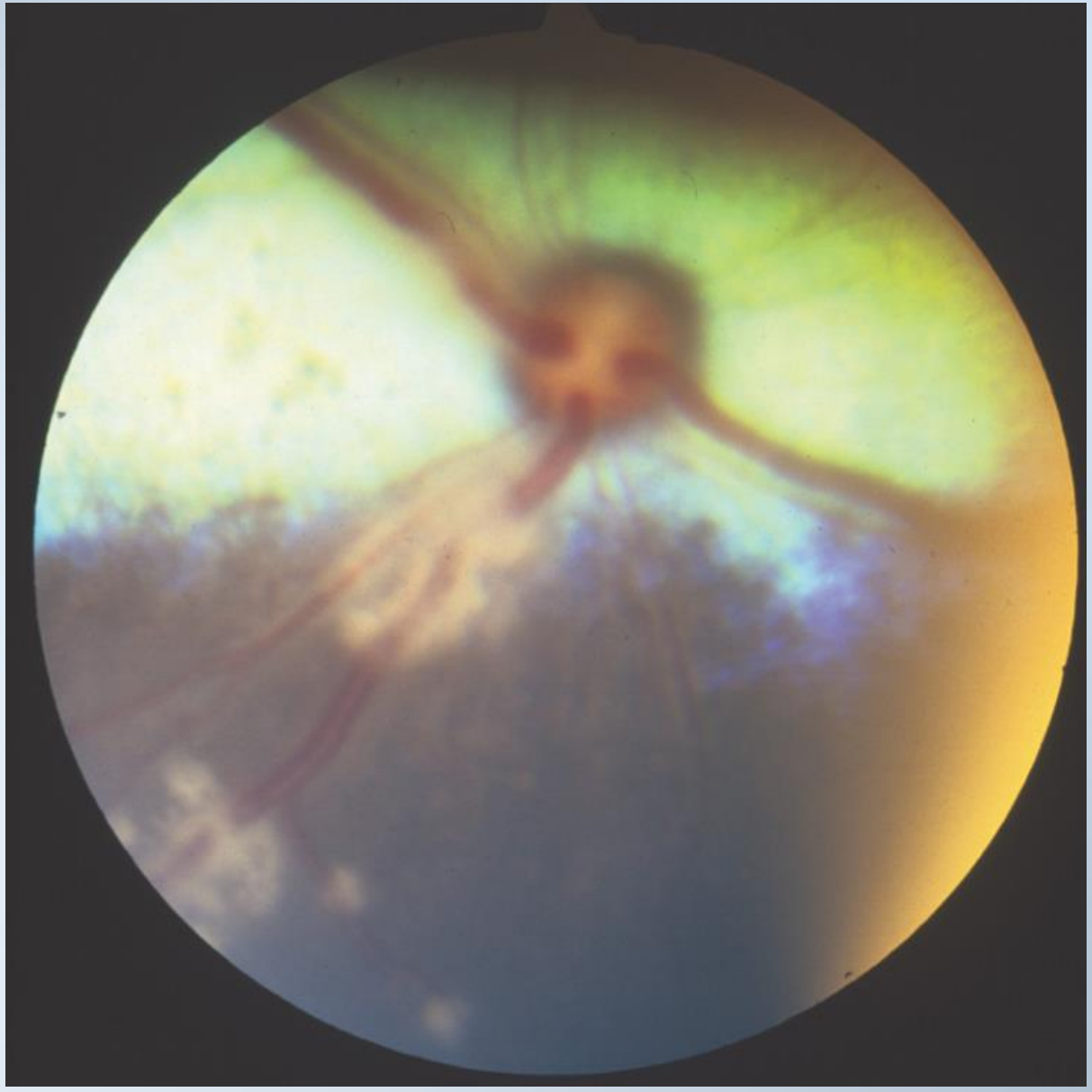
Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt



Indirect Ophthalmoscopy

Retinal vasculitis in a cat with feline infectious peritonitis. Note the perivascular cuffing of inflammatory cell.

Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt



Fluorescein Staining

- Water-soluble dye and is thus absorbed by **hydrophilic tissue** (corneal and conjunctival stroma) but not by **lipophilic tissue** (conjunctival and corneal epithelium and Descemet's membrane)
- While retracting the upper lid, touch the wetted fluorescein strip to the **bulbar conjunctiva** rather than to the cornea itself. Allow the patient to blink, which distributes the dye across the surface of the cornea. Rinse excess stain from the cornea with sterile eyewash
- Any exposed corneal stroma (indicating loss of corneal epithelium) will absorb fluorescein.
- **A deep ulcer with no stain uptake at its base is present, this is most likely a descemetocele**

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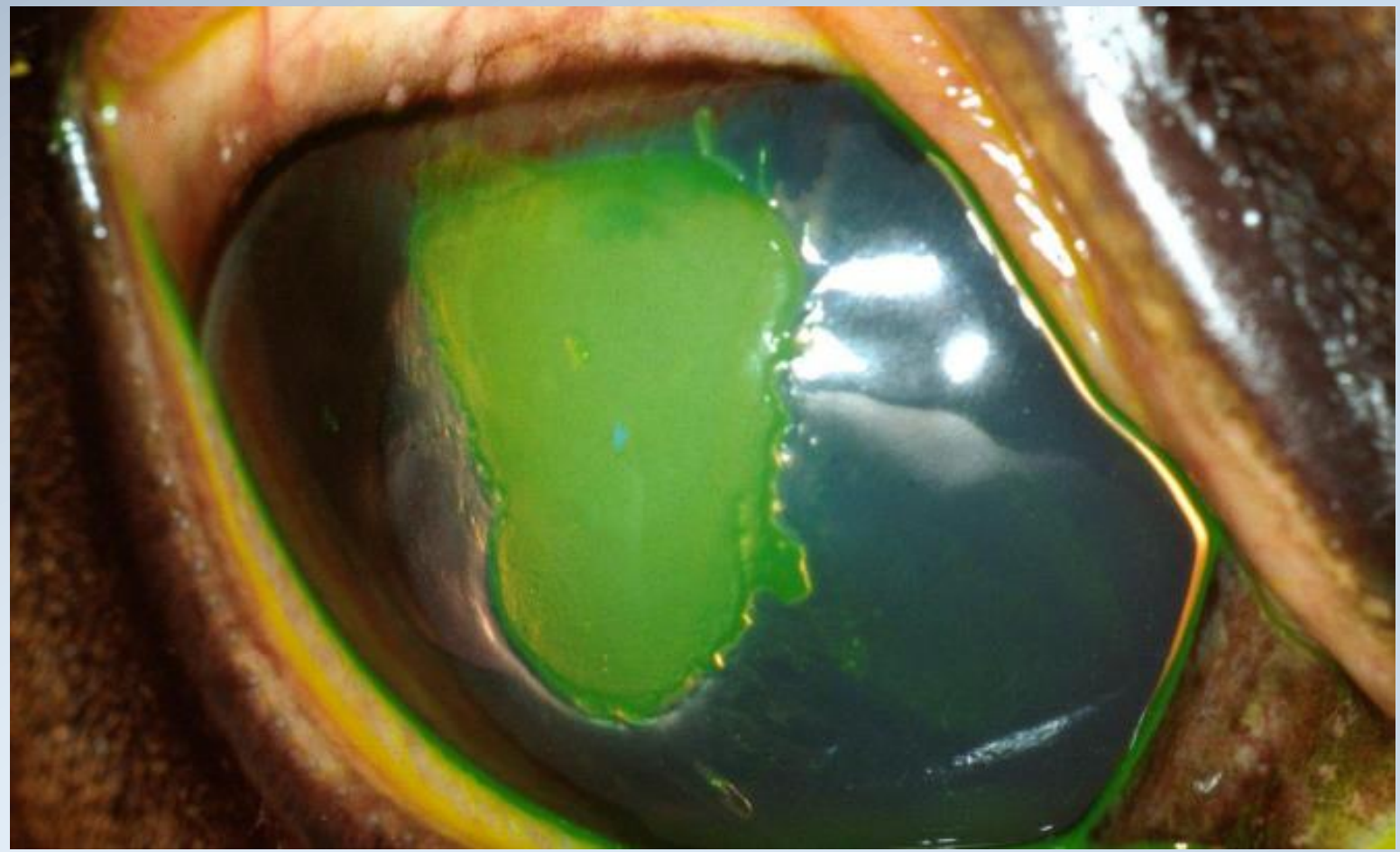

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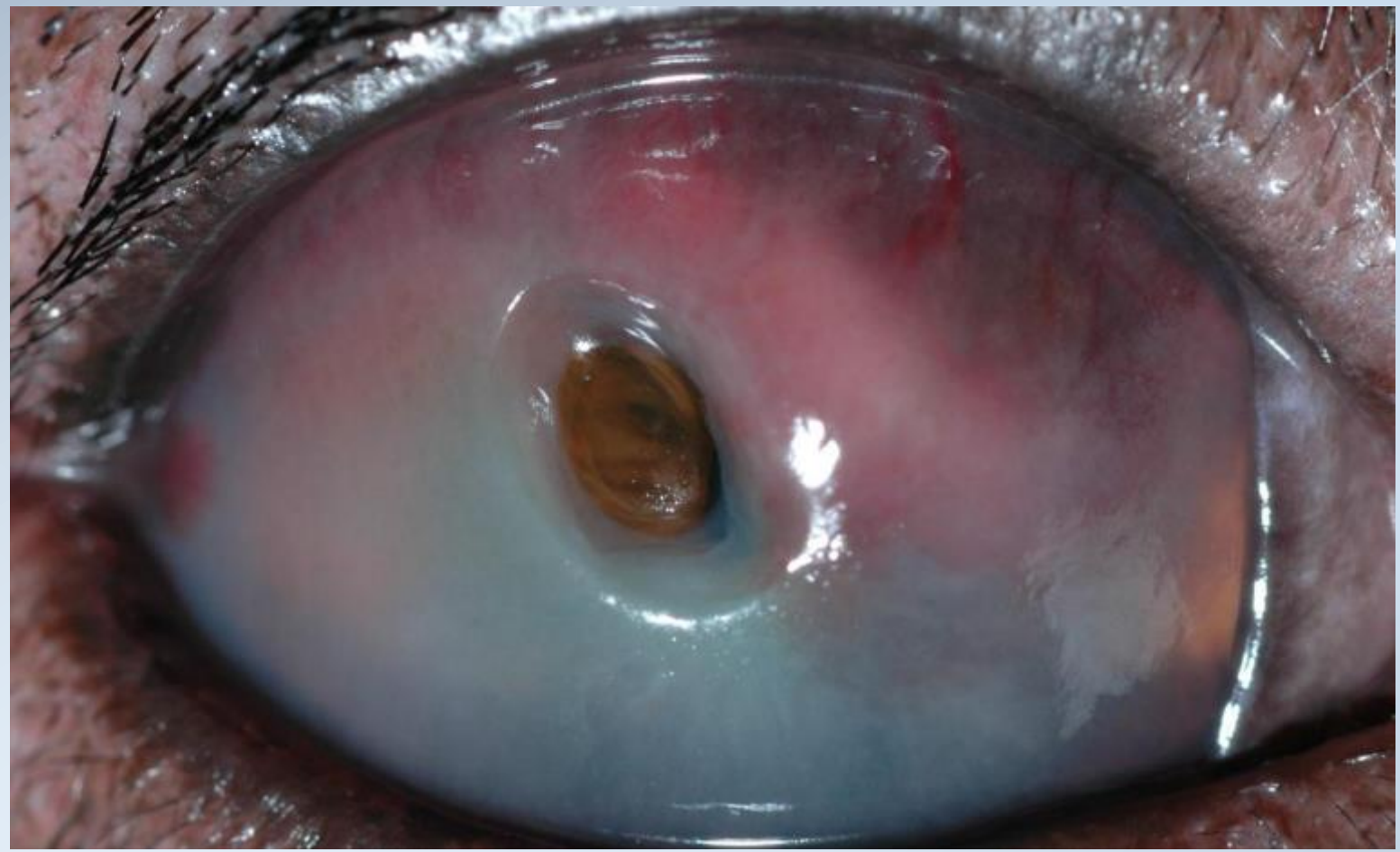

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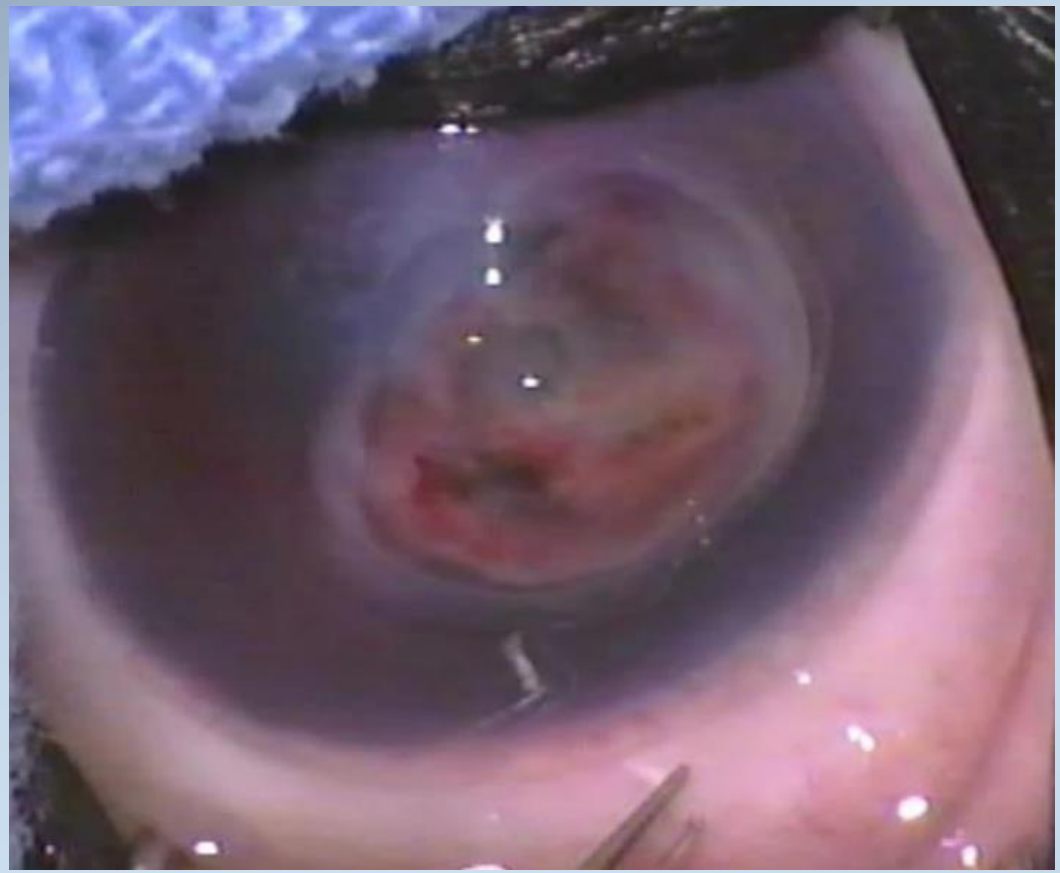
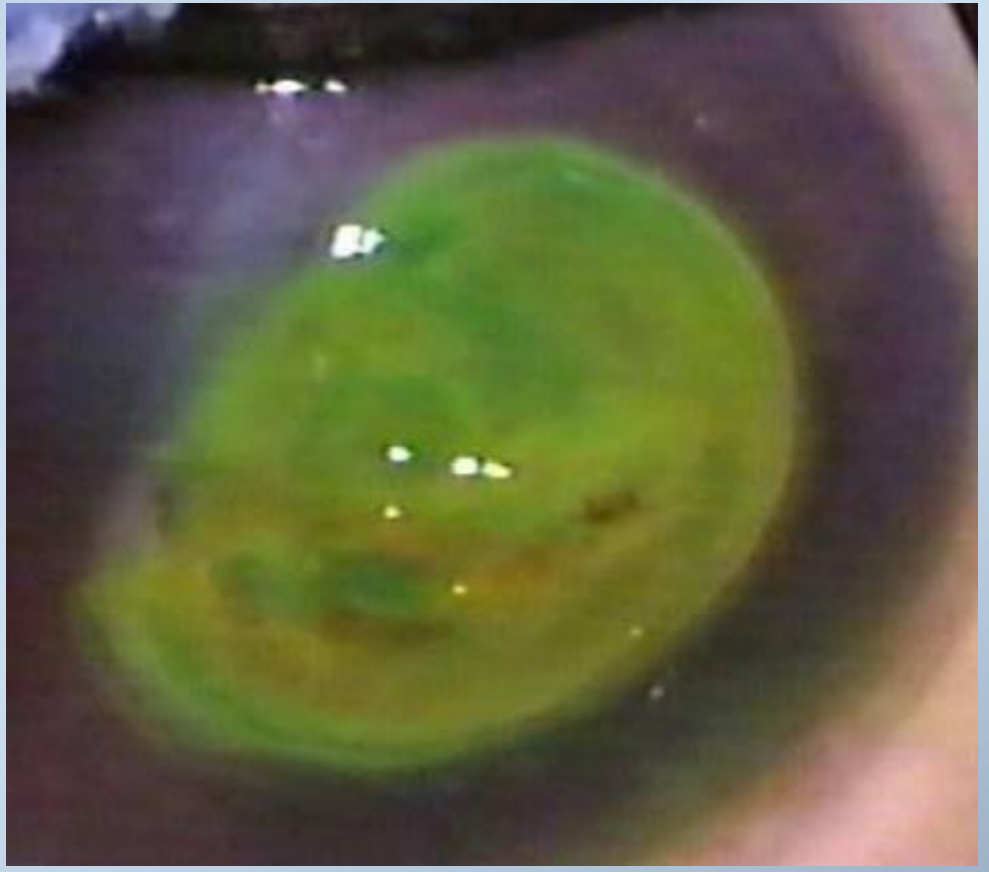


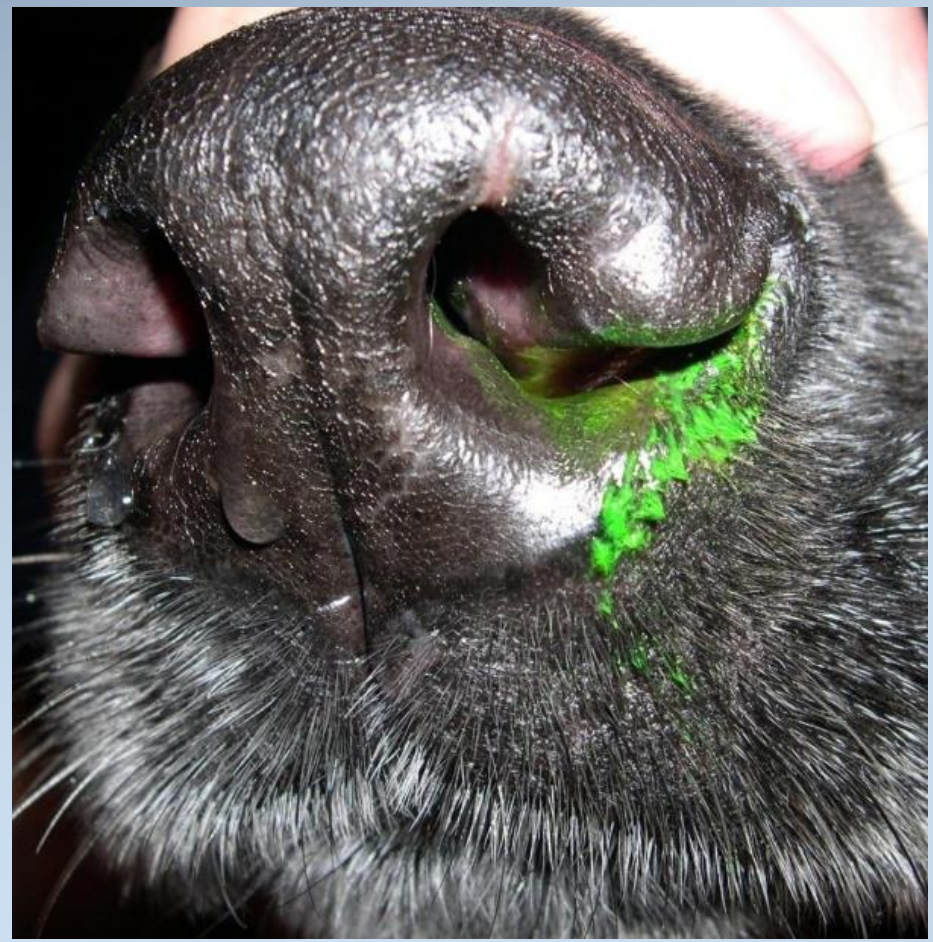


If aqueous humor mixed with fluorescein is seen running from the surface of a cornea with an ulcer, it would be considered a **positive Seidel test,** indicating a corneal perforation

Courtesy of The University of Florida: EXAMINATION OF THE EYE: METHODS OF DIAGNOSIS AND INSTRUMENTATION

Fluorescein Staining

- Fluorescein can also be utilized to assess **patency of the nasolacrimal system**. For this assessment, stain is placed on the ocular surface, but not rinsed, and then the nares are observed for the appearance of the dye. This test is known as the **fluorescein passage or Jones test**.
- In cats, the time it takes for fluorescein to reach the nares is quite variable, typically ranging from a few seconds to a few minutes.
- Some cats may also have a nasolacrimal duct opening into the oral cavity. Therefore it is important to observe the **oropharynx for dye if fluorescein is not observed at the cat's nares.**



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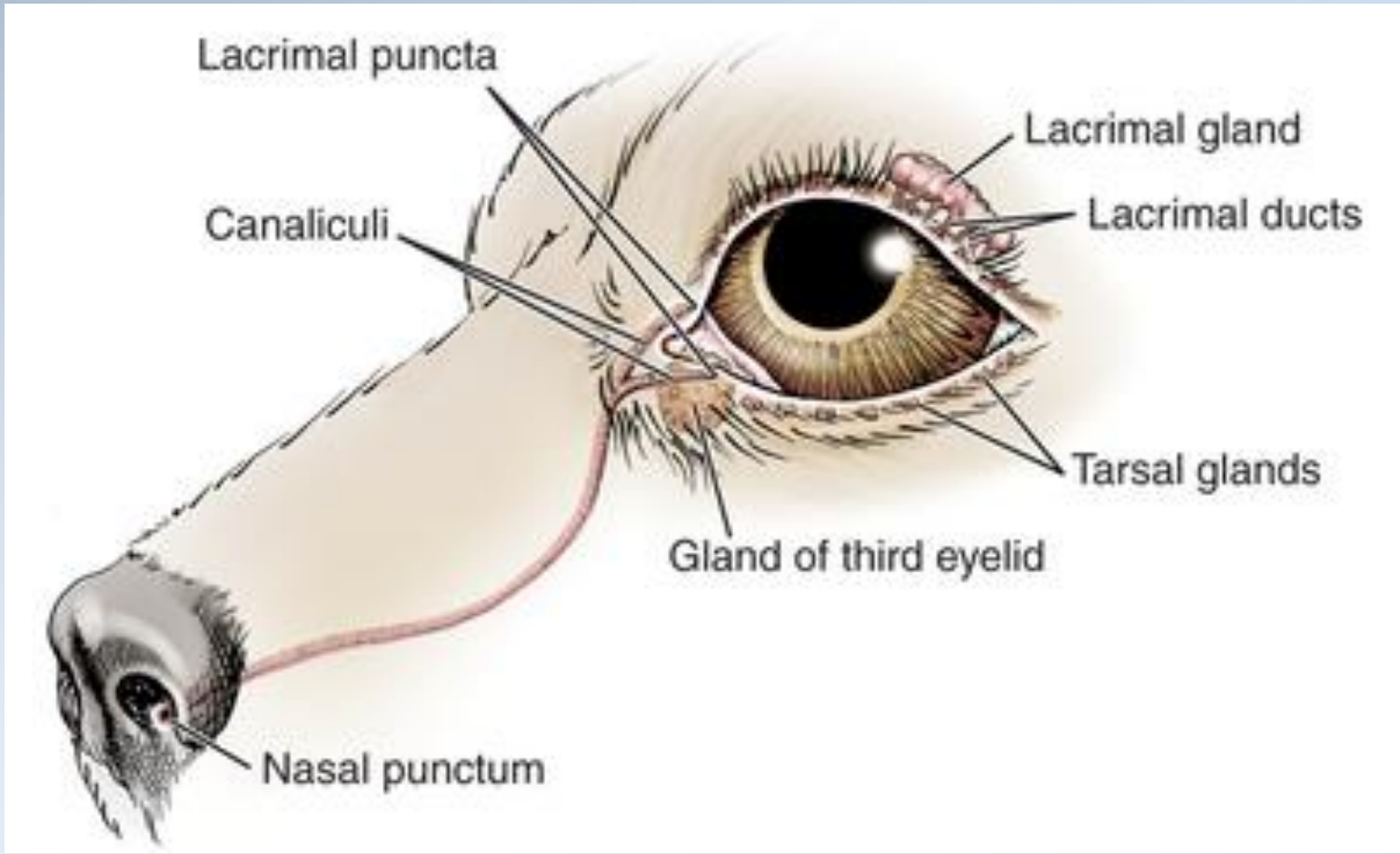
Nasolacrimal System Flush

- Under topical anaesthesia it's possible to cannulate nasolacrimal puncta in dogs and rabbits. With cats, you may require sedation.
- The ducts are assessed for patency using sterile saline.
- The upper punctum is cannulated with a 22g **pliable plastic cannula.**
- Start flushing with sterile saline the **upper punctum**, which will result in saline flowing through the lower punctum**. Occlude** the lower punctum with your finger and saline will drip to the nose. Some dogs will cough or swallow as the solution drains into the mouth. The procedure is repeated with the **lower punctum.**
- If there is a blockage, then further investigation is required such as cytology, culture and imaging with or without contrast.



Courtesy of Veterian Key

Tonometry

- Tonometry is used to measure intraocular pressure (IOP)
- Normal range:
    - Dog 15-25 mmHg
    - Cat 16-27 mmHg
    - Rabbit 16-20 mmHg

Tonometry

- It is important to ensure **that pressure is not being placed around the pet's neck or on the globes as the eyelids are held open as it may affect the IOP.**
- Restraint **under the chin and behind the head** will help to prevent movement of the pet without affecting the IOP.
- A topical anaesthetic must be used when utilizing applanation tonometry, but is not necessary for rebound tonometry due to the short contact time between the probe and the cornea.
- The most important thing when checking patients over time **is to utilize the same measuring device.**

Applanation Tonometer

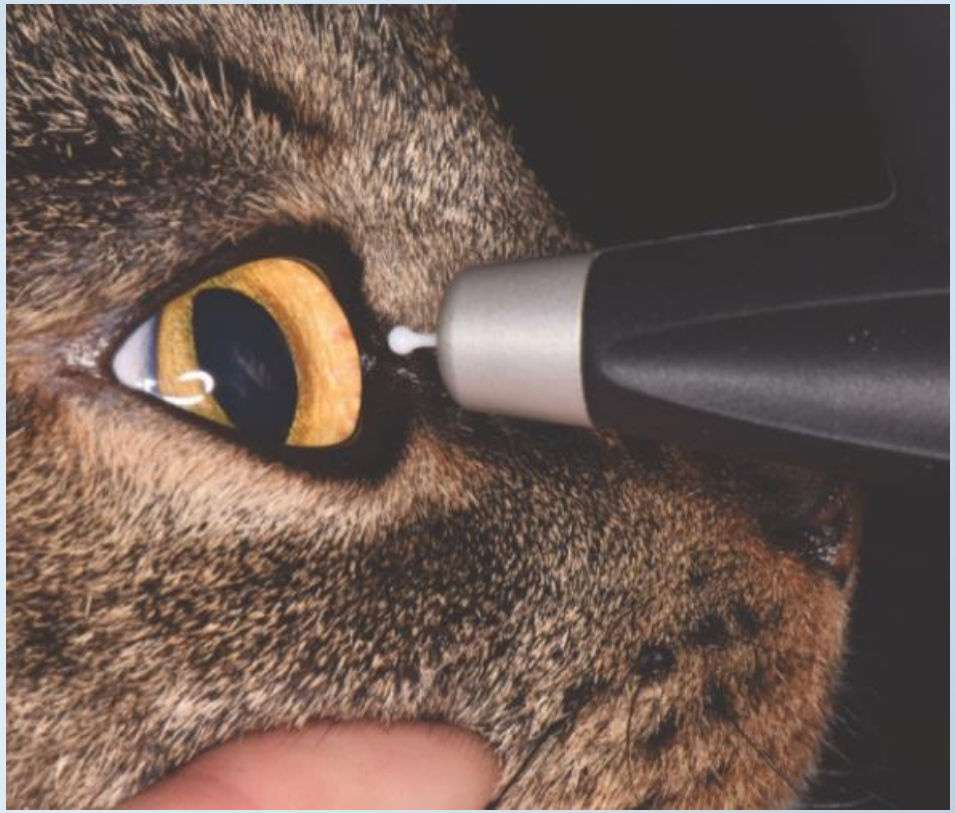
The Tono-Pen an **applanation tonometer** works by flattening the cornea with the instrument's footplate

Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt

Rebound Tonometer

The TonoVet is a **rebound tonometer** works by measuring the speed with which the probe returns to the instrument following contact with the cornea

Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt



Cytology

- Examination of cells obtained from ocular surfaces (conjunctiva or cornea) can be helpful in diagnosing and treating ocular issues
- Use of Microbrushes allows the collection of cells in an atraumatic manner and preserves well the cells
- Topical anaesthetic is applied, then the Microbrush is placed on the conjunctiva or corneal surface and rolled several times in one direction
- Cells are transferred to a slide, then dried and stained in a routine manner

Microbrush

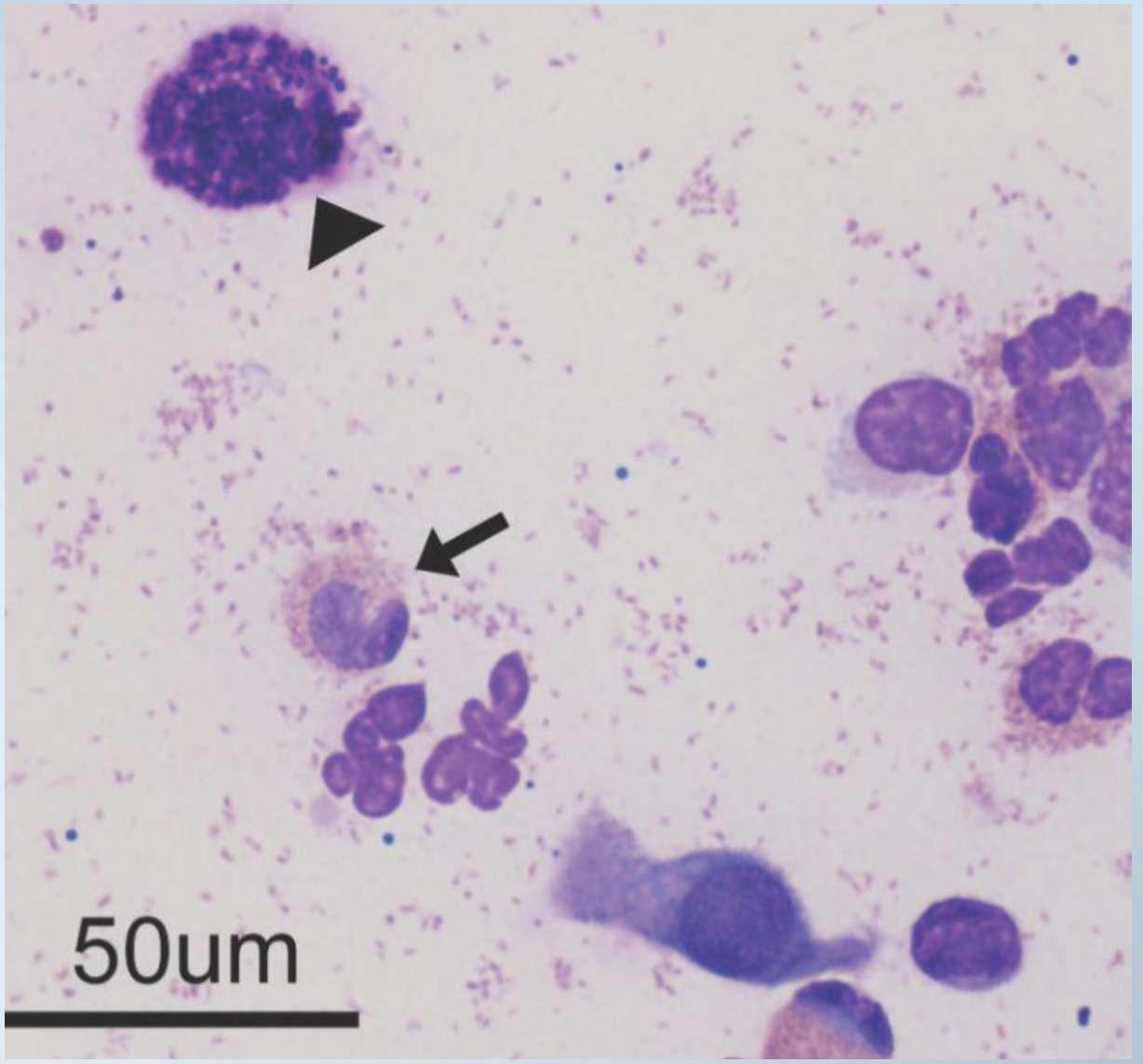
The Microbrush should be rolled across the conjunctiva or cornea several times. The brush is then rolled on a glass slide to transfer the cells.

Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt

Eosinophilic Keratitis

Cytologic preparation from a cat with a raised pinkish-white plaque and corneal vascularization. Purulent inflammation with **eosinophils (arrow) and a mast cell (arrowhead) is present, confirming eosinophilic keratitis**

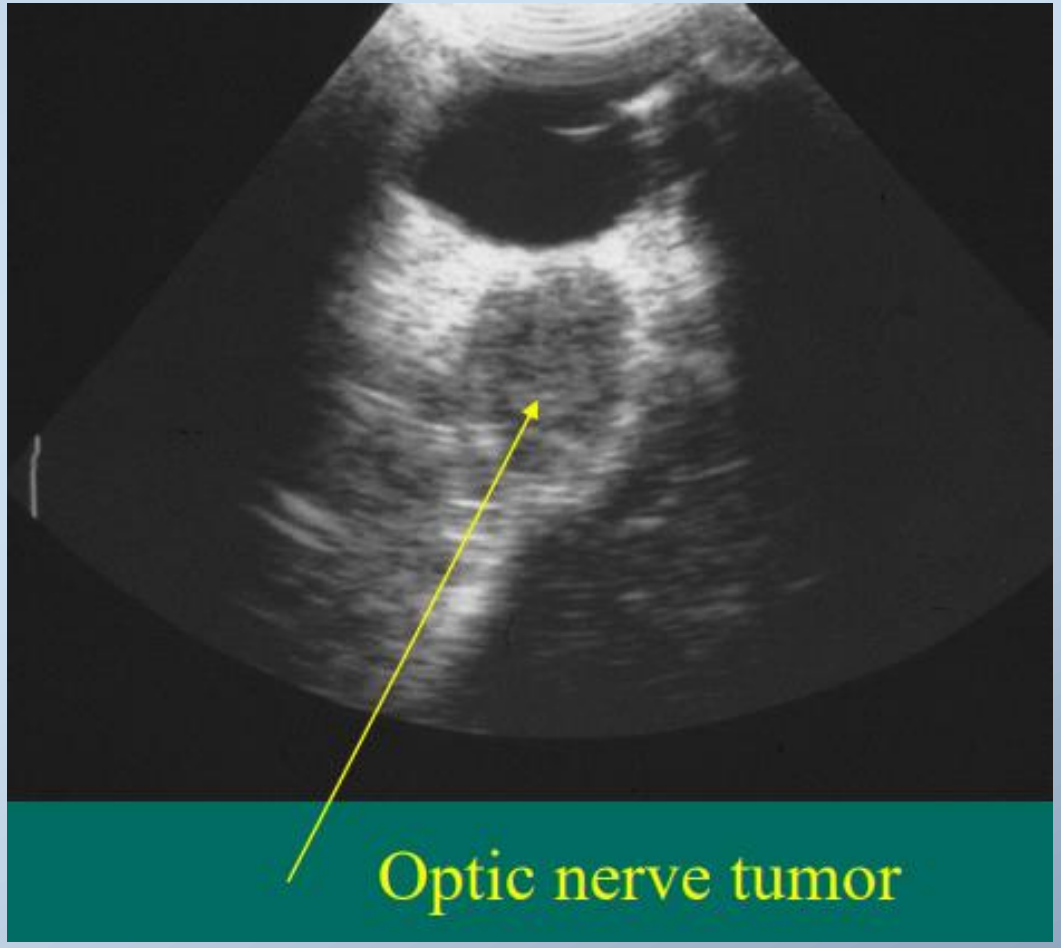
Courtesy of Eye examination in the cat: Step-by-step approach and common findings; August 25 2016; Jean Stiles stiles; Beth Kimmitt



Further Examination Techniques

- **Gonioscopy**
  - Examination of the iridocorneal angle.
- **Electroretinography (ERG)**
  - The electrical response recorded when the retina is stimulated with light. It's used mainly to establish retinal function.
- **Blood pressure measurement**
- **Ocular ultrasonography**

Ocular Ultrasonography



Courtesy of The University of Florida: EXAMINATION OF THE EYE: METHODS OF DIAGNOSIS AND INSTRUMENTATION

Summary

- History
- Distant examination
- Close ‘hands-off’ examination
- Schirmer Tear Test
- Vision and neuro-ophthalmic tests
- Adnexal and anterior segment examination
- Indirect ophthalmoscopy
- Fluorescein staining
- Tonometry
- Further test such as cytology, Gonioscopy, ERG, U/S and blood pressure measurement

Telemedicine ophthalmology service

- We offer **FULL OPHTHALMOLOGY TELEMEDICINE SERVICE** with virtual video consultations.
- Working together with vets we aim to provide a **treatment plan** to manage your cases effectively.
- Keep your cases **in-house**.
- Reduce **waiting time for seeing an ophthalmologist**.

Telemedicine ophthalmology service

- **Guiding** vets who need help with eye cases.
- **Save patients' eyes** and improve their quality of life.

Services we provide

Vet to vet services

Ophthalmology Telemedicine Report

Ophthalmology Telemedicine Consult

HOW TO REFER A TELEMEDICINE CASE

- Go to www.vetonlines.co.uk/ophthalmology-telemedicine-get-started
- Fill out the referral form
- I will contact you back to arrange a telemedicine consult

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