



Practical session 1:

DISTANT DIRECT OPHTHALMOSCOPY: THE PUPILLOMETER
& EXAMINING THE POWER OF THE TAPETAL REFLECTION

Distant direct Ophthalmoscopy

- Ophthalmoscope on zero
 - ▶ or
- Light source as close to visual axis as possible



Use as a “pupilometer” : assess pupil size, symmetry, shape and response to light.

Assess tapetal reflectivity & symmetry.

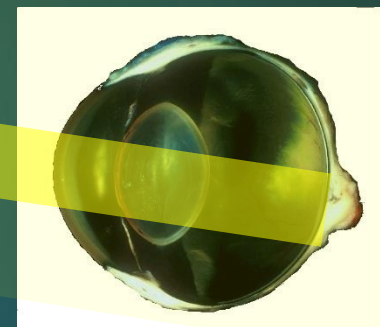
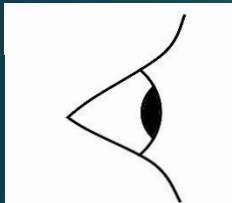
Assess opacities in the visual axis

Assess opacities outside the visual axis

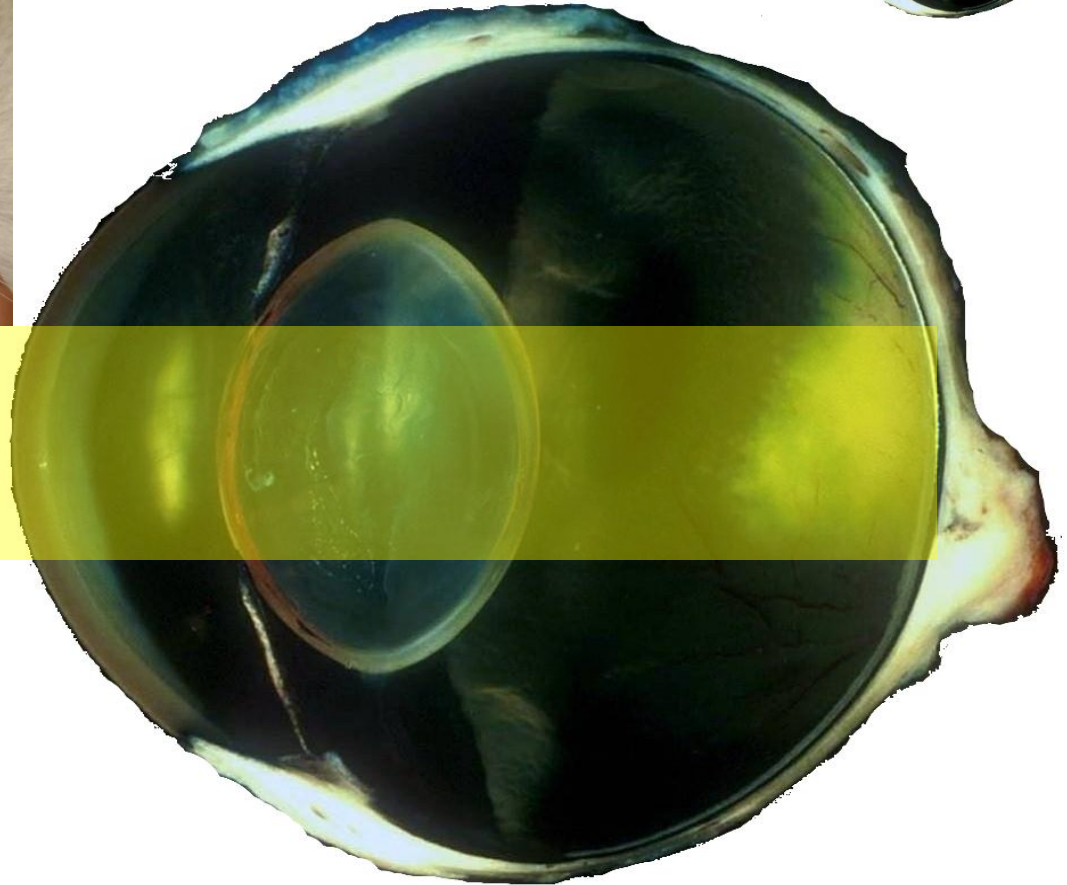
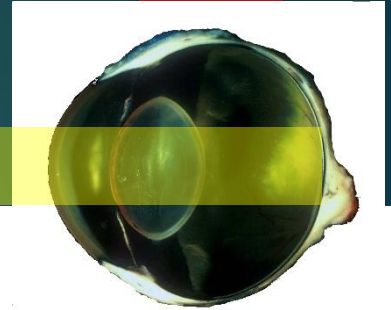
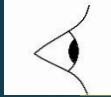
Localisation of opacities using parallax

Localisation of opacities using oblique illumination “the search light technique”.

Pupillometer

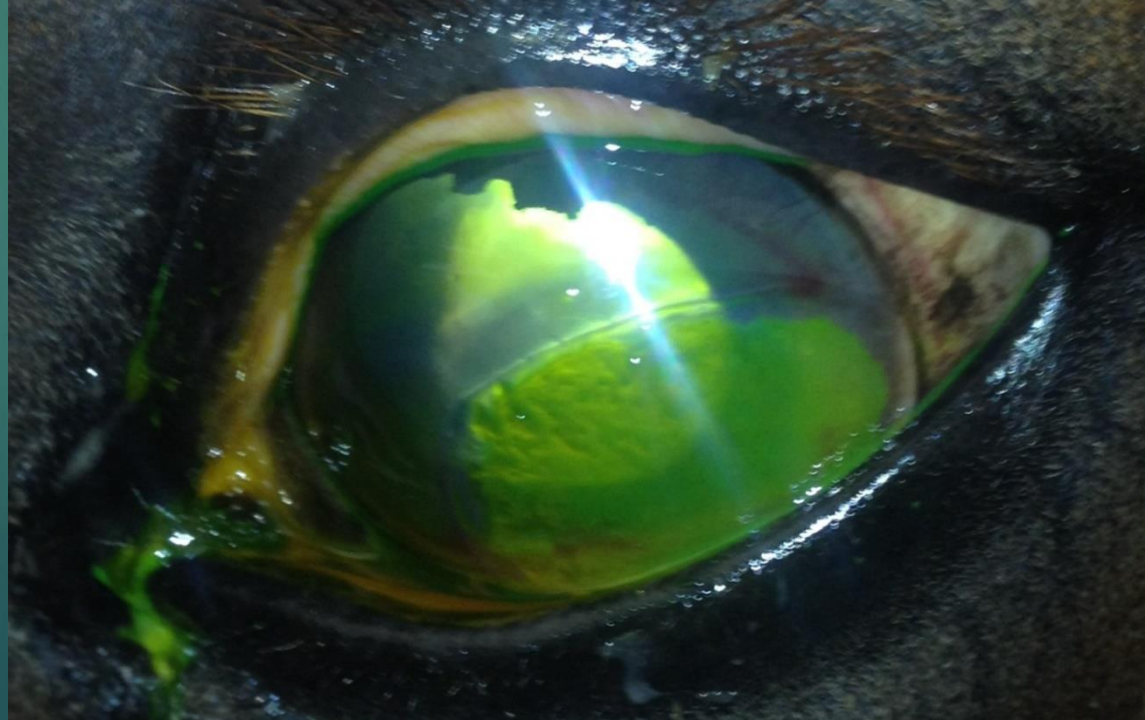


Compare tapetal reflection



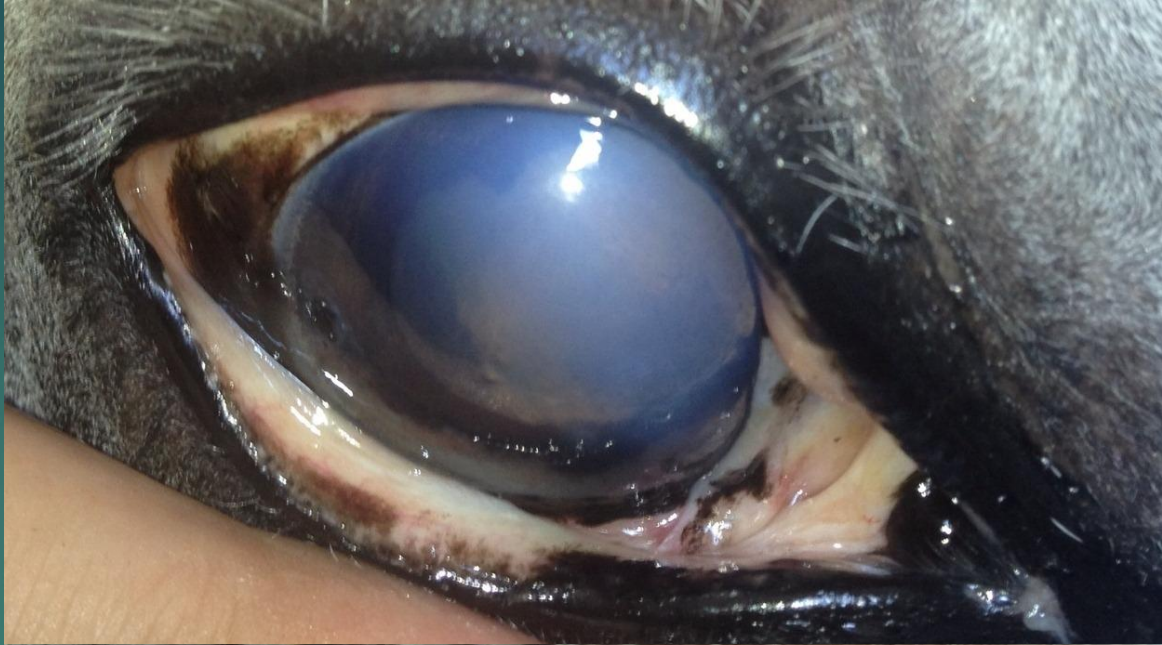


“distant direct”





“distant direct”







“distant direct”



Practical session 1:

Pupilometer

With a partner:

Large circle

Set to your "0"

Rheostat to low

- ▶ Direct PLR
- ▶ Swinging flashlight test
- ▶ Compare tapetal reflections

With your model

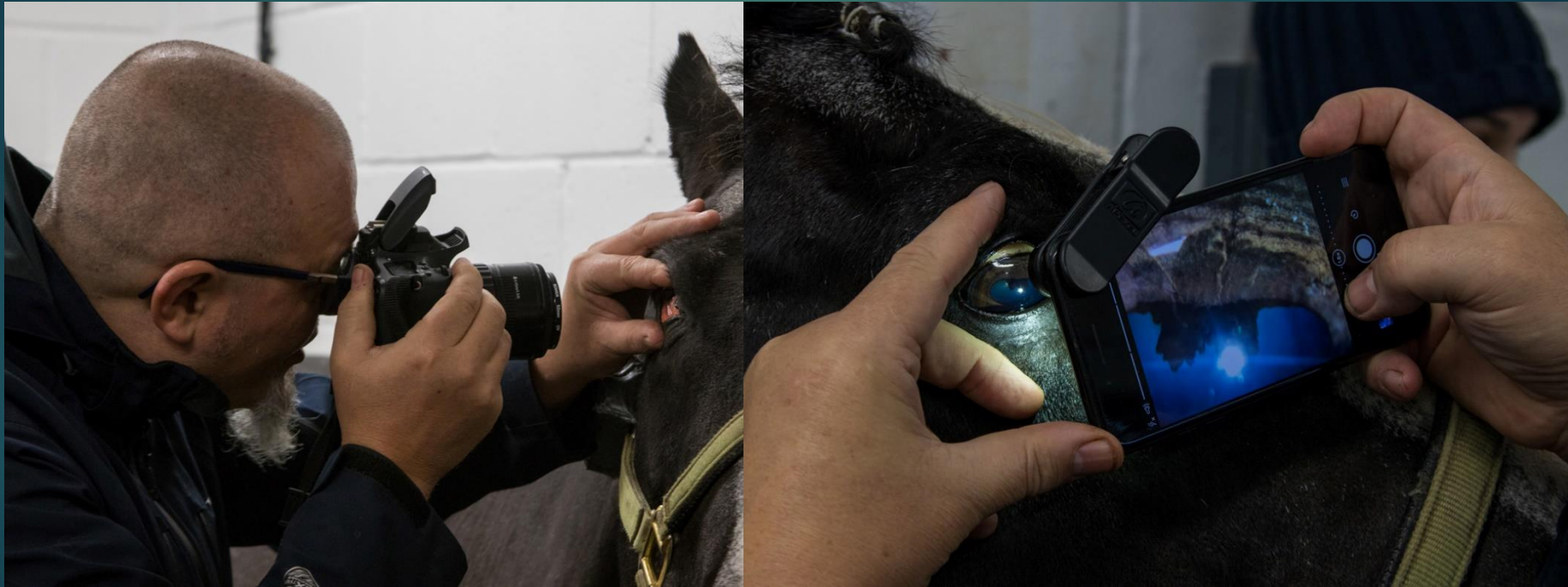
- ▶ Examine Tapetal reflection
- ▶ See how it changes with angle and understand why



Practical session 2:

SMART PHONE ANTERIOR SEGMENT
MACROPHOTOGRAPHY

Smart phone anterior segment macrophotography





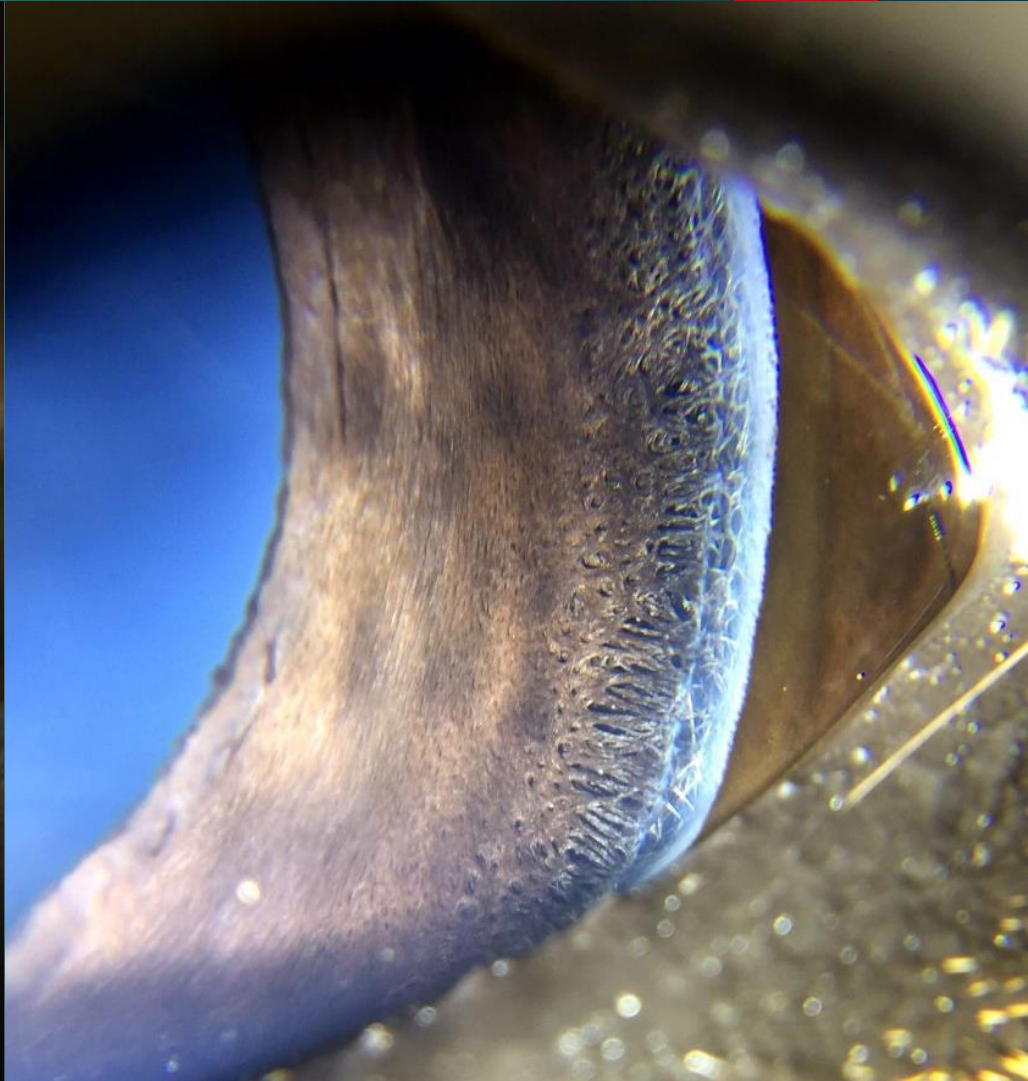
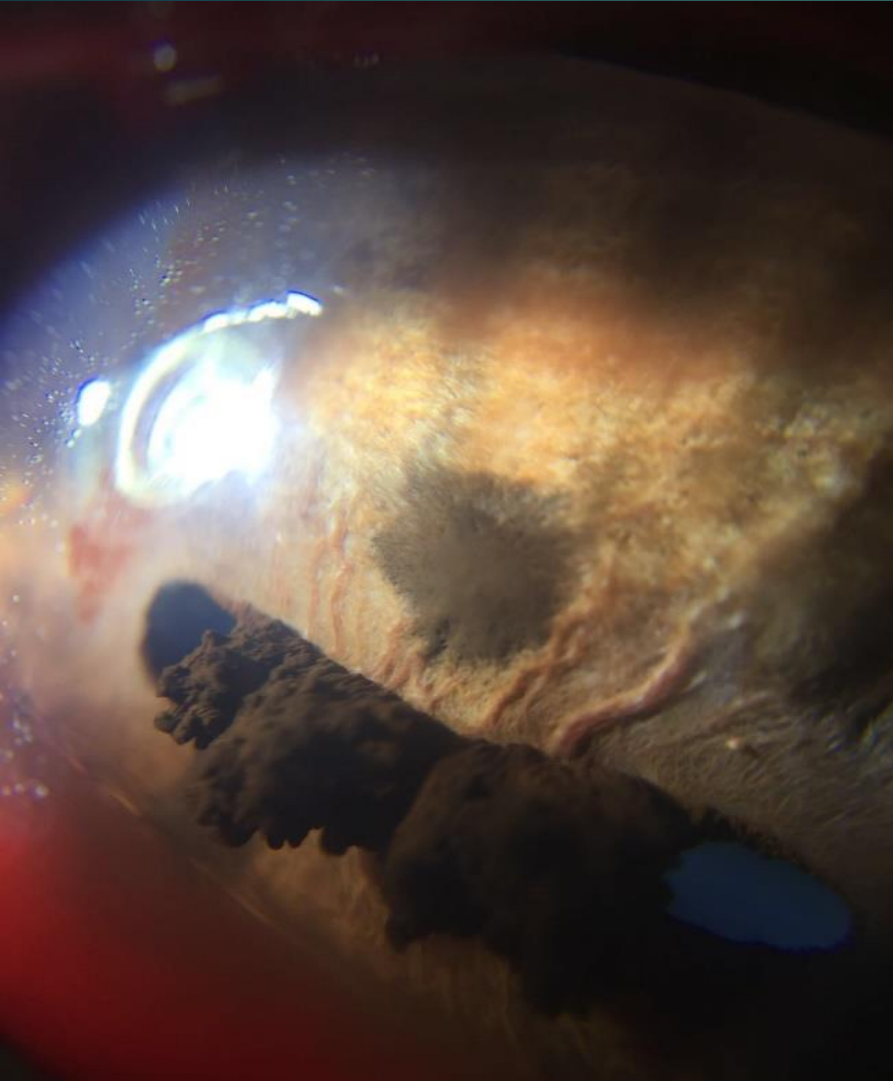


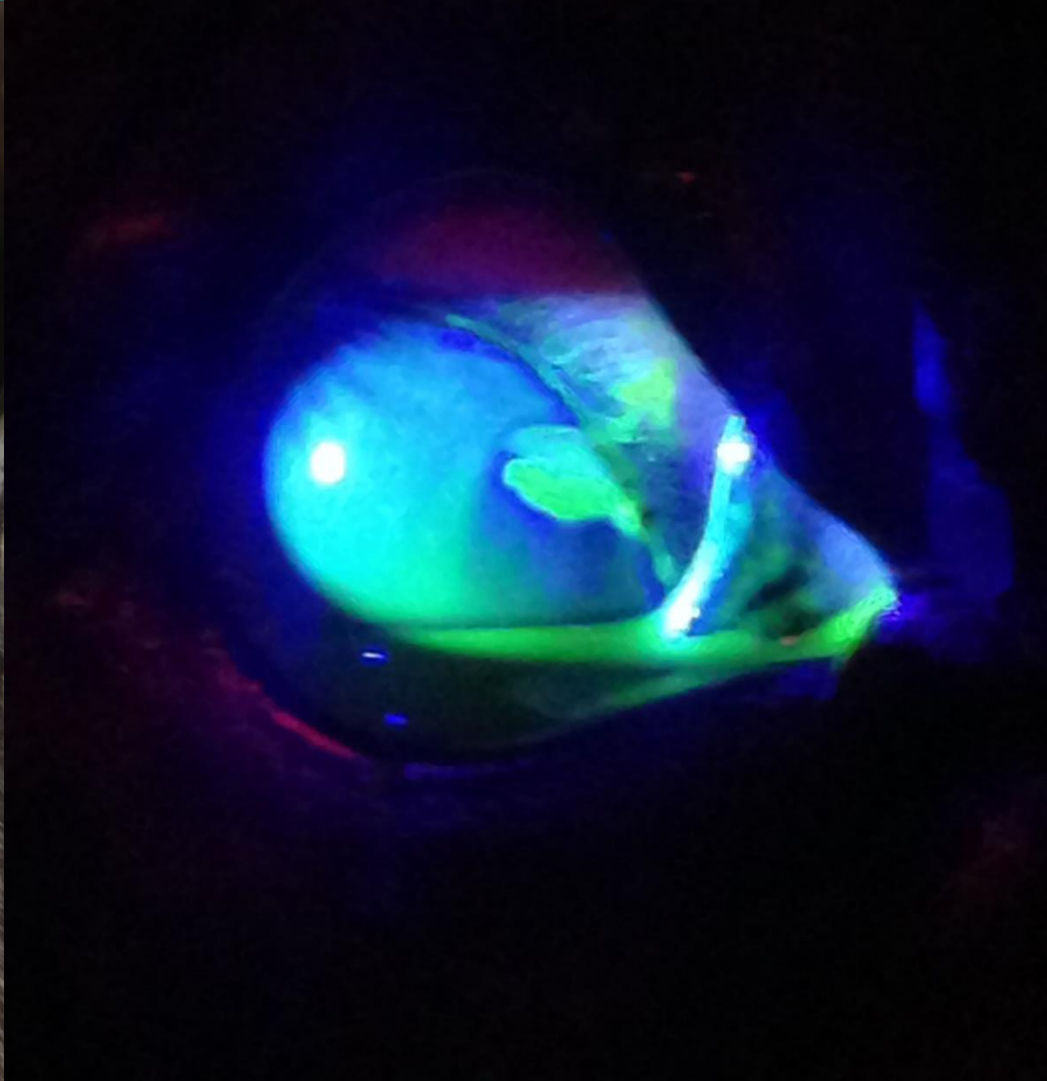


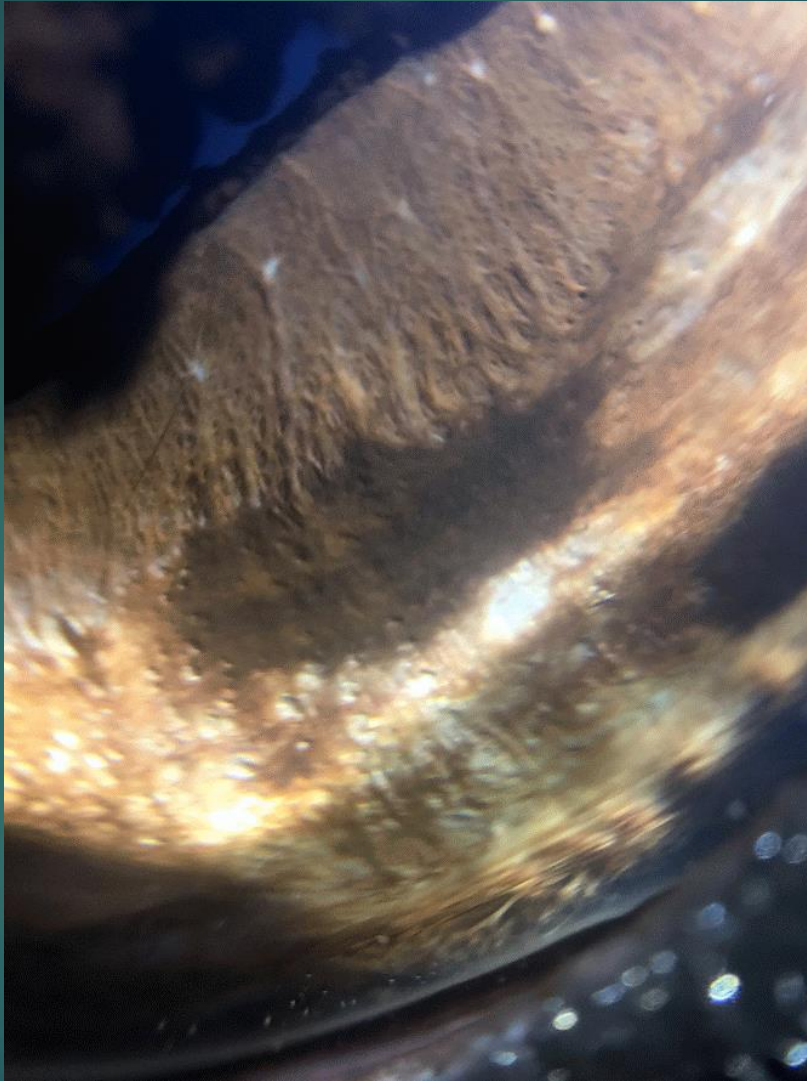


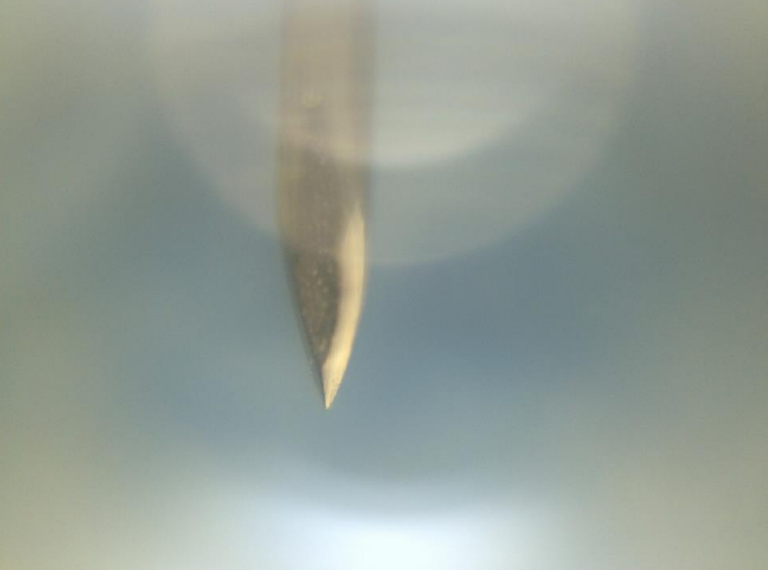




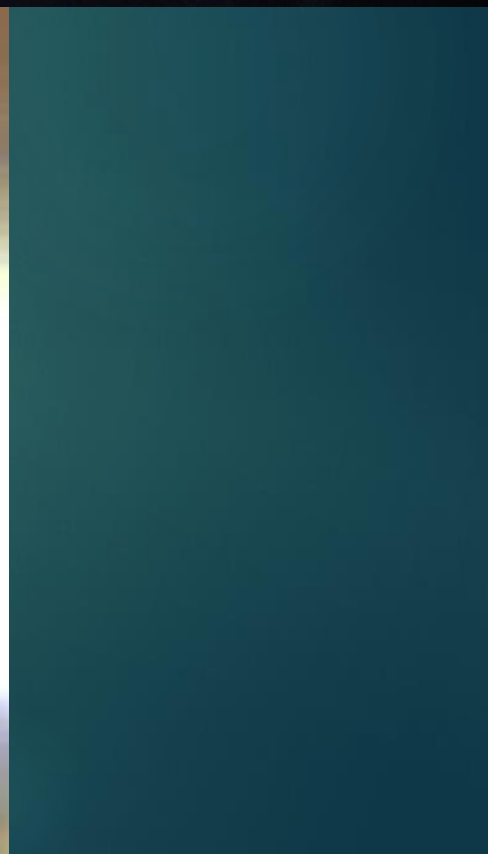
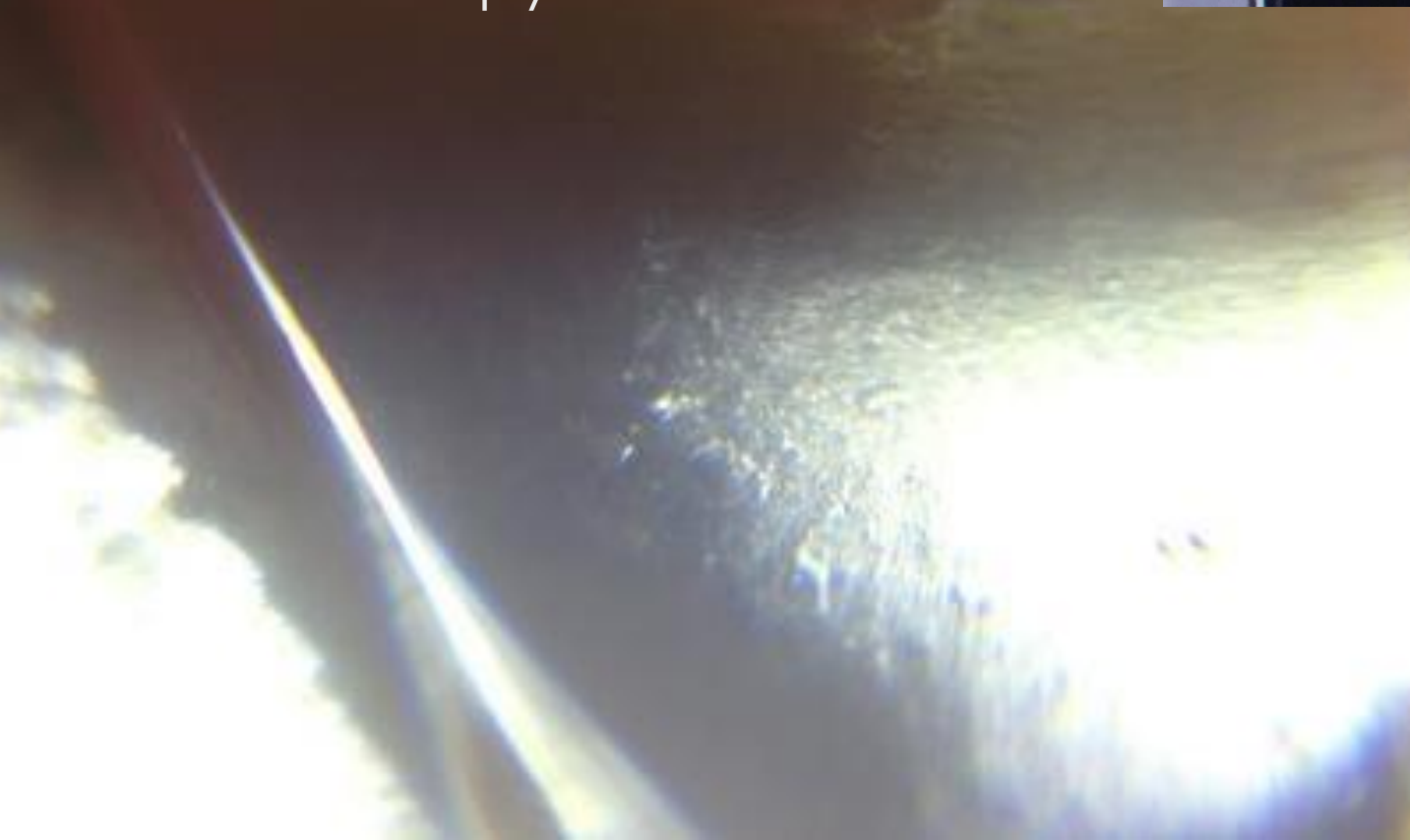


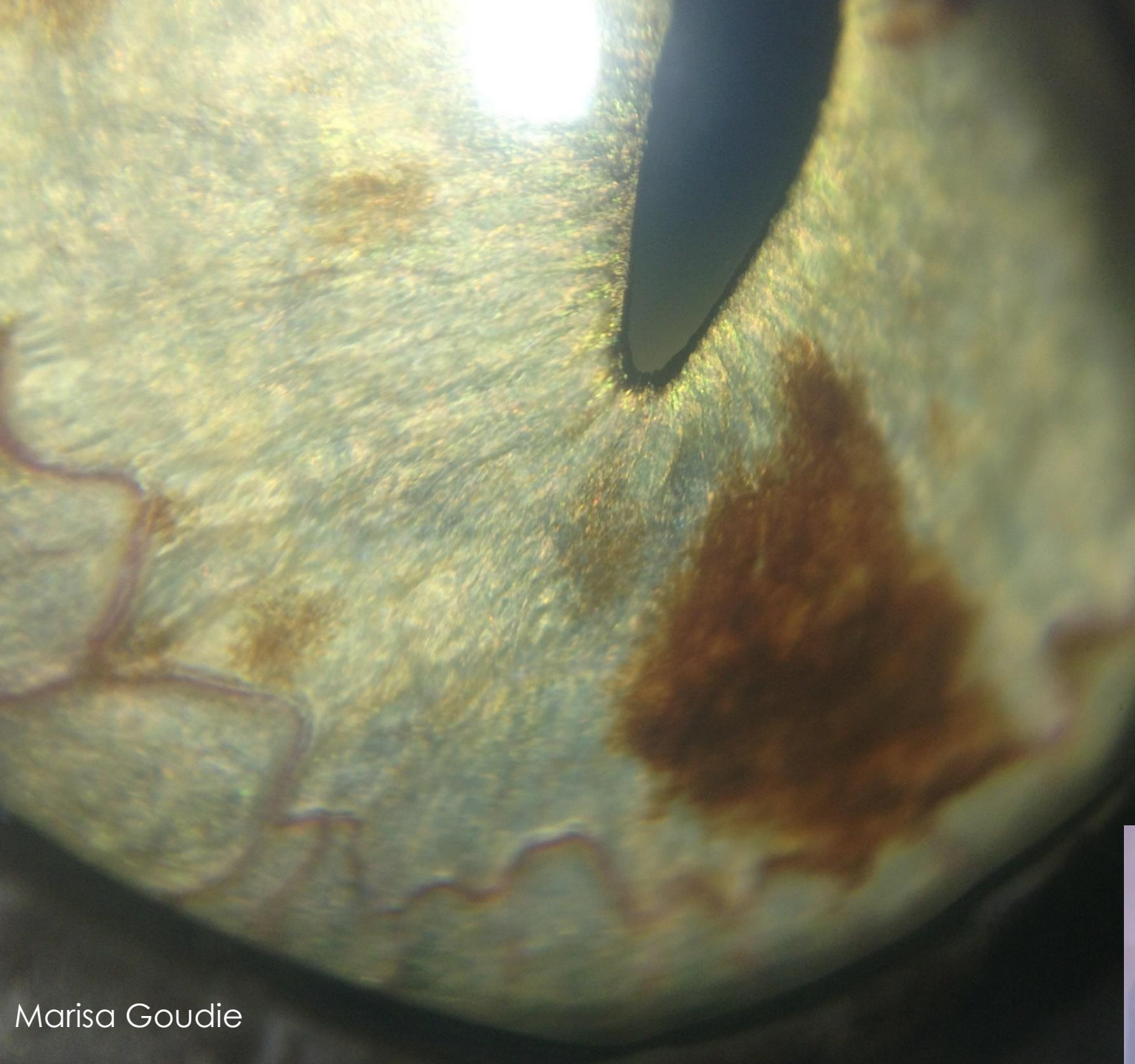




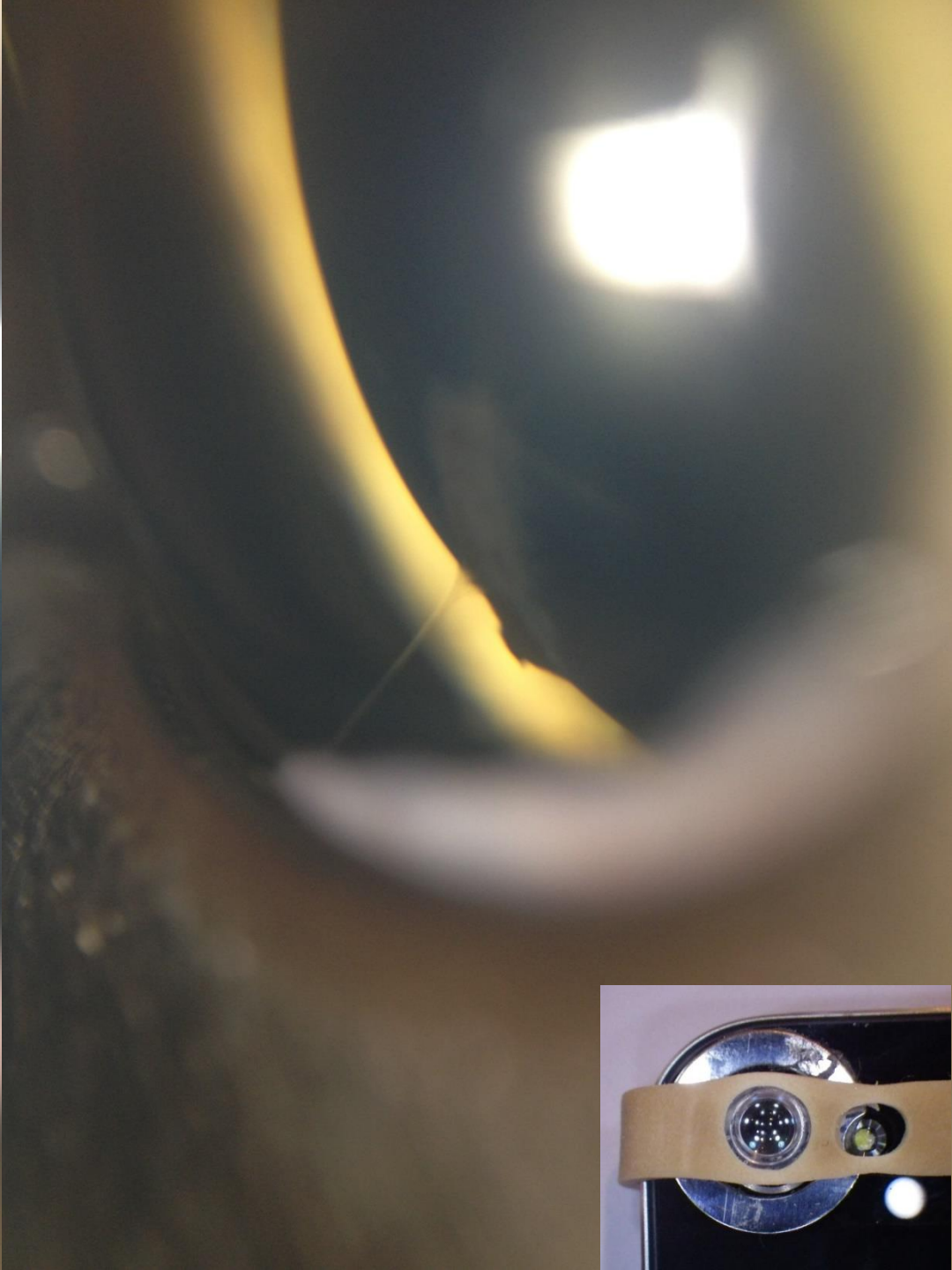
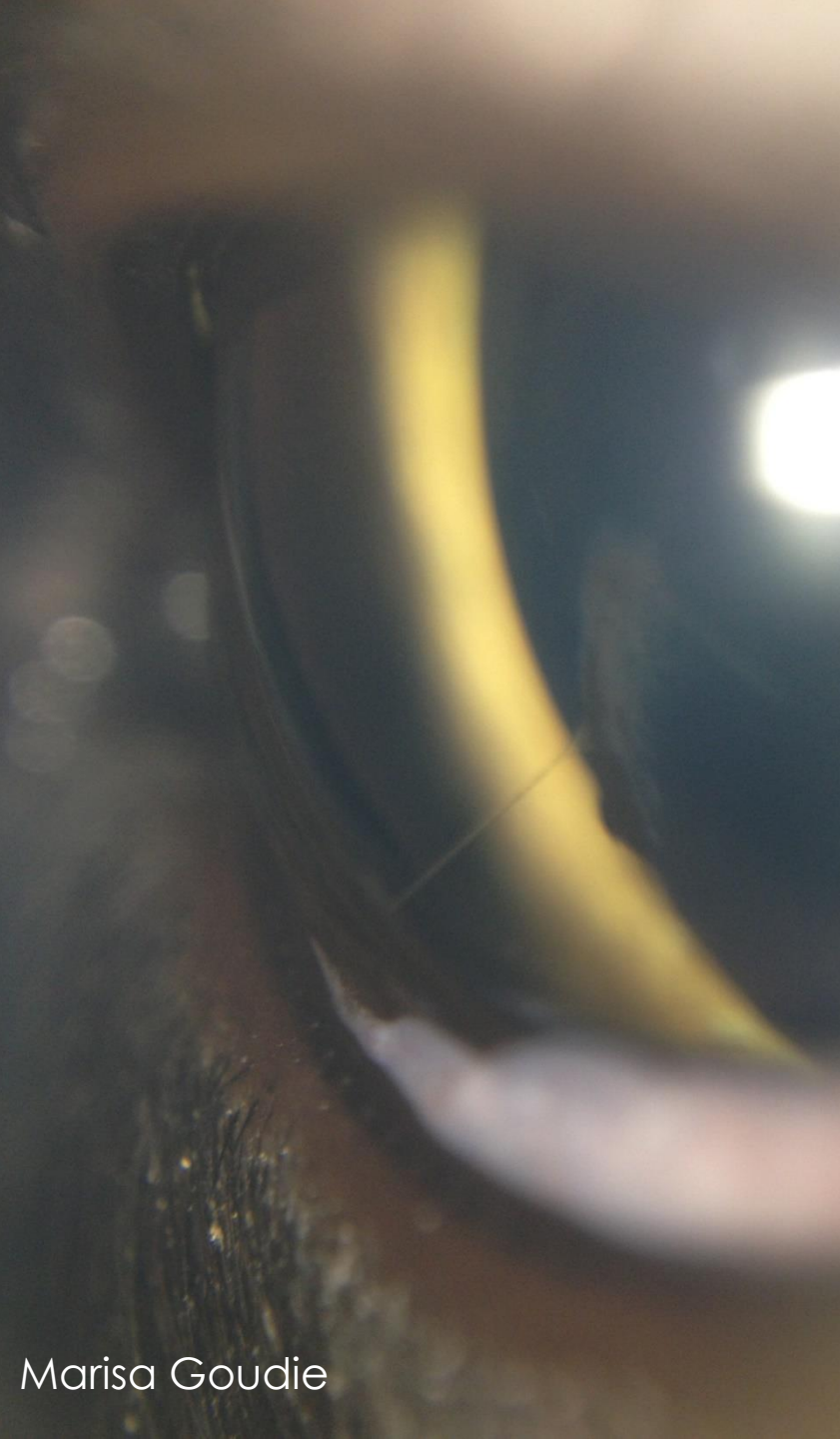


microscopy

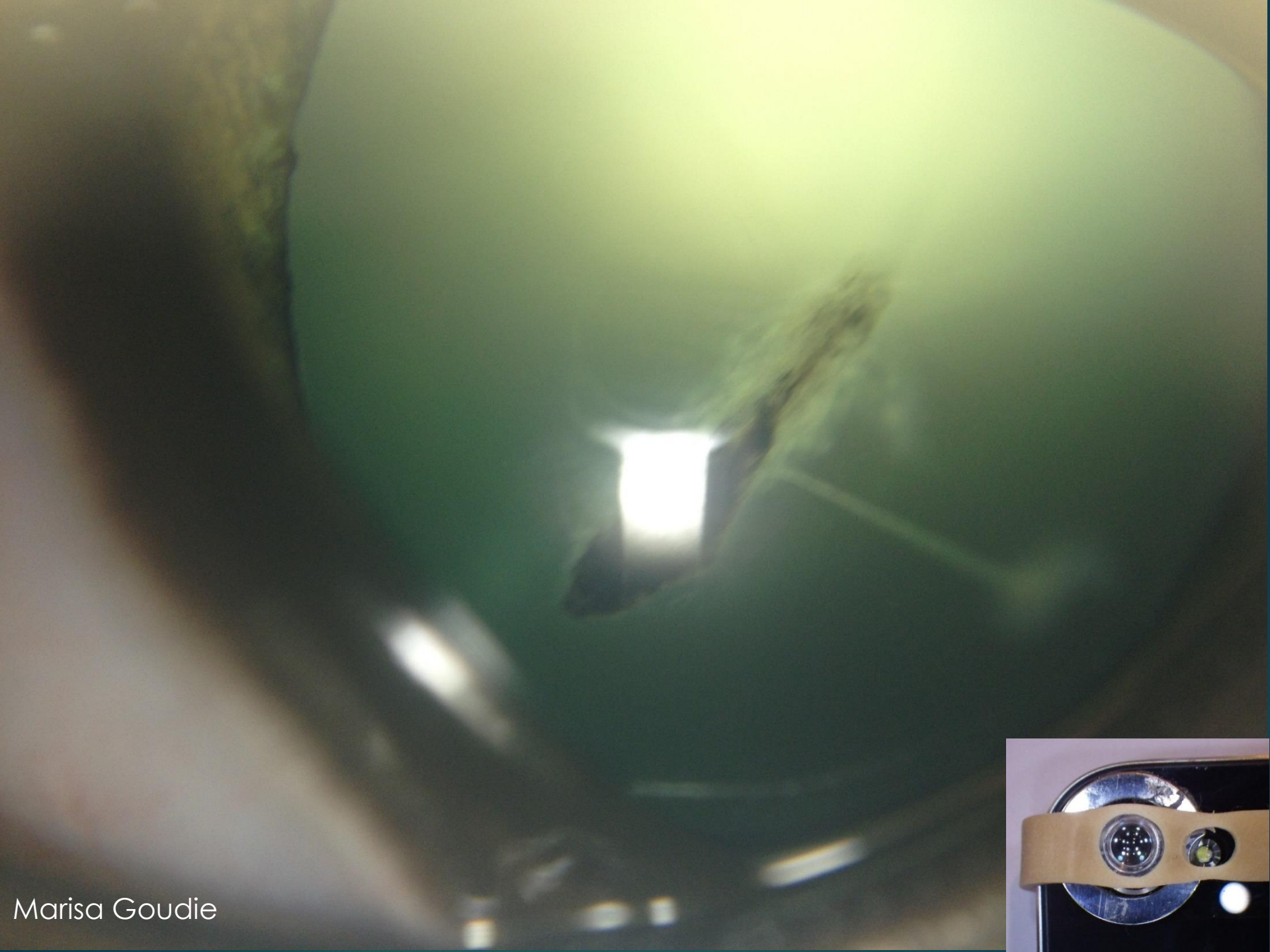




Marisa Goudie



Marisa Goudie

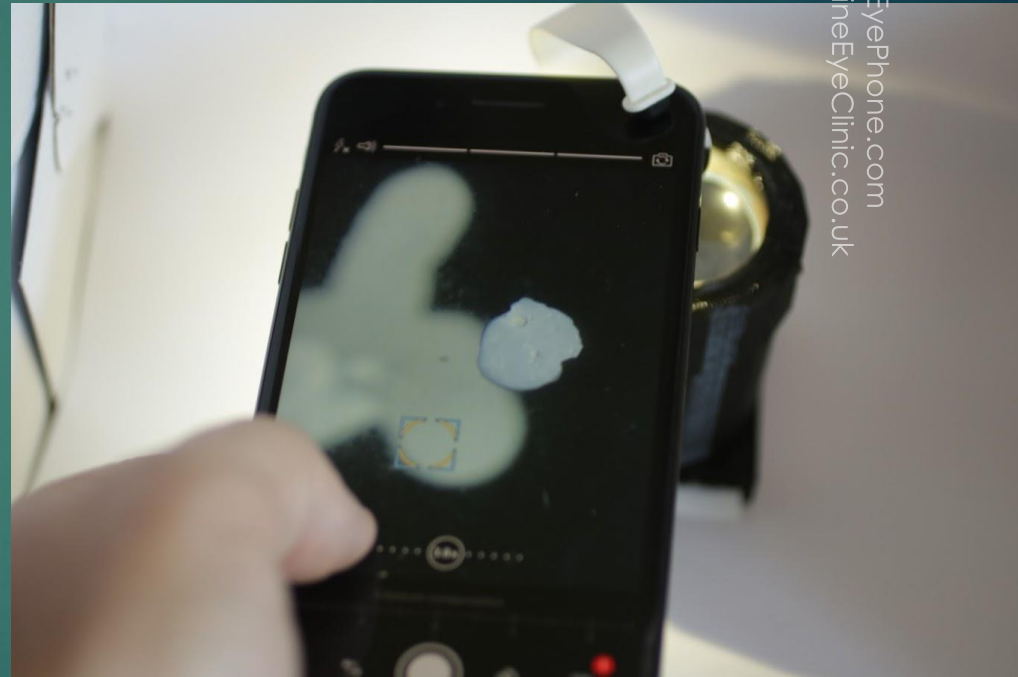


Marisa Goudie



Your turn !

Simulating lens lesions: macrophotography





Practical session 3:

DISTANT DIRECT OPHTHALMOSCOPY: LOCALISING
OPACITIES

Distant direct Ophthalmoscopy

- Ophthalmoscope on zero
 - ▶ or
- Light source as close to visual axis as possible



Use as a “pupilometer” : assess pupil size, symmetry, shape and response to light.

Assess tapetal reflectivity & symmetry.

Assess opacities in the visual axis

Assess opacities outside the visual axis

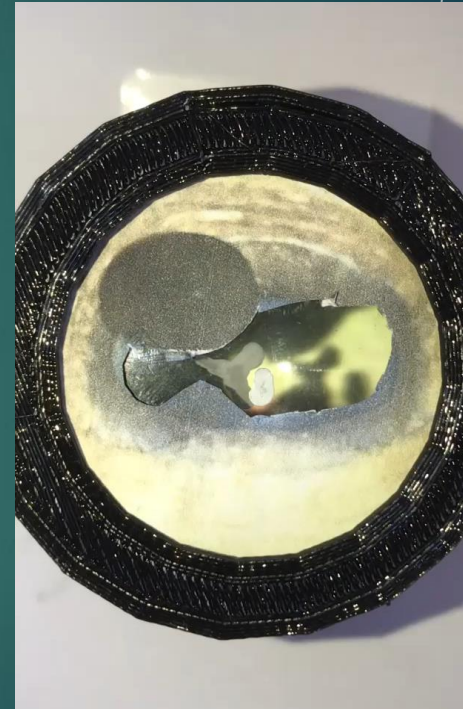
Localisation of opacities using parallax

Localisation of opacities using oblique illumination “the search light technique”.

Simulating lens lesions



Simulating lens lesions: parallax

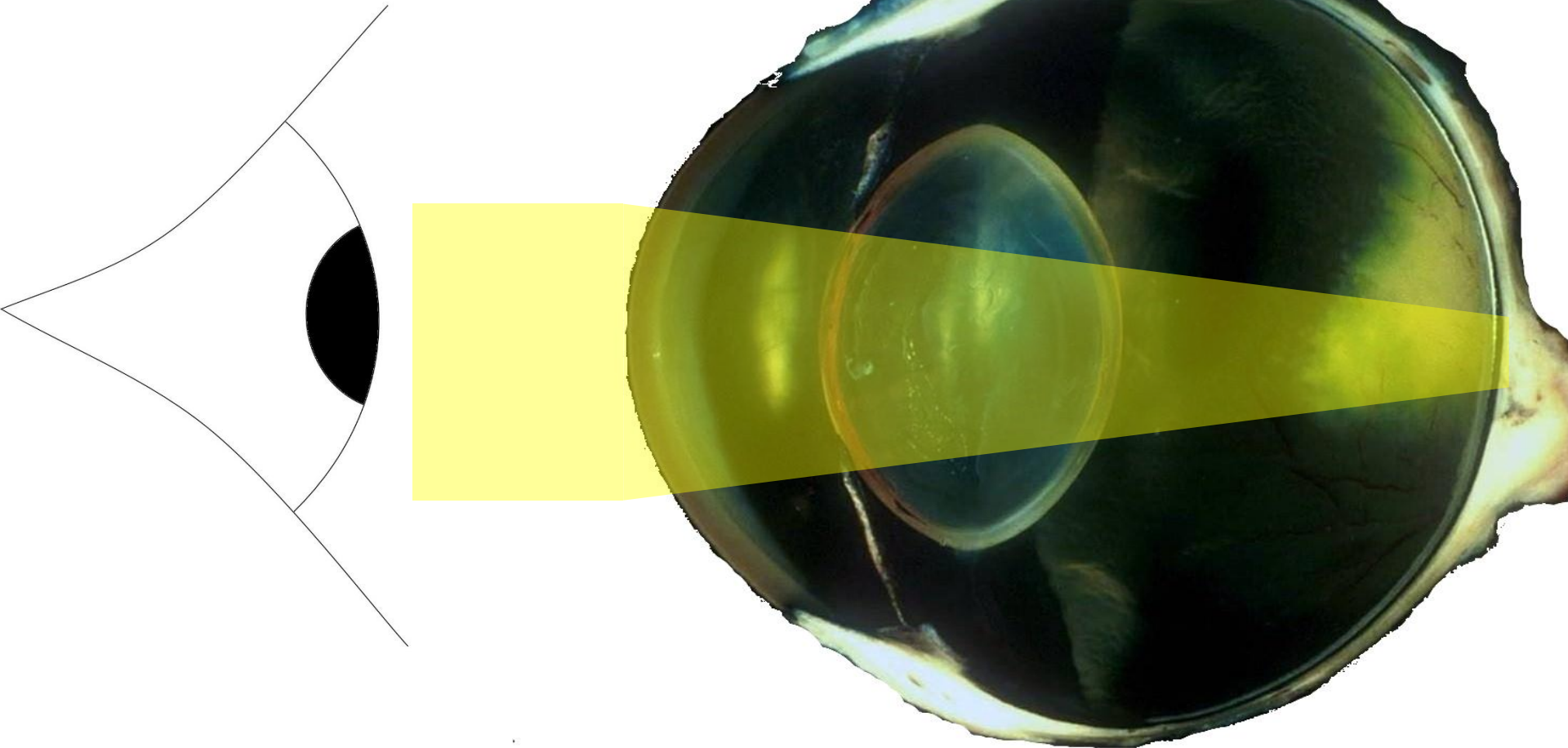


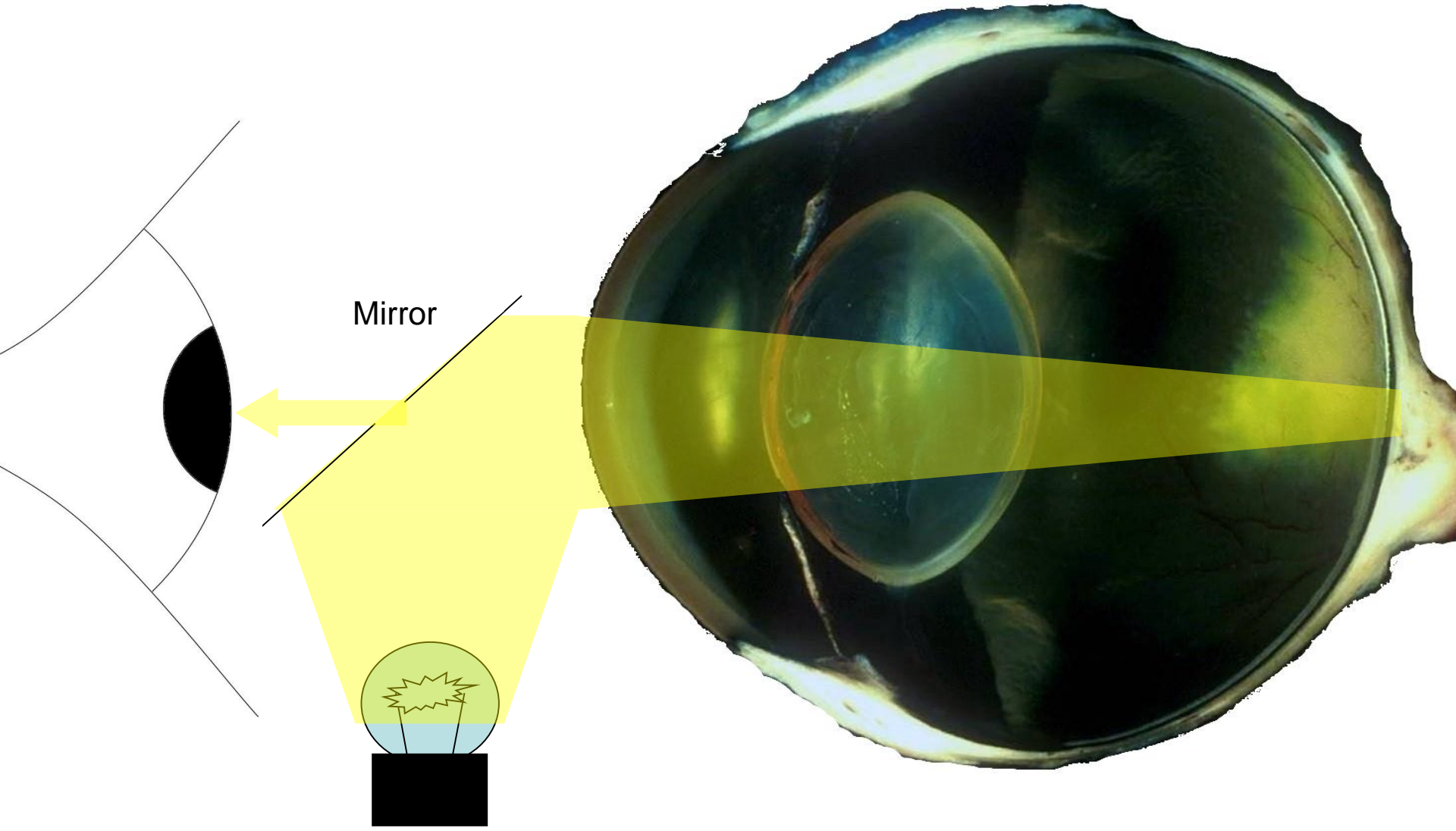


Practical session 4:

DIRECT OPHTHALMOSCOPIC EXAMINATION OF LENS
LESIONS AND THE SEARCH LIGHT TECHNIQUE

Normal refraction

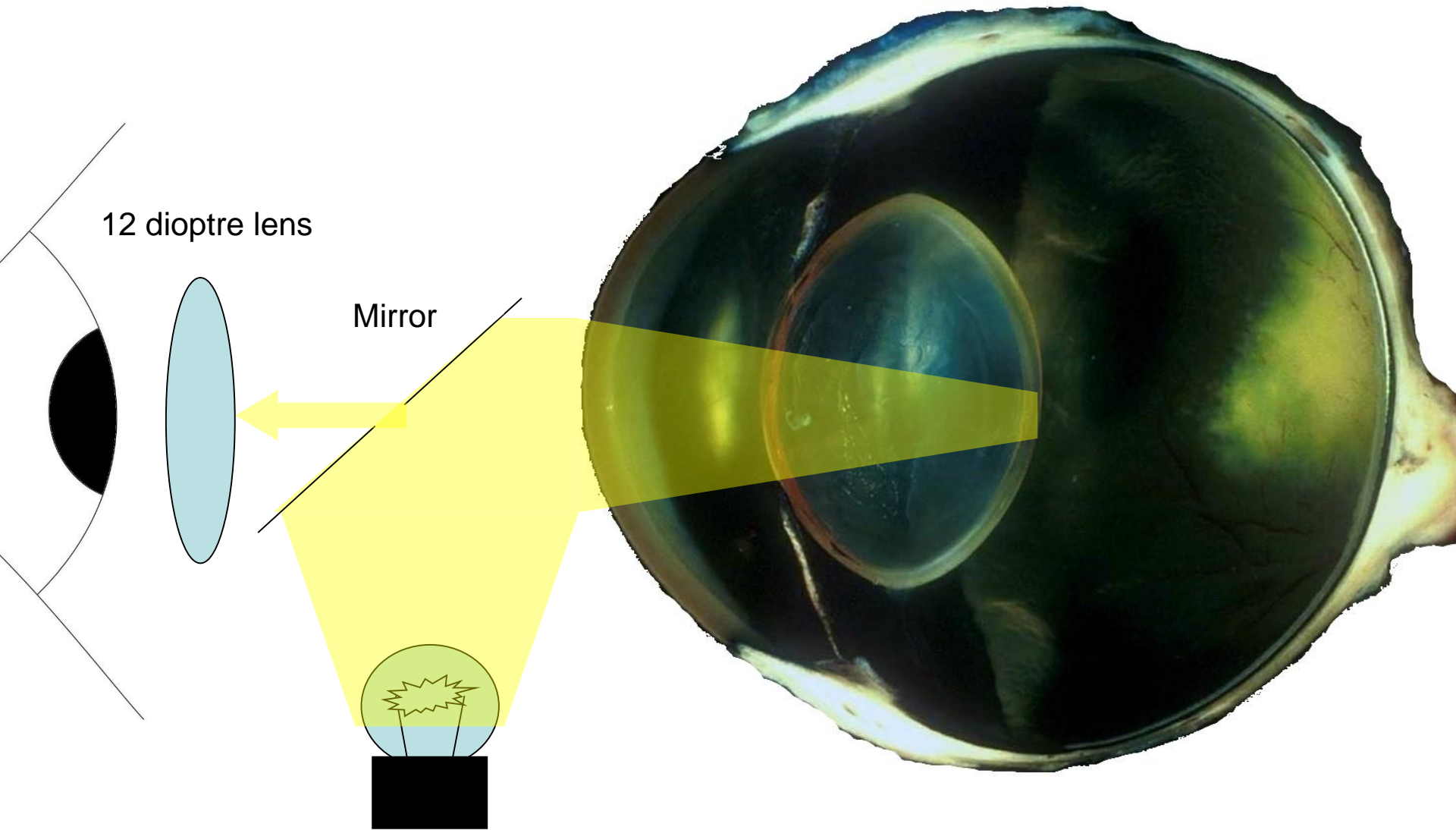




Mirror

+ lenses (BLACK)

20 for cornea
15 for iris/anterior pupil
10 for posterior lens



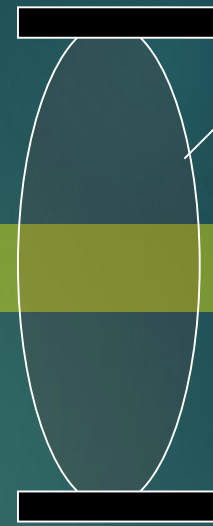
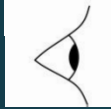
And try it with your macro lens too



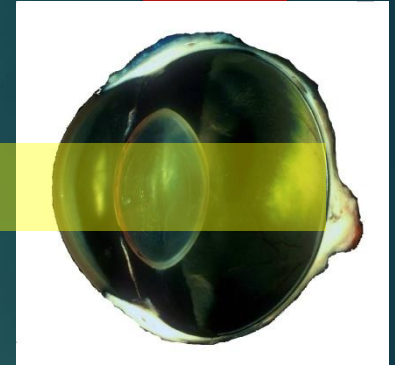


Practical session 5:

DISTANT DIRECT OPHTHALMOSCOPY



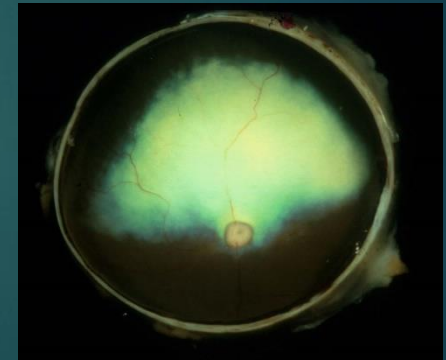
20 Dioptre lens



Virtual, **inverted**, image formed in front of lens



Large field of view



Whole fundus



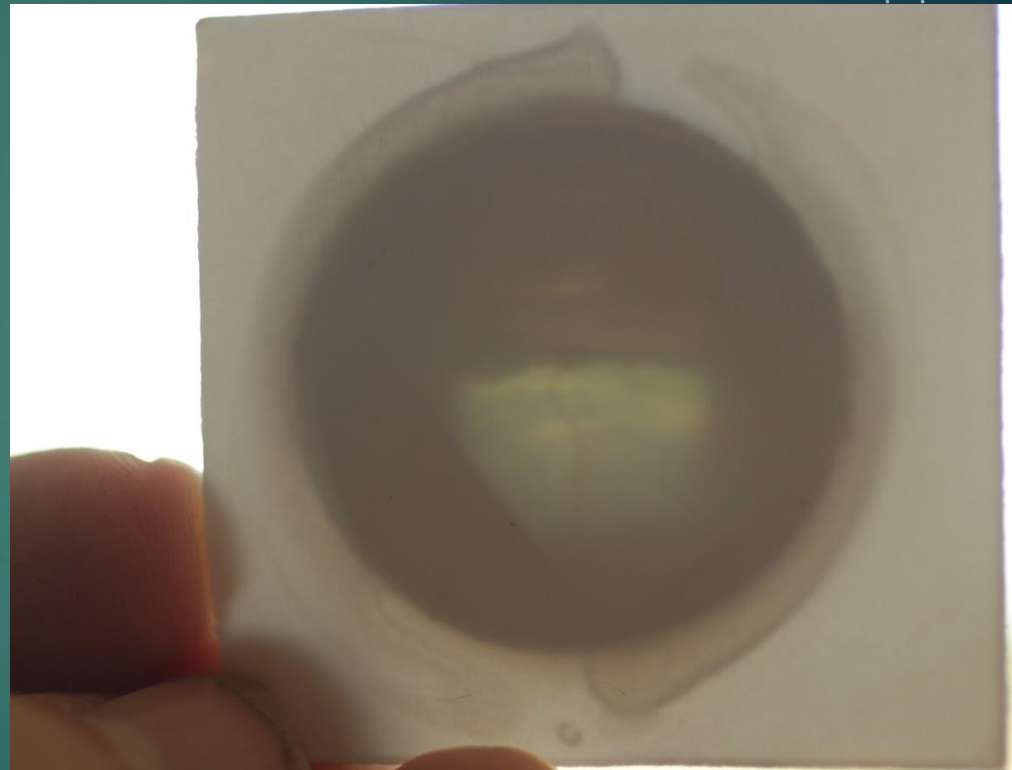
Practical session 6:

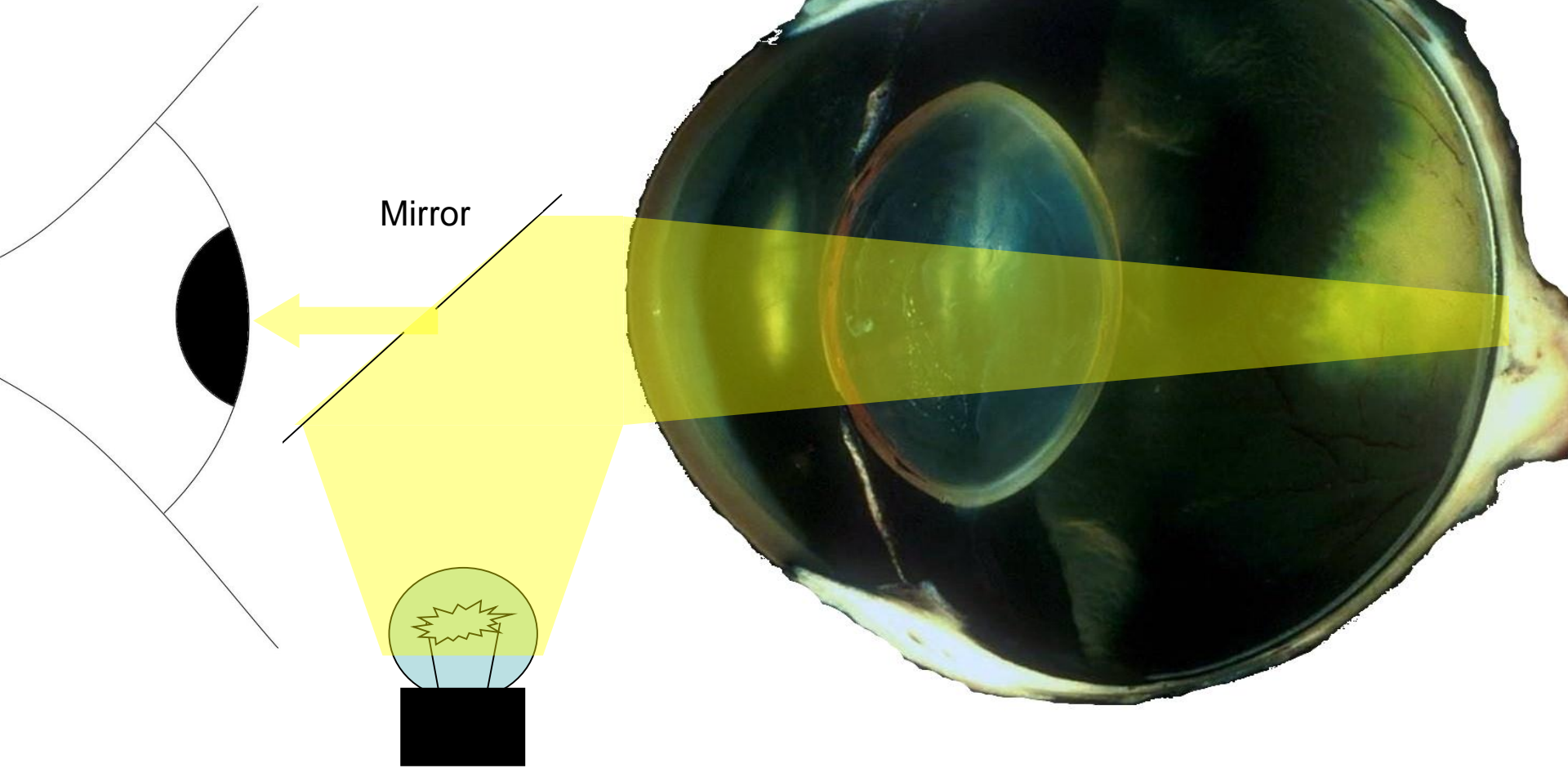
CLOSE DIRECT OPHTHALMOSCOPY



Step 1: “Camera obscura” experiment

- ▶ Anterior cabochon mimics the anterior chamber
- ▶ Posterior cabochon mimics the crystalline lens
- ▶ Both cabochons focus image on the “retina” 25mm from nodal point of the “lens”
- ▶ image ***inverted & reversed***

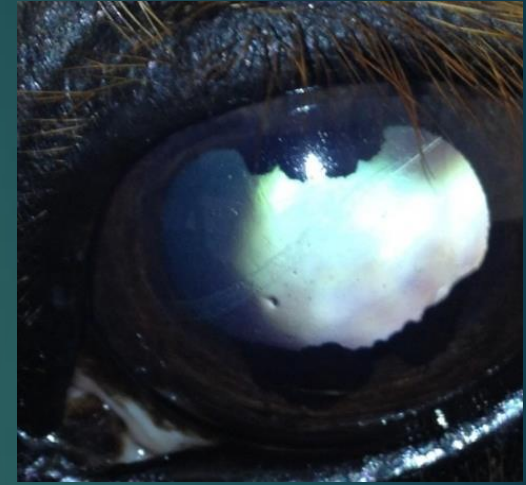
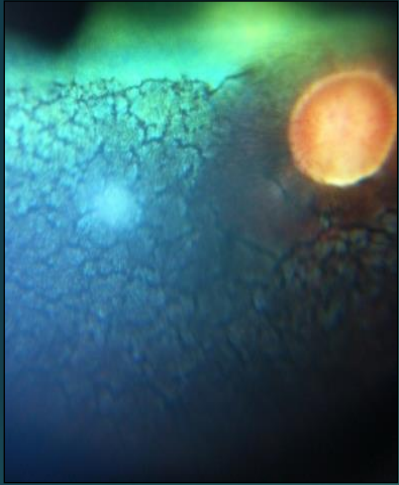






Practical session 6b:

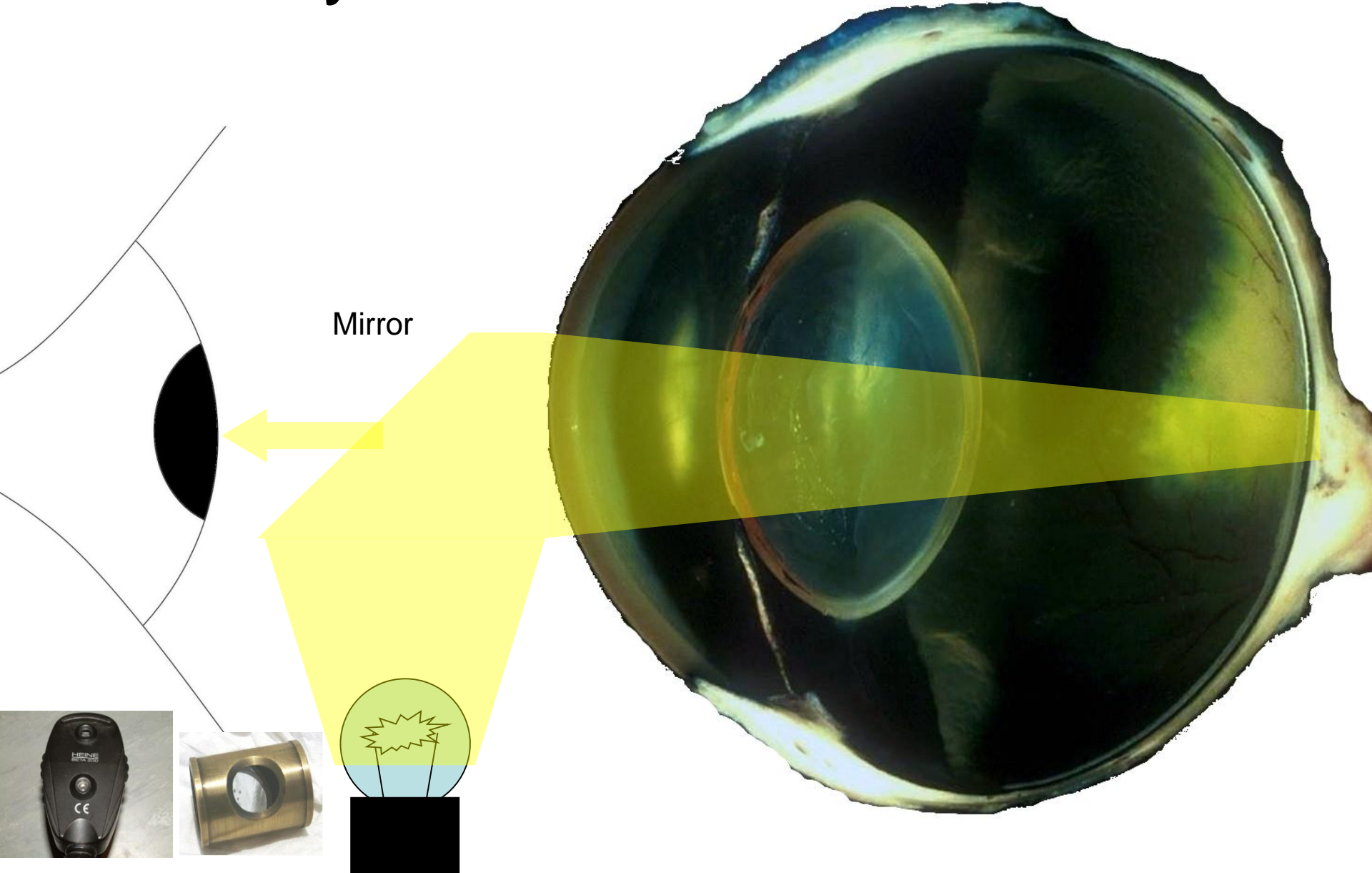
CLOSE DIRECT OPHTHALMOSCOPY... WITH YOUR
PHONE



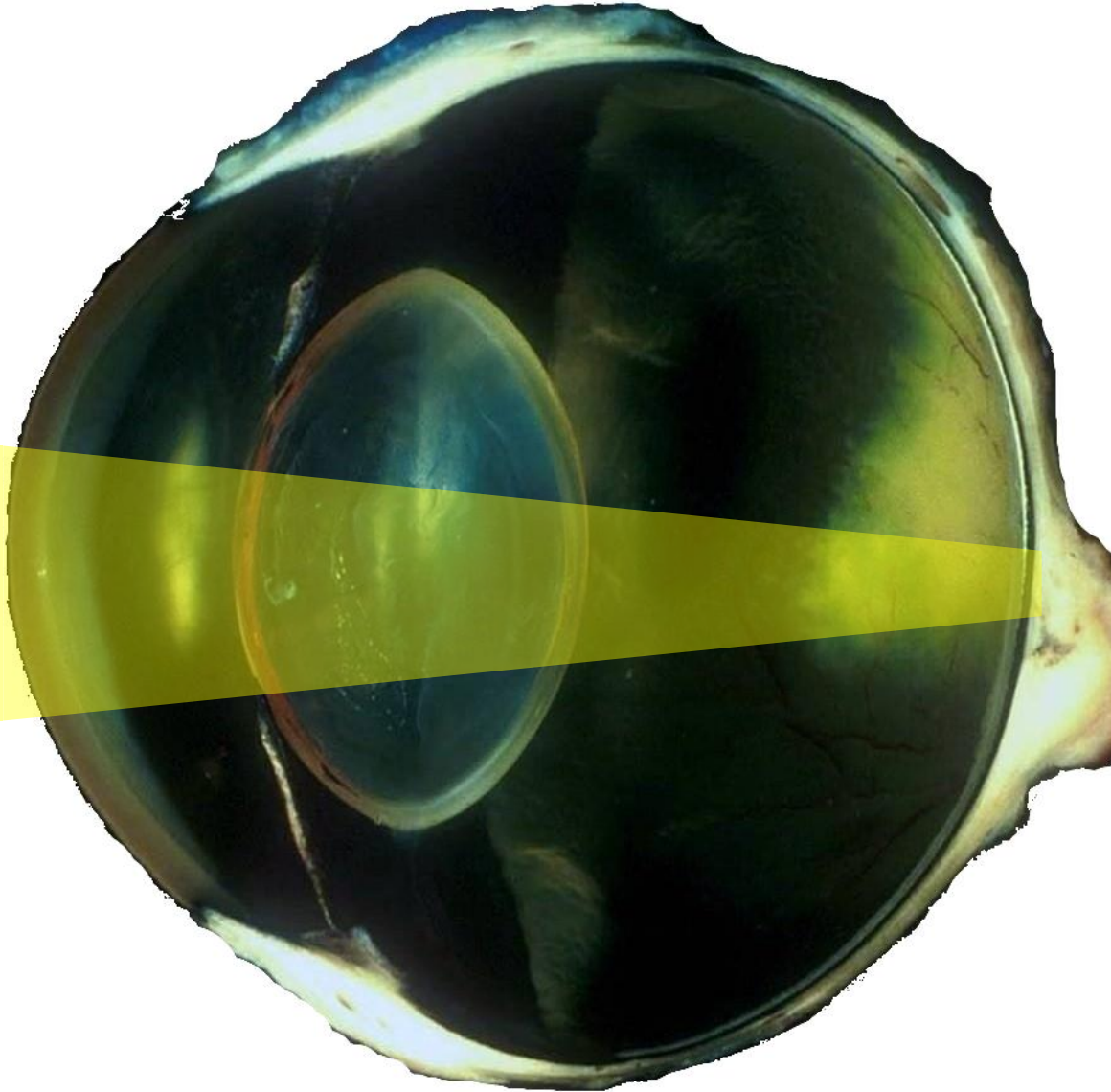
Direct “phoneoscopy”

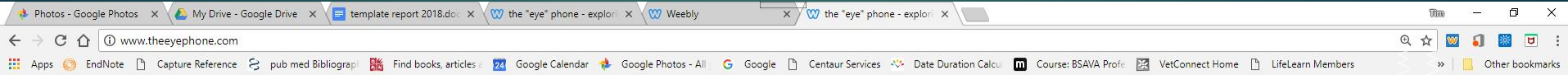
HOW TO MIMIC *CLOSE* AND *DISTANT* DIRECT
OPHTHALMOSCOPY WITH A SMART PHONE CAMERA...

The eye does the work for us



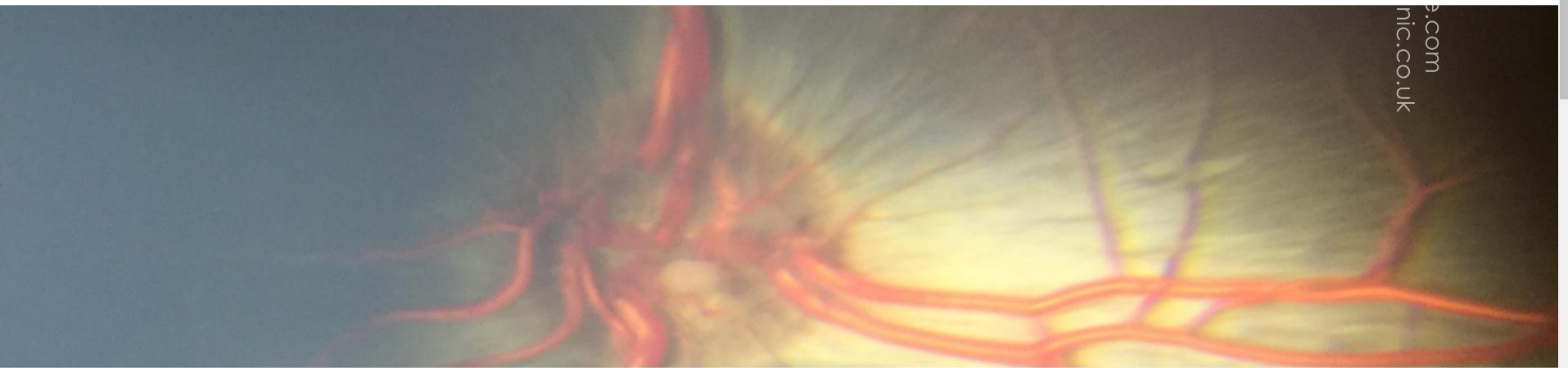
The eye does the work for us





THE "EYE" PHONE - EXPLORING THE ART OF PHONESCOPY

[HOME](#) [ABOUT](#) [CONTACT](#) [TRAINING EYES](#) [HOW TO IMAGE THE.](#) [WHICH CAMERA PHONE?](#) [WHAT APP?](#) [CLOUD STORAGE](#)



The art of phonecopy - using the smart phone to image the eye.

WELCOME to the home of phonecopy.

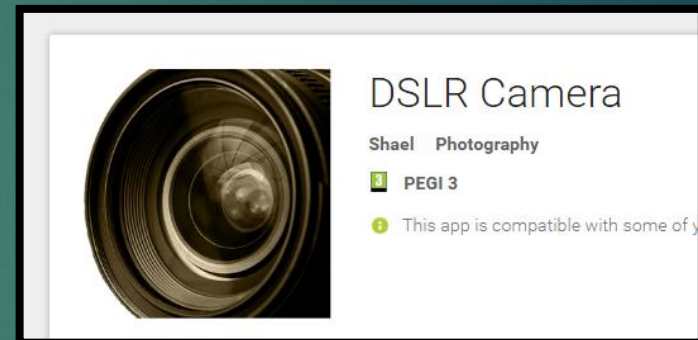
Imaging the eye well allows us to educate others and ourselves, document pathology and to share the beautiful and the unusual. This site is dedicated to making this easier than ever to achieve.



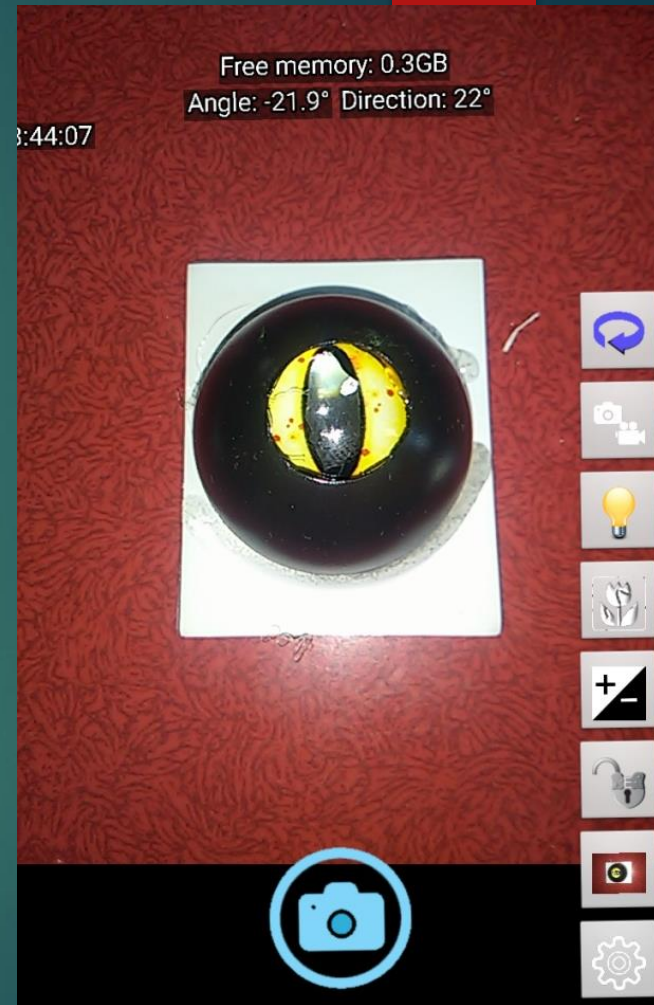
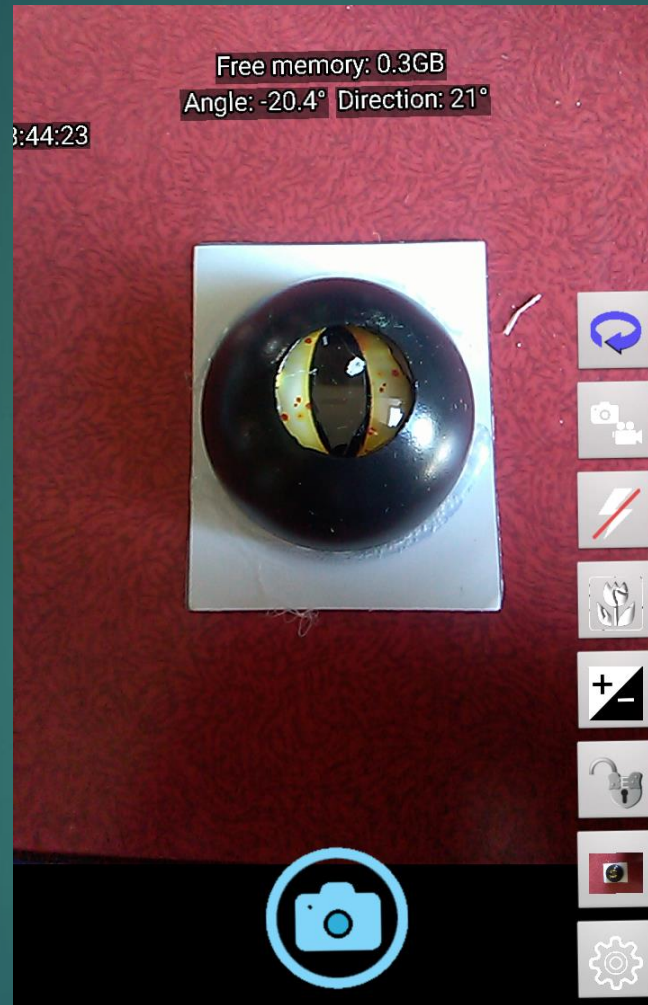
Apps: Must have light on all the time

Apple/iOS

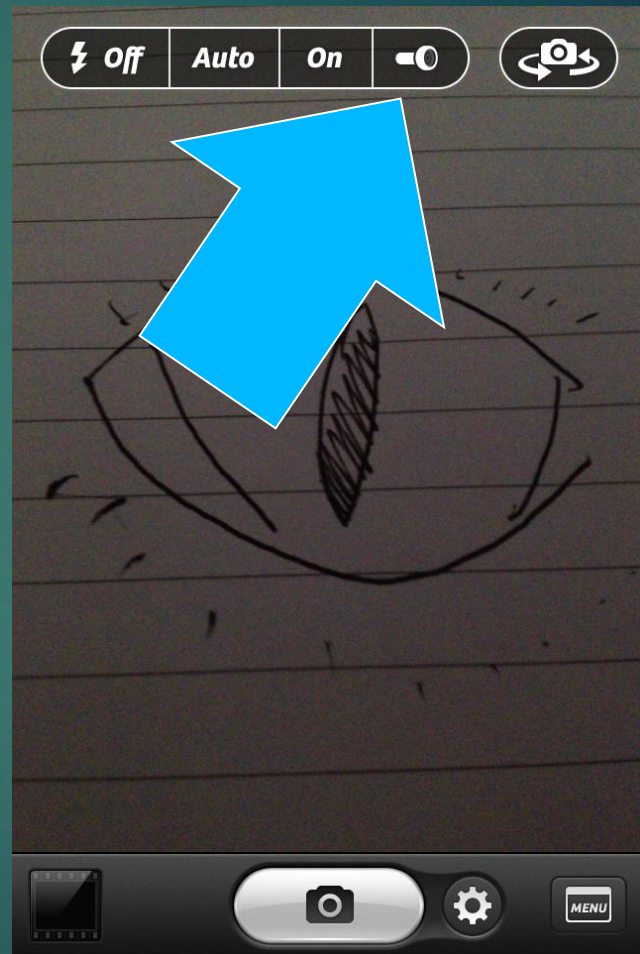
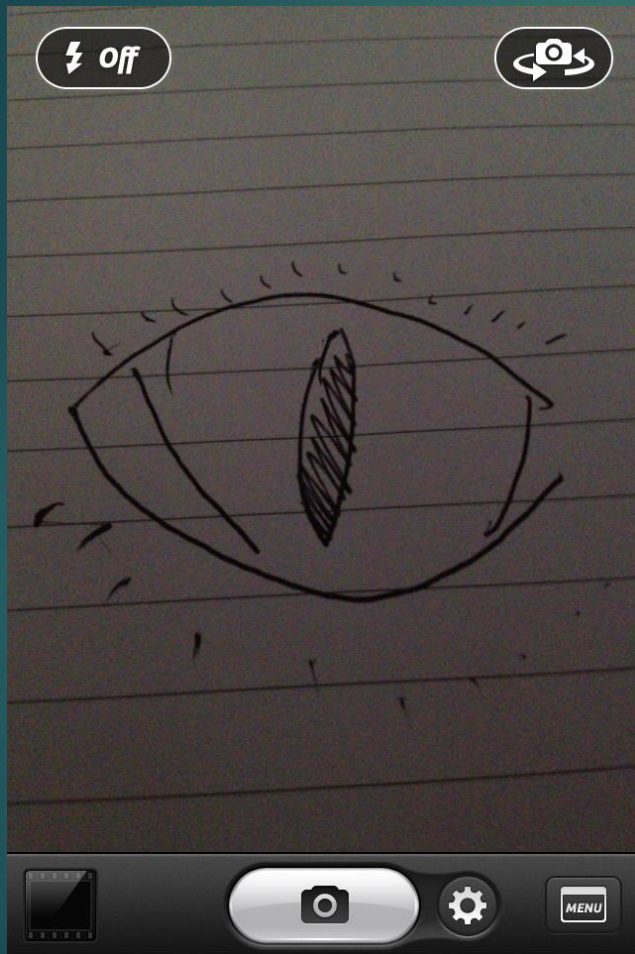
Android



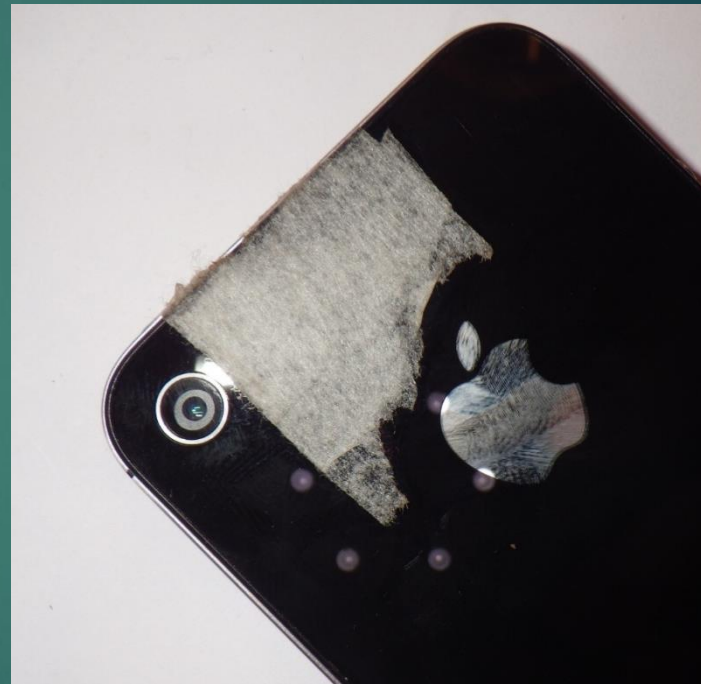
Android (DSLR app)



Camera + iOS



Diffuser and/or an app to dim the light

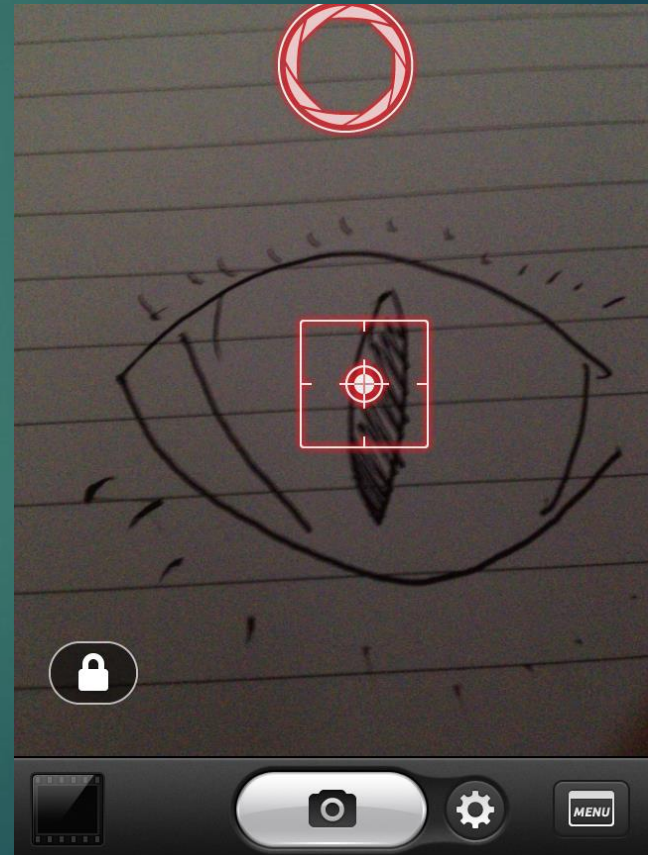
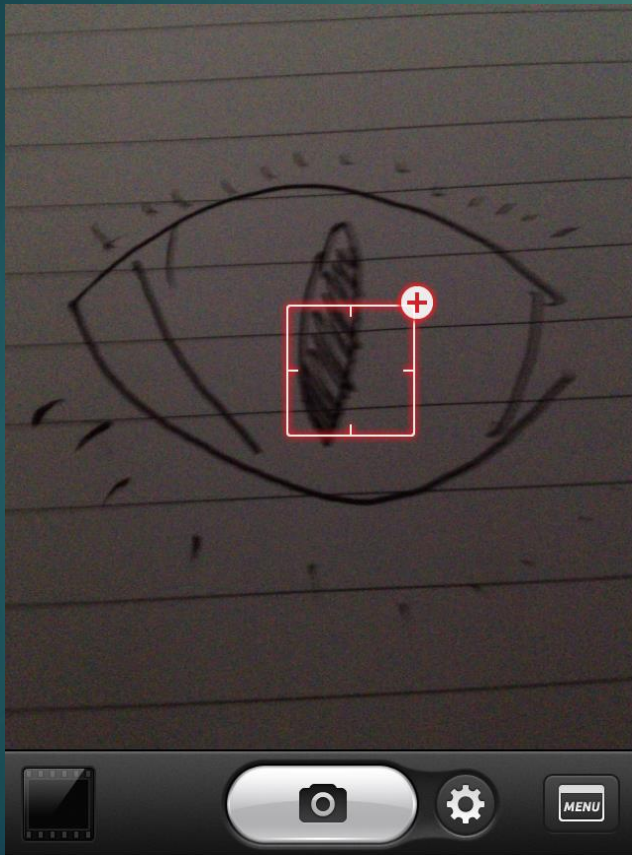




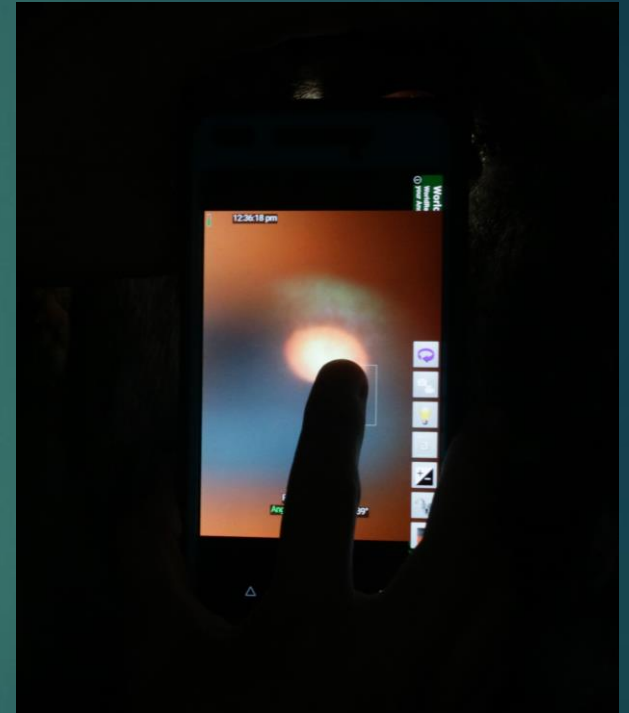
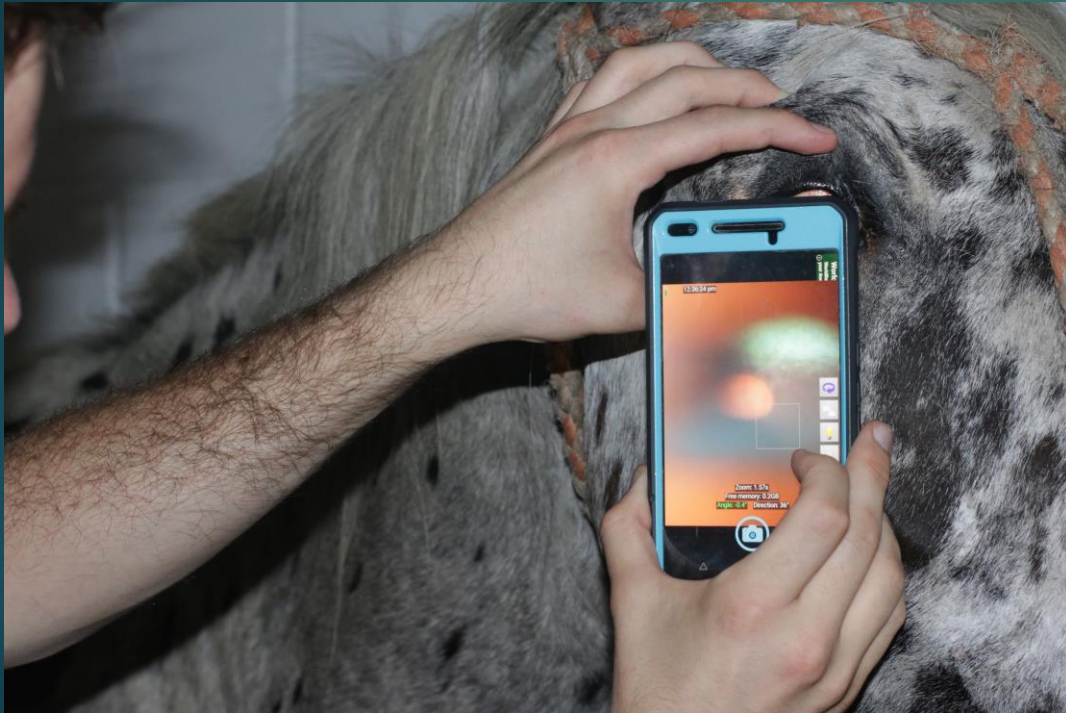
www.theeyephone.com

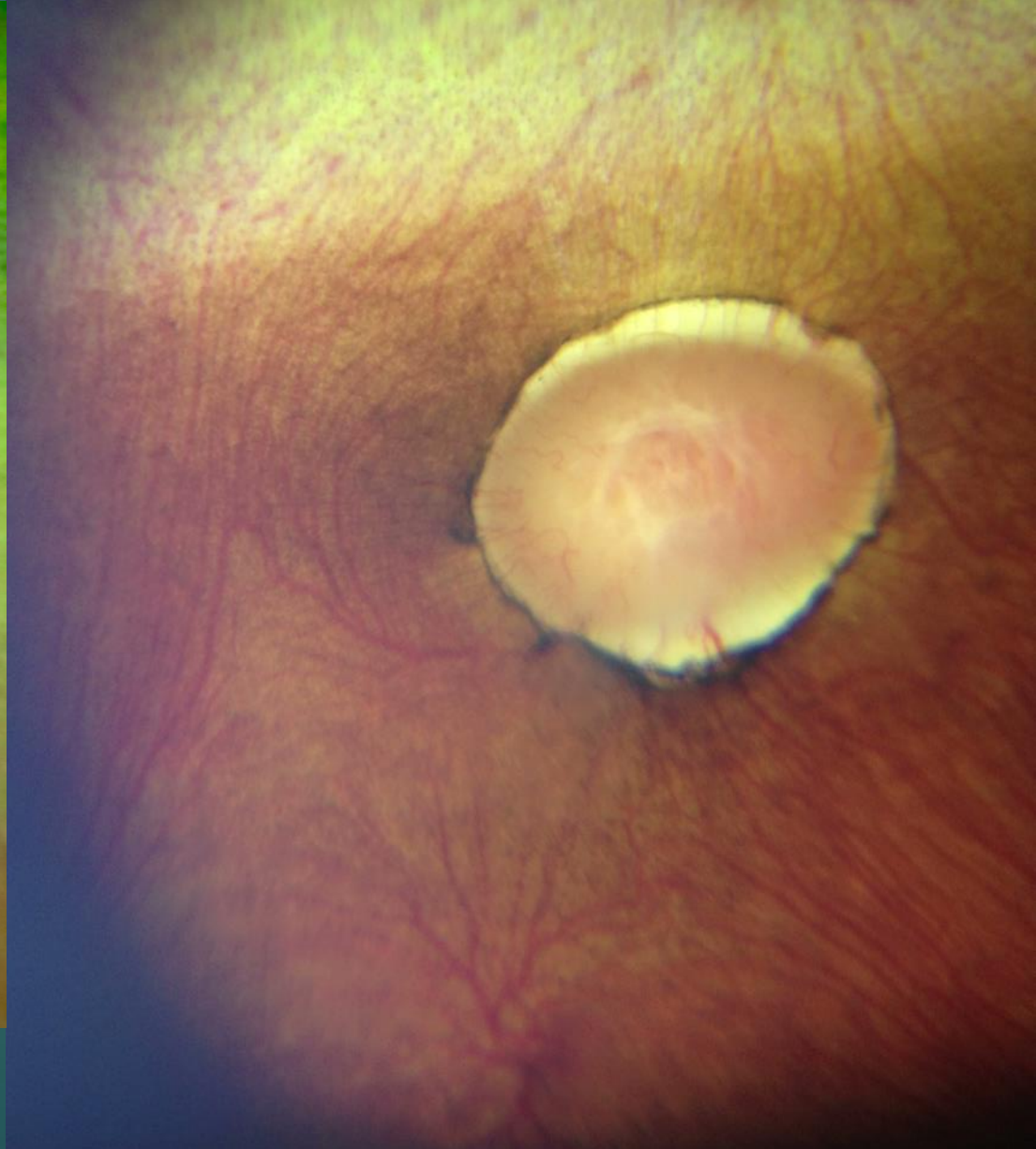
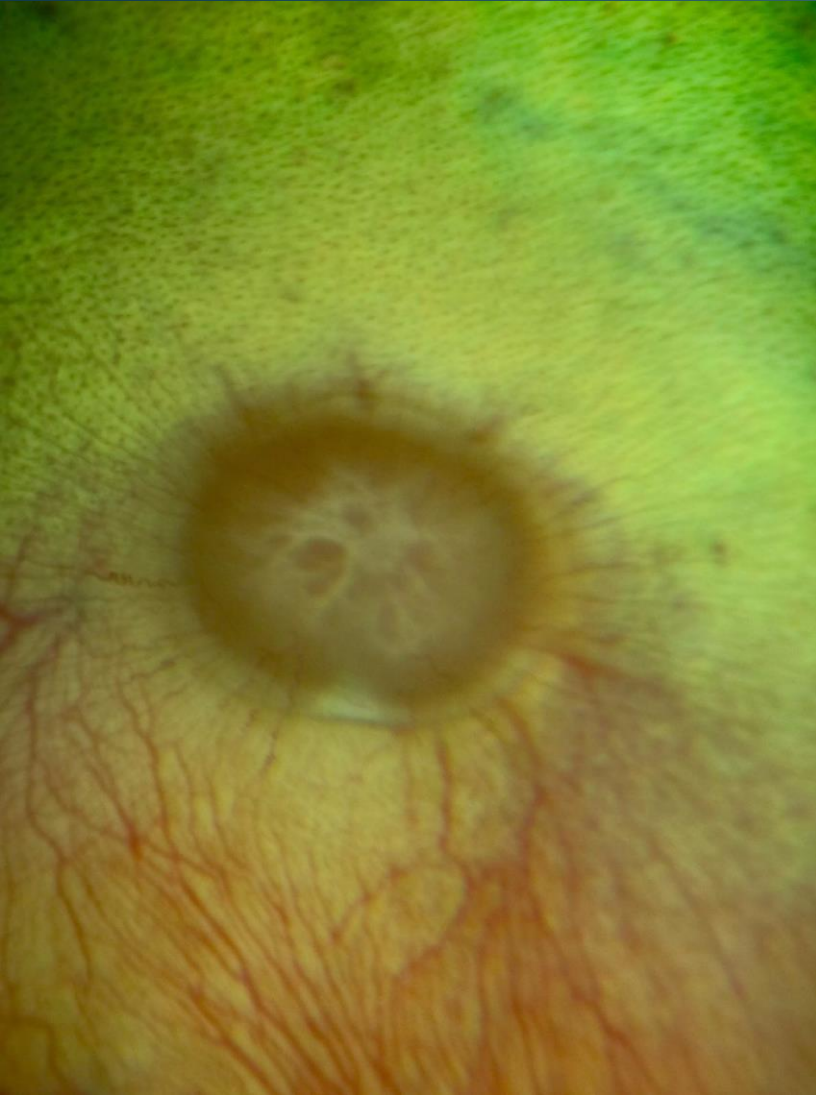


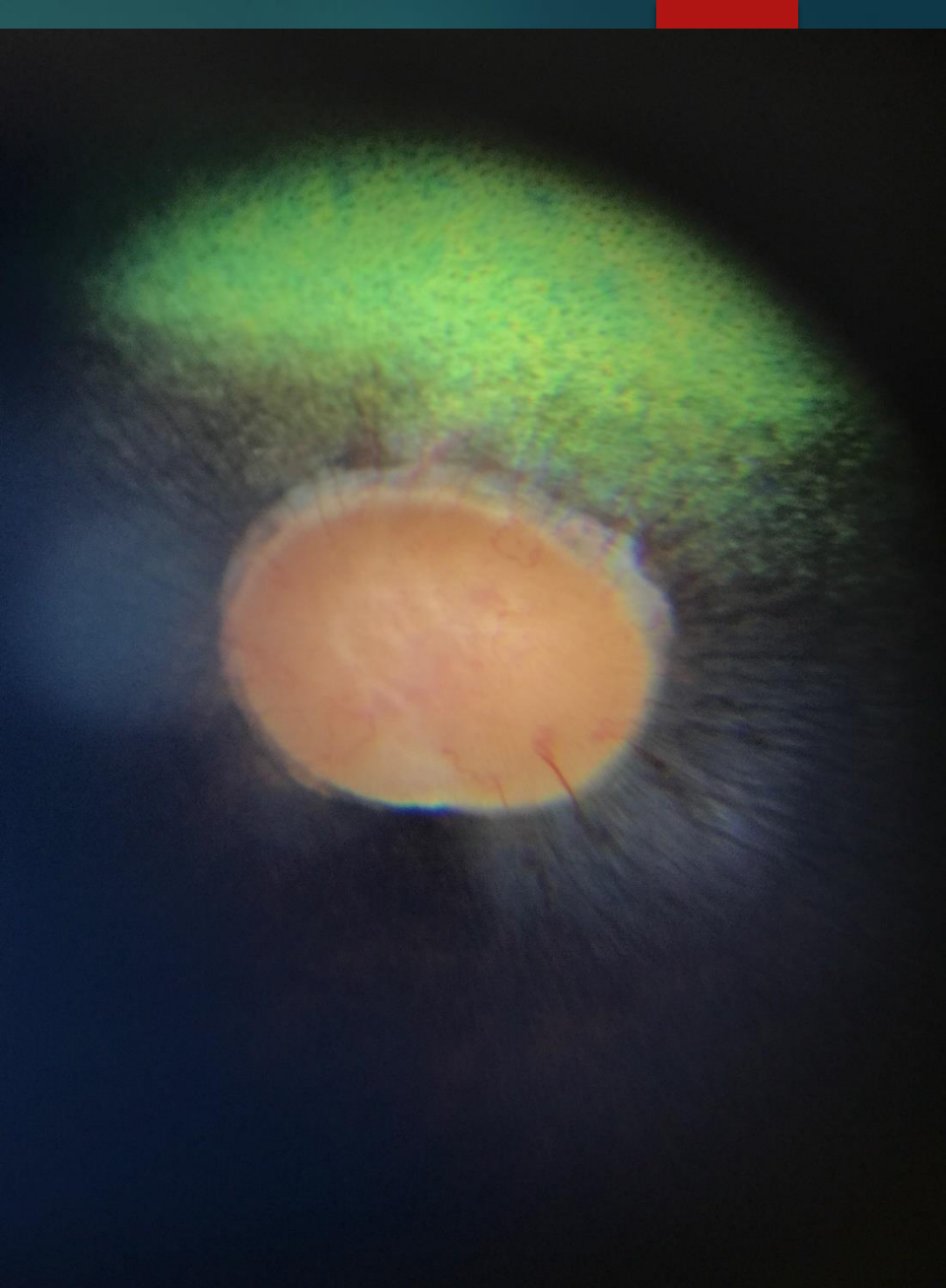
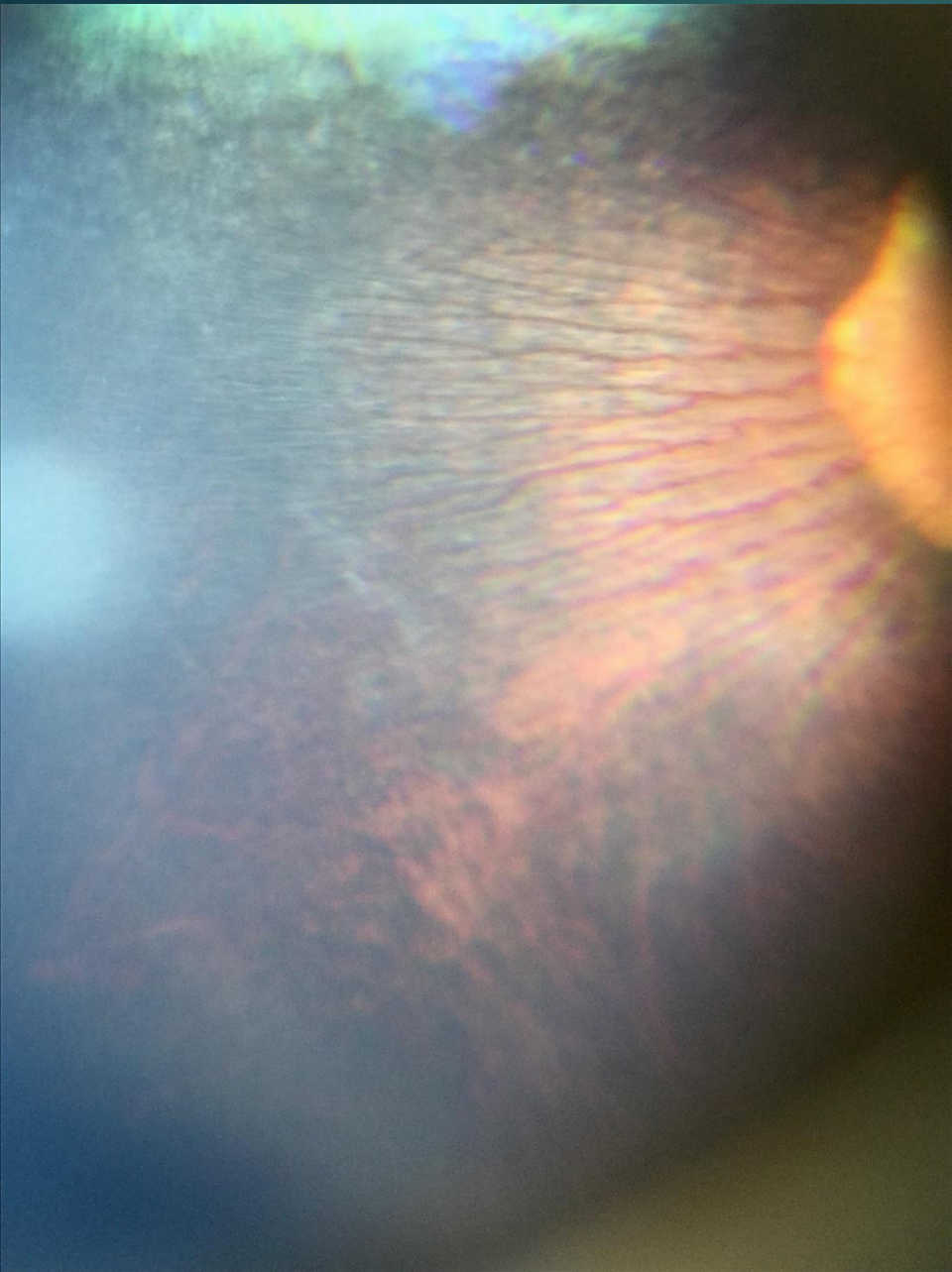
Understand how to Change exposure



www.theeyephone.com



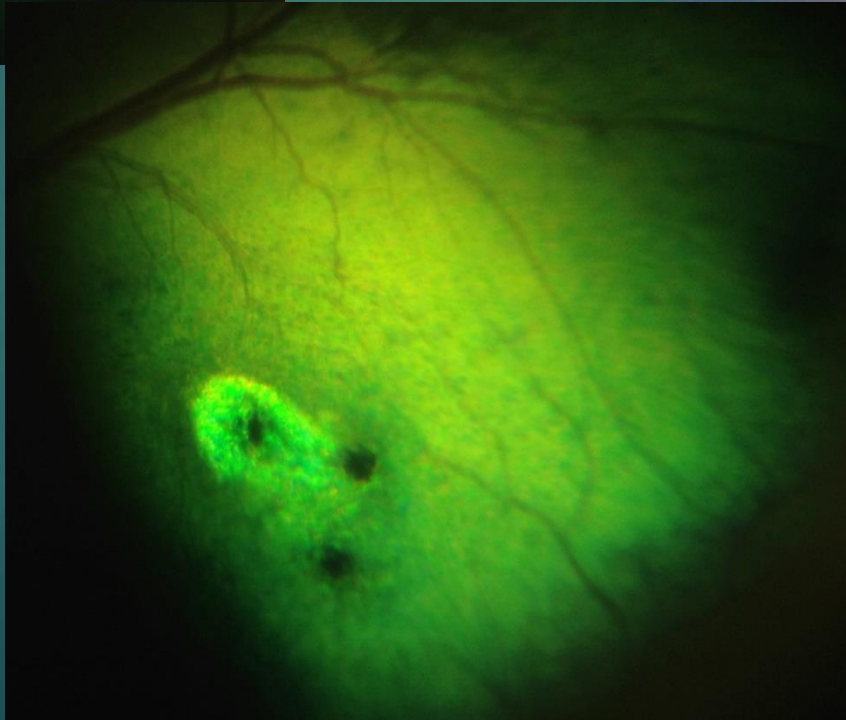
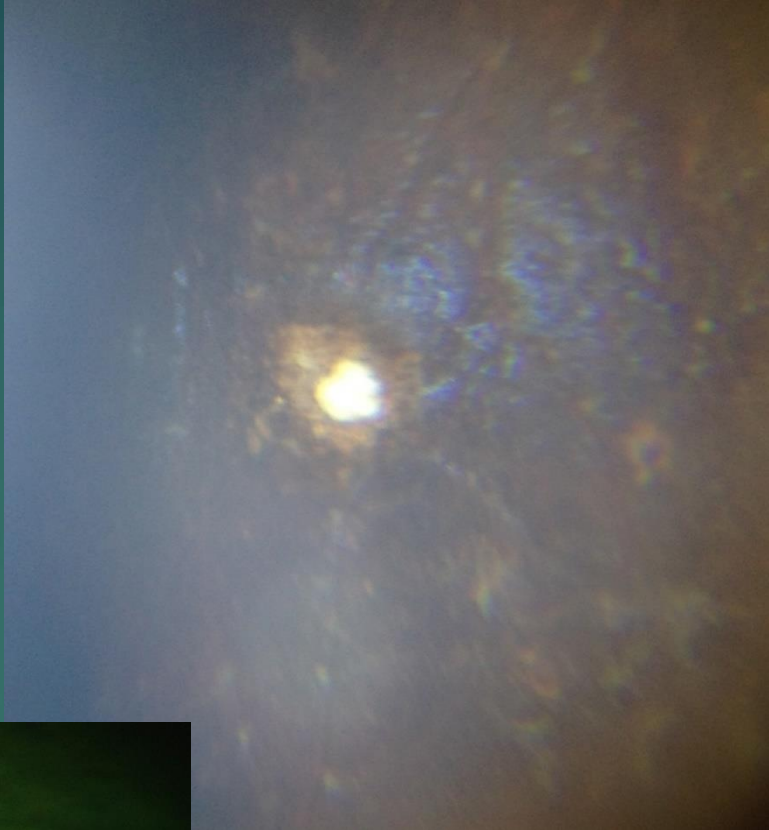
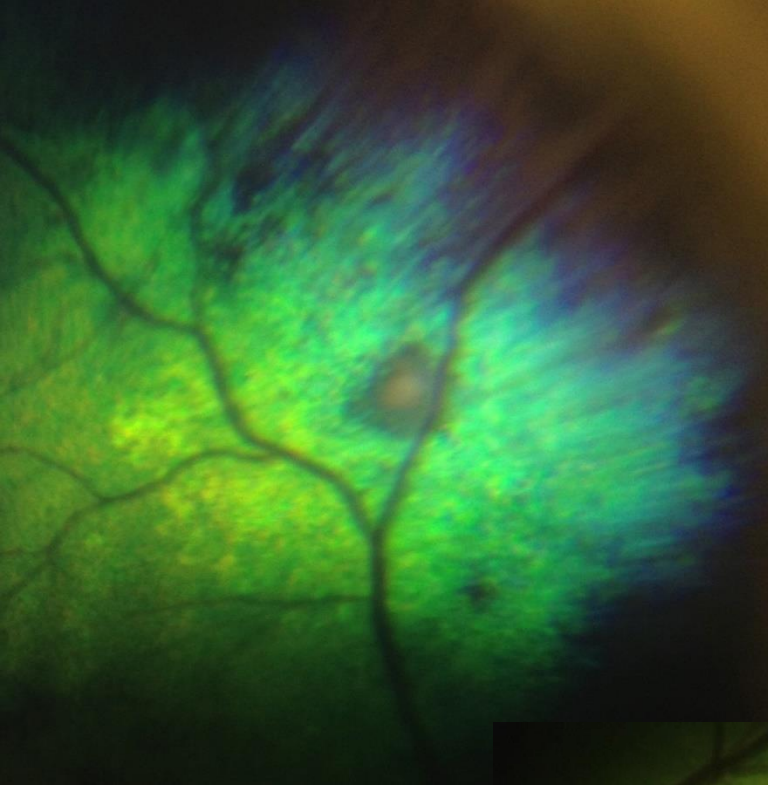


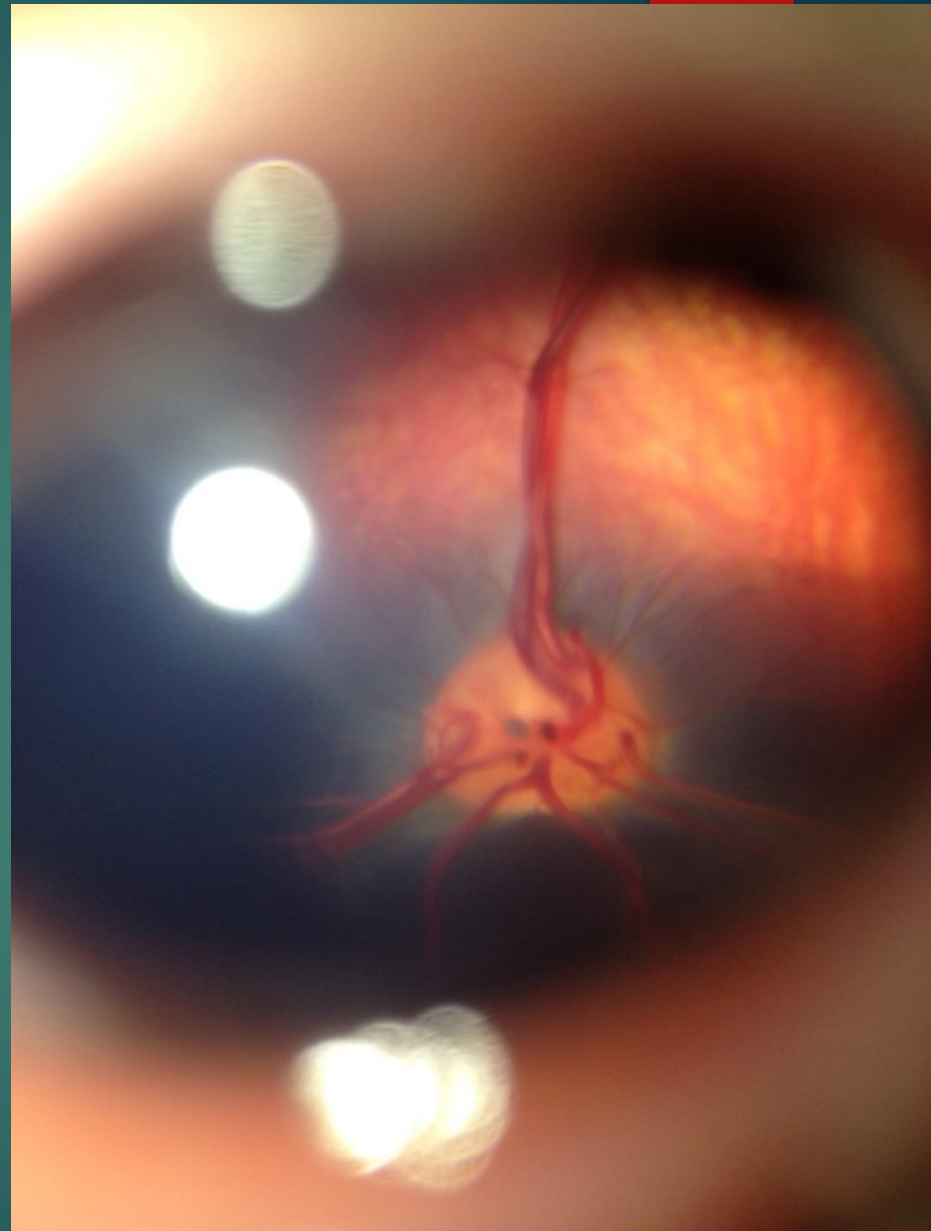
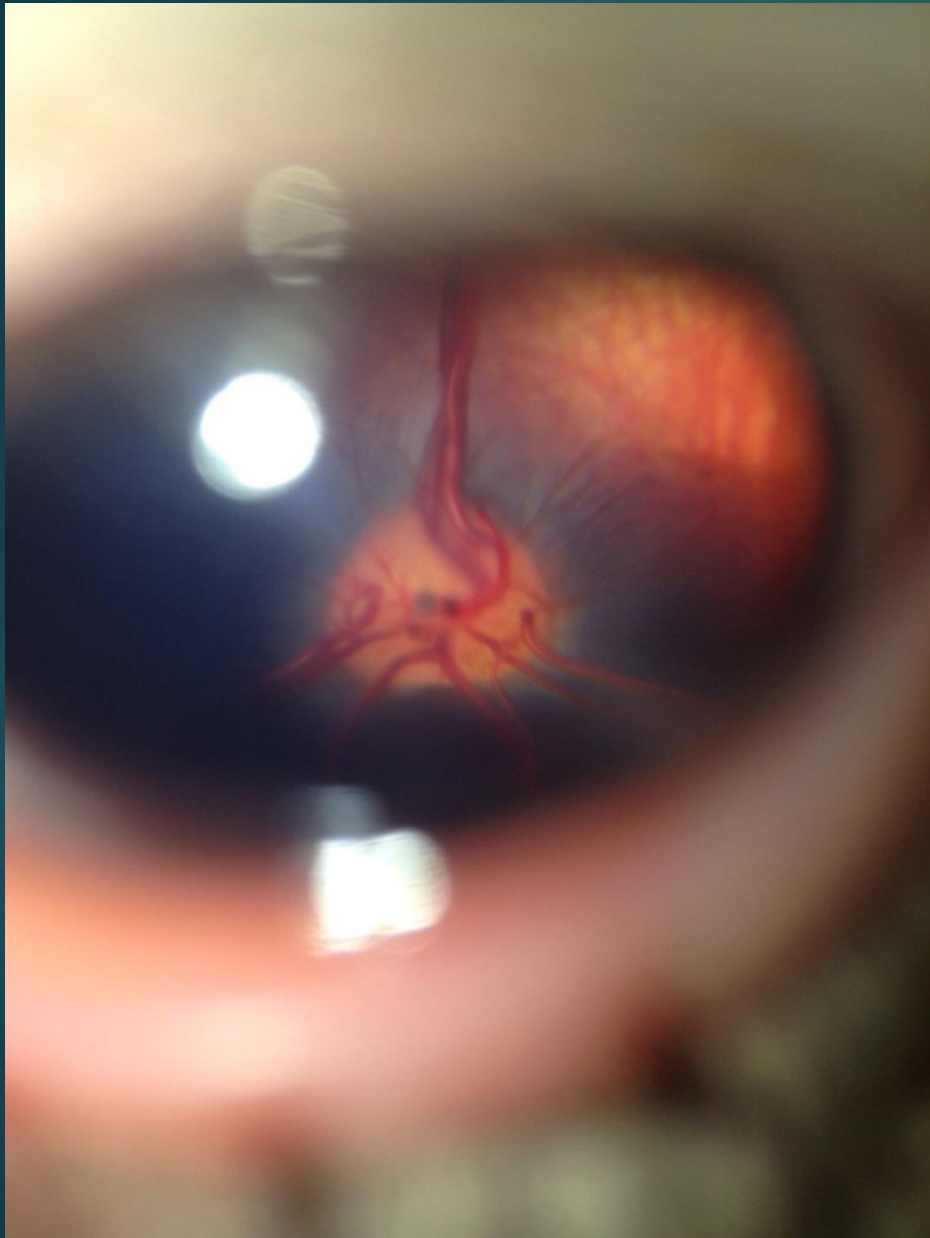


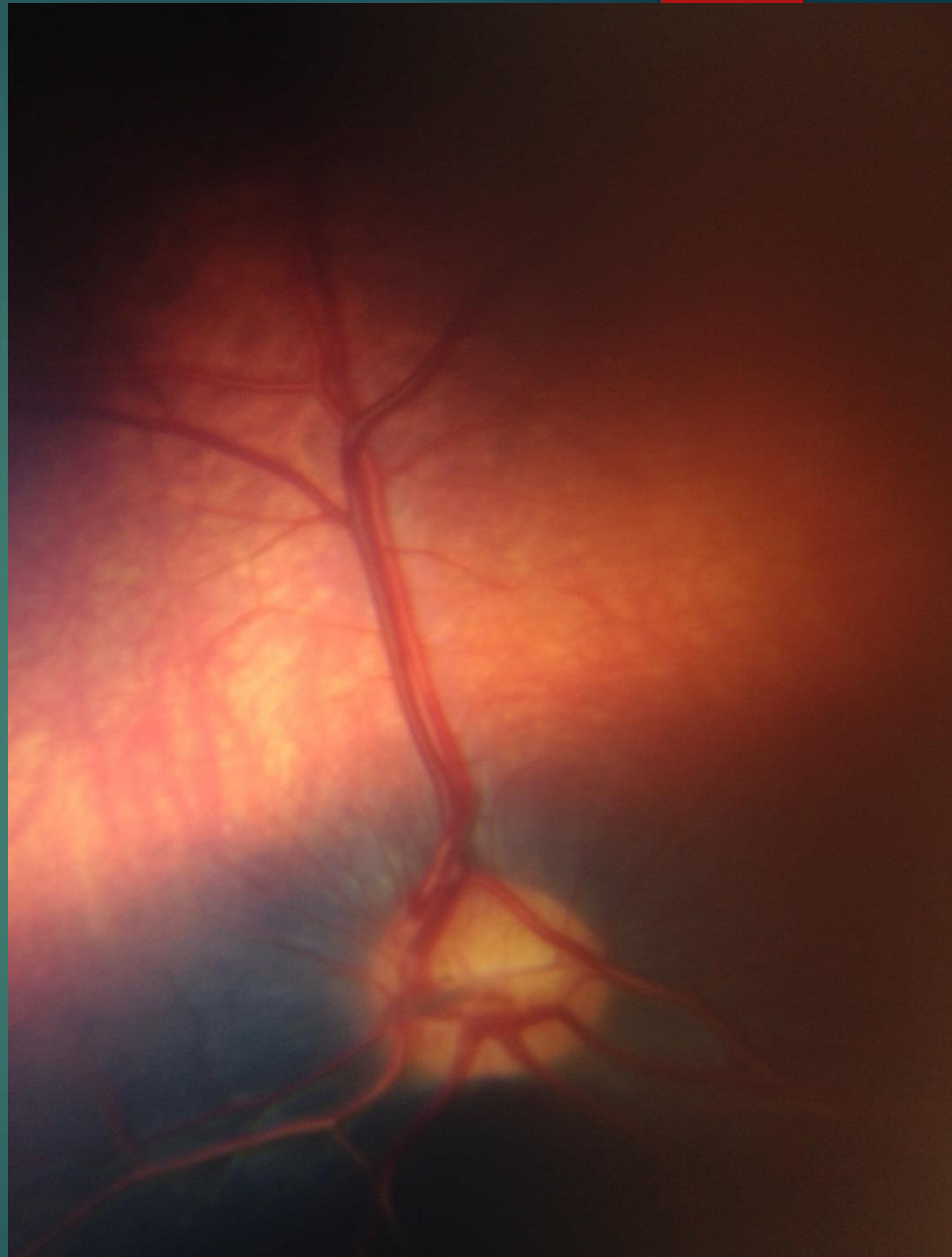
Iphone: 60 degrees (12+ mag)

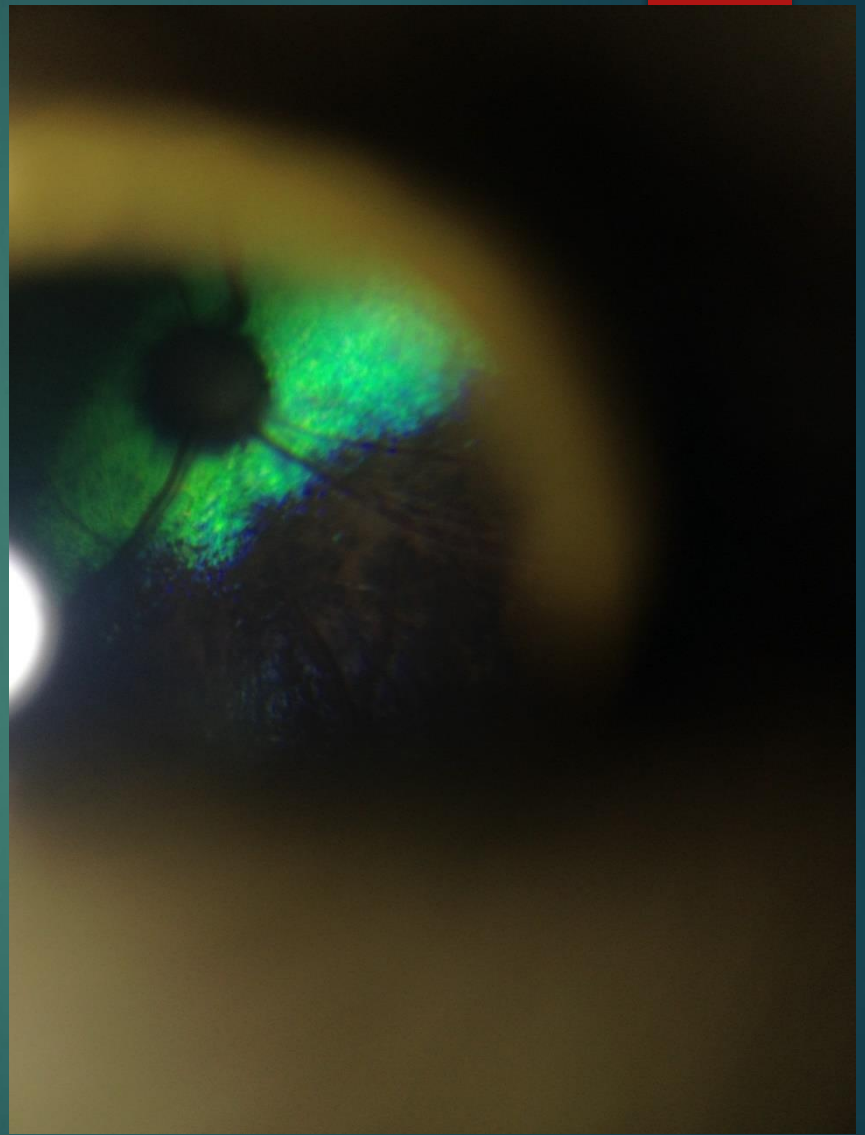
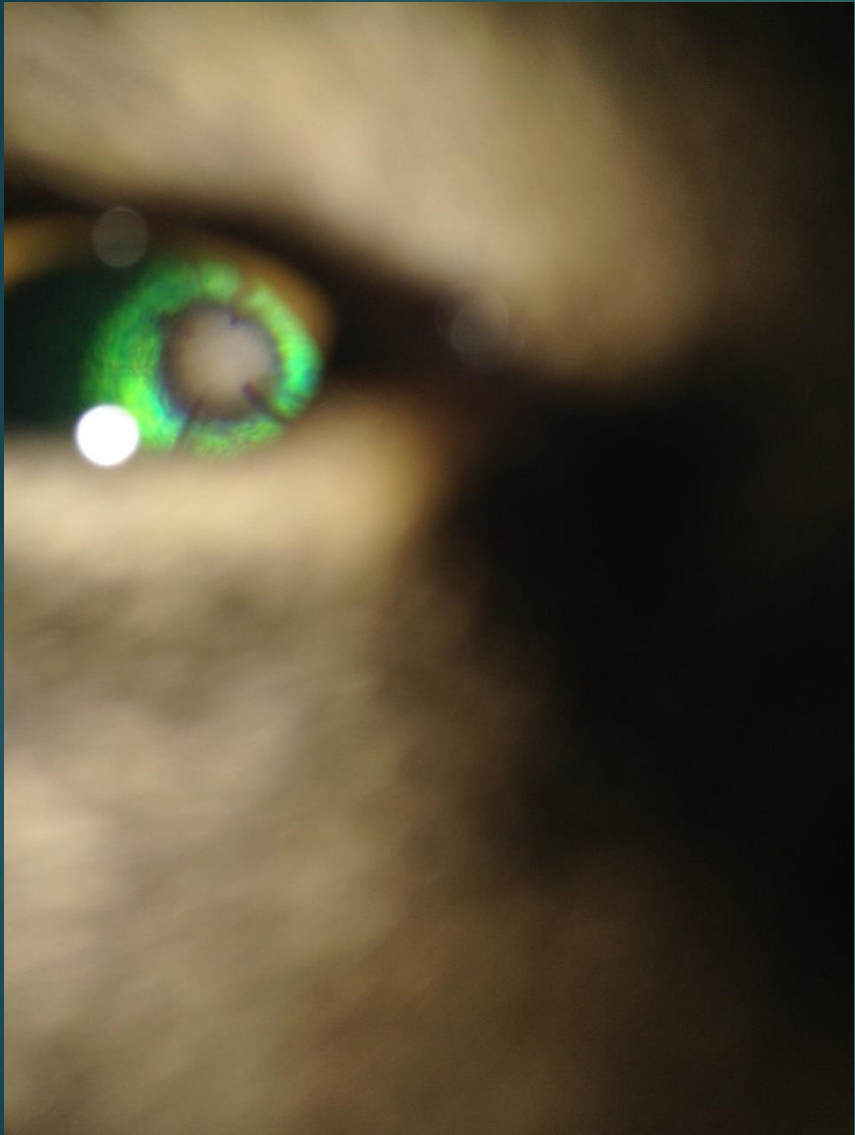
Pan retinal: 73deg 2.67x

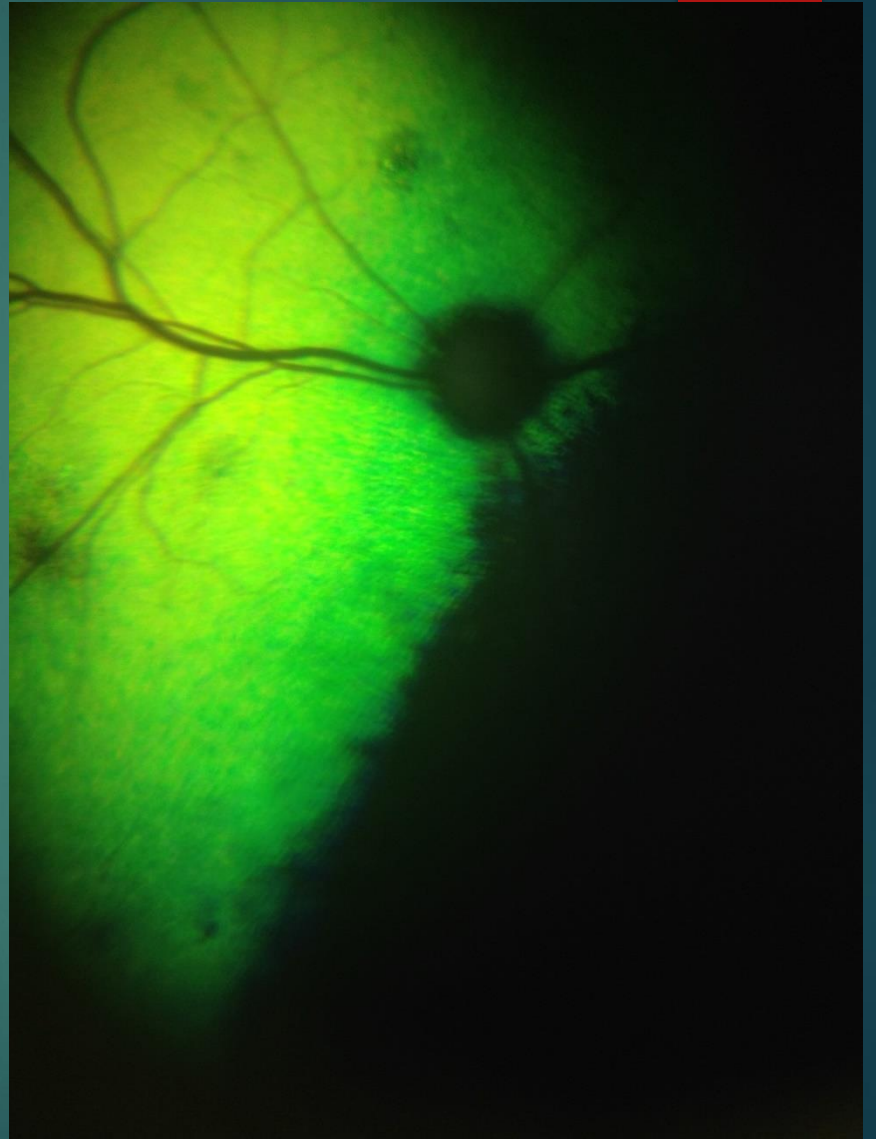
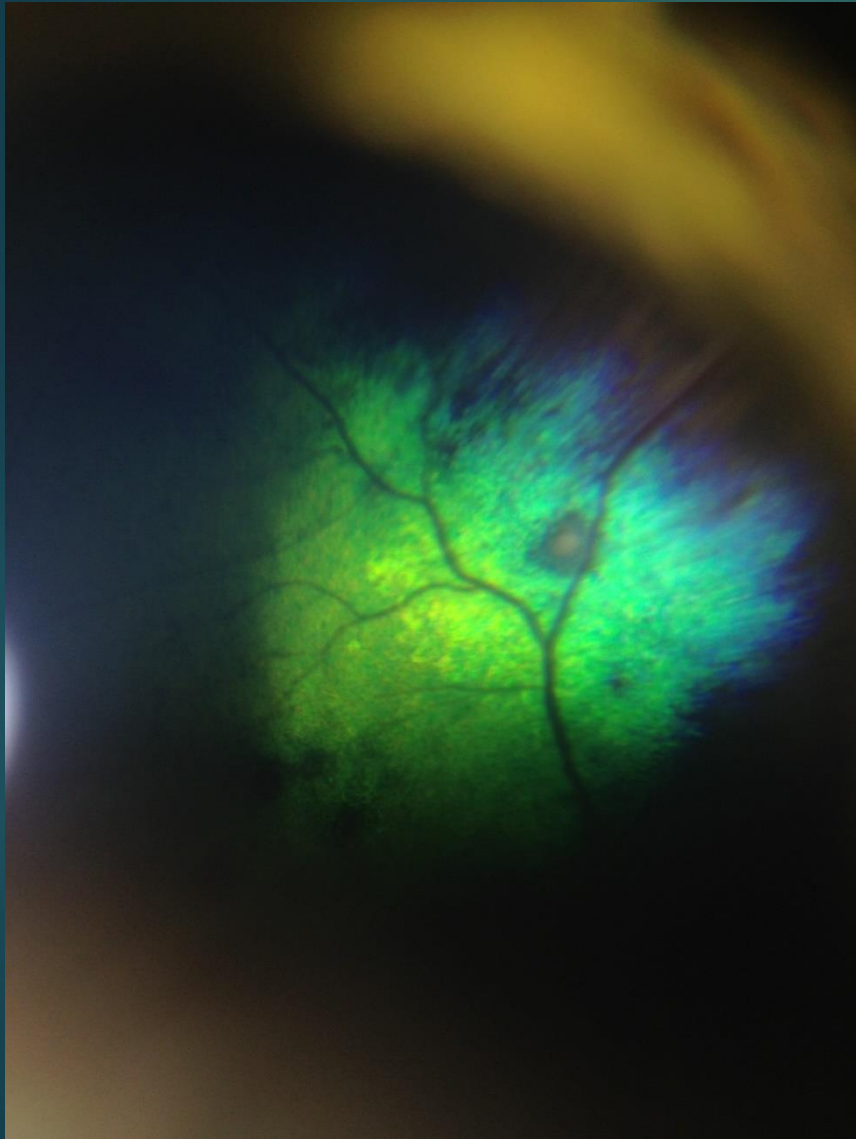


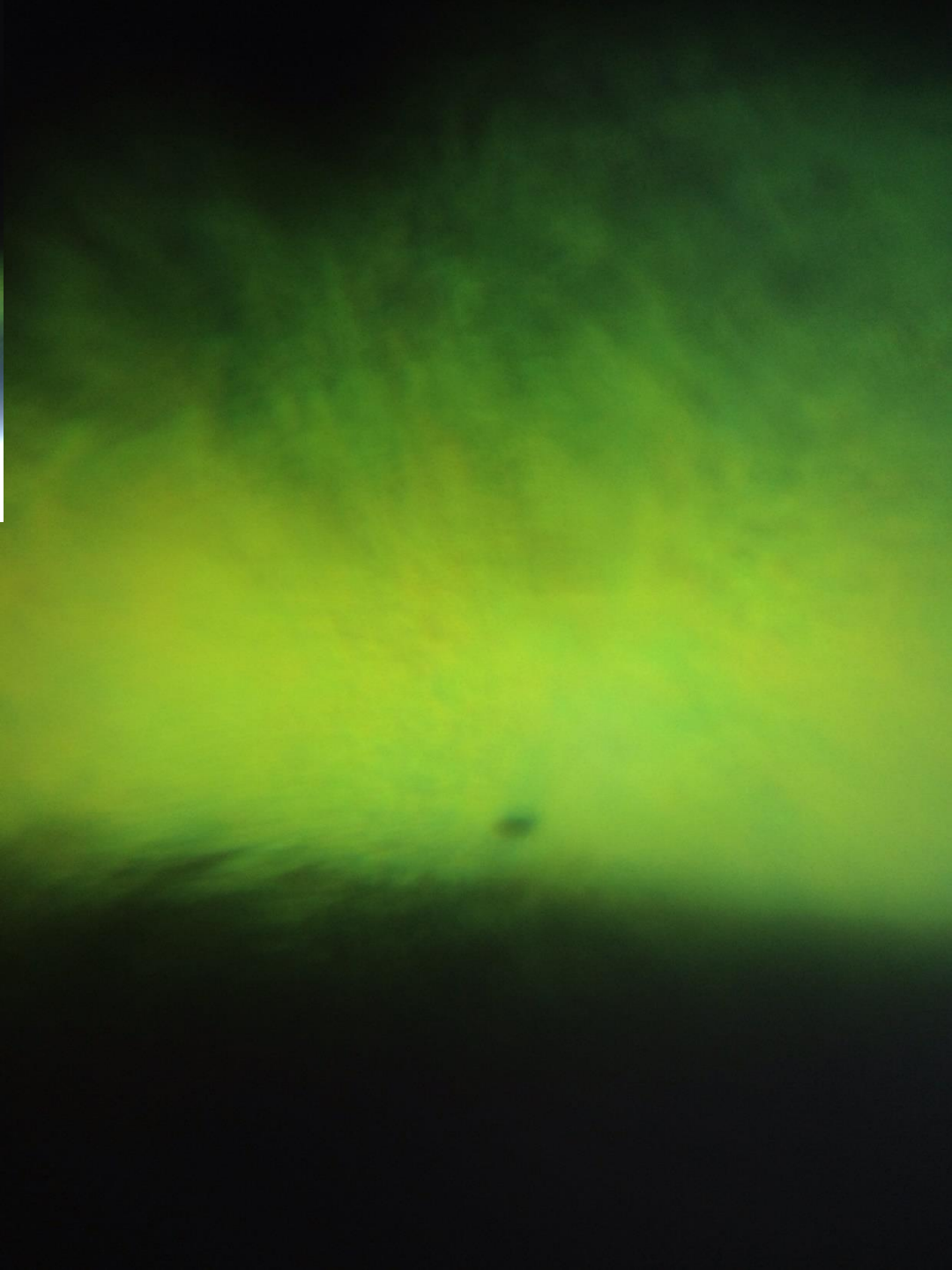
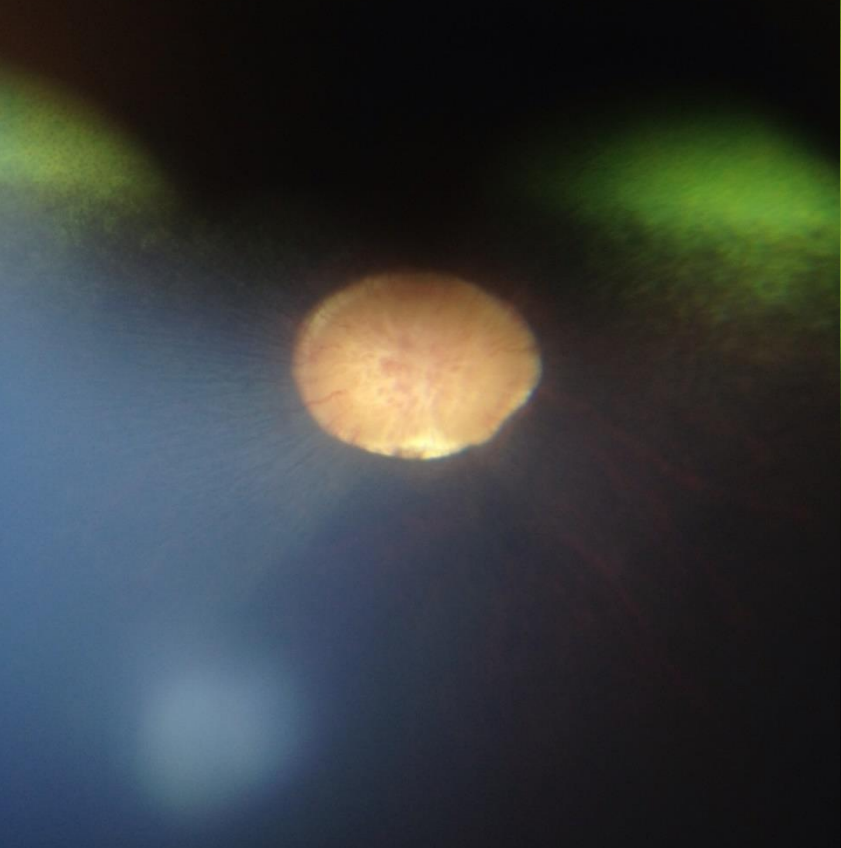
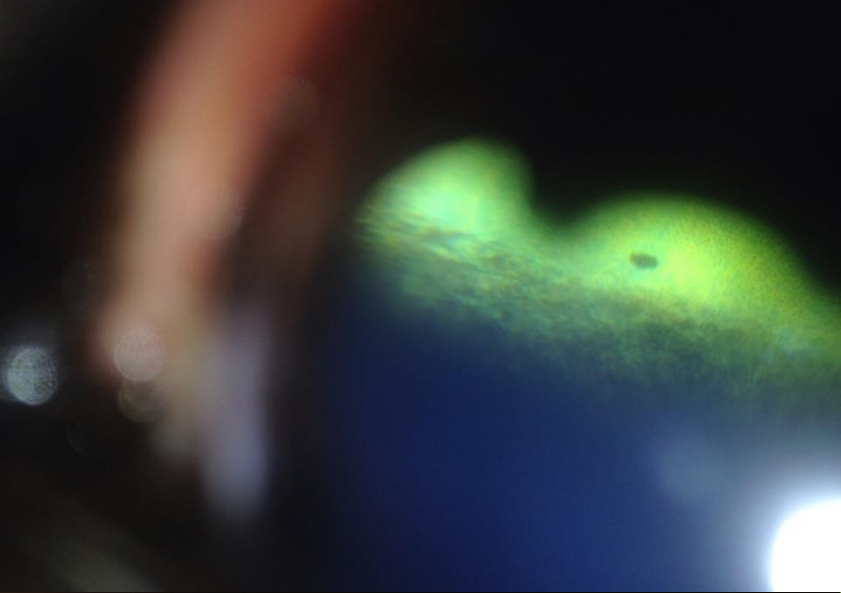




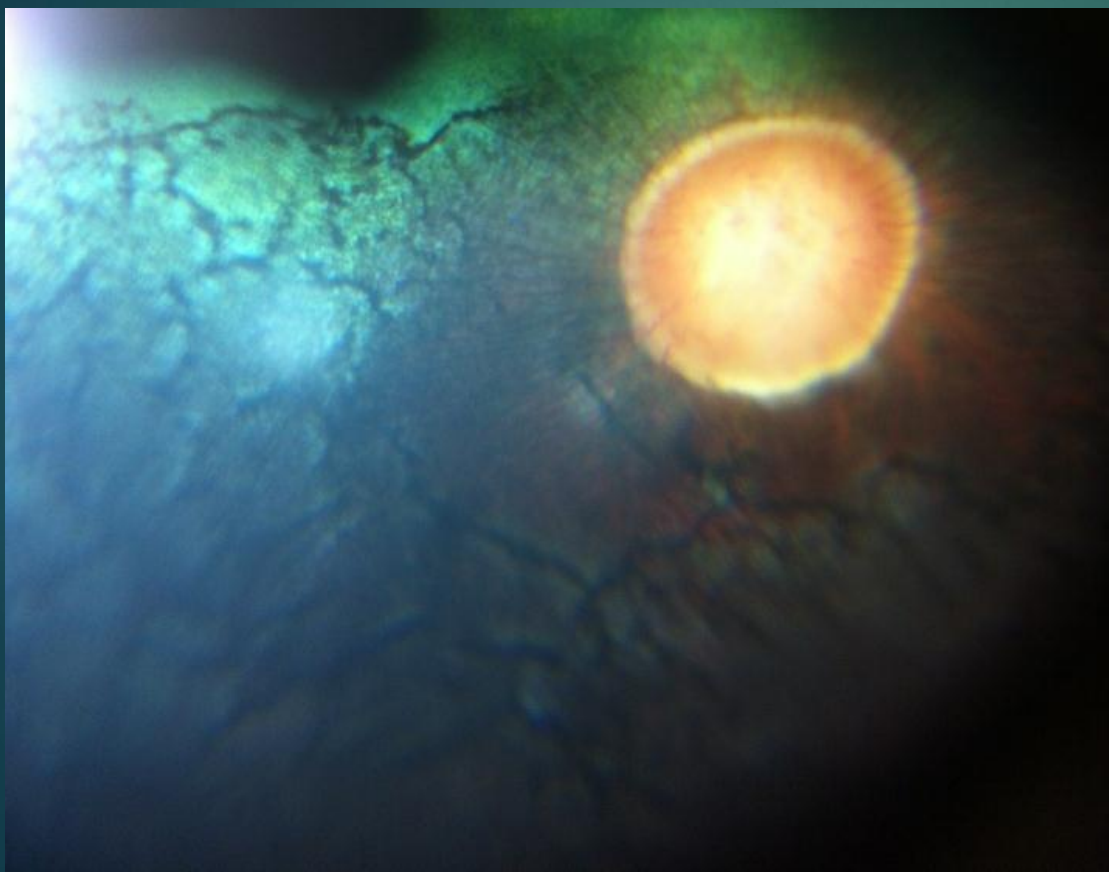




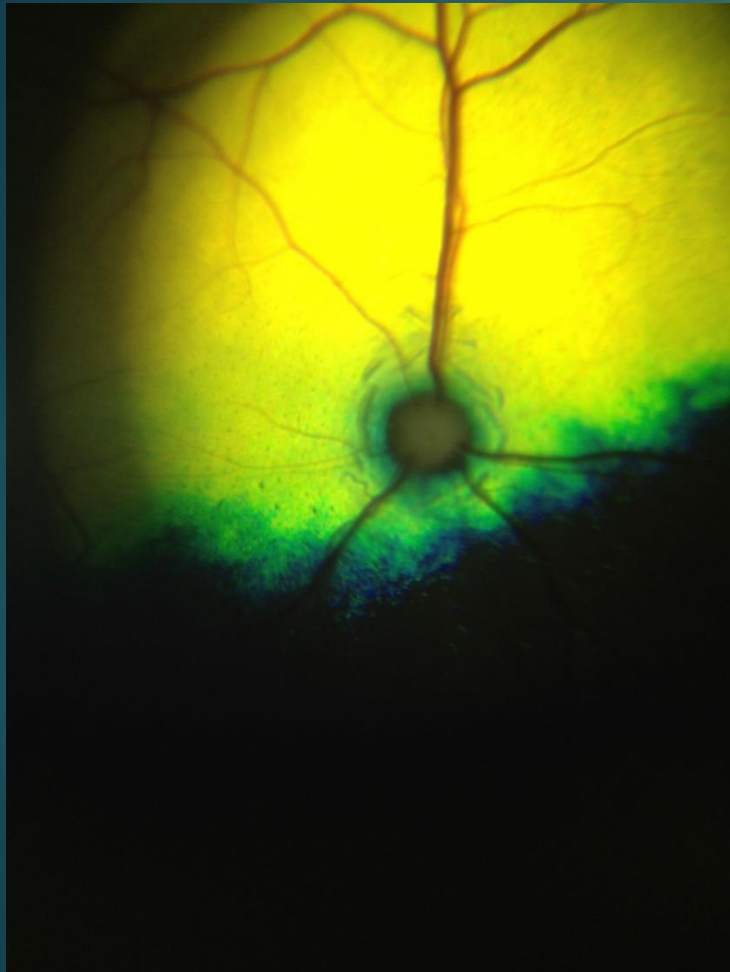




Equine/ungulates



Feline

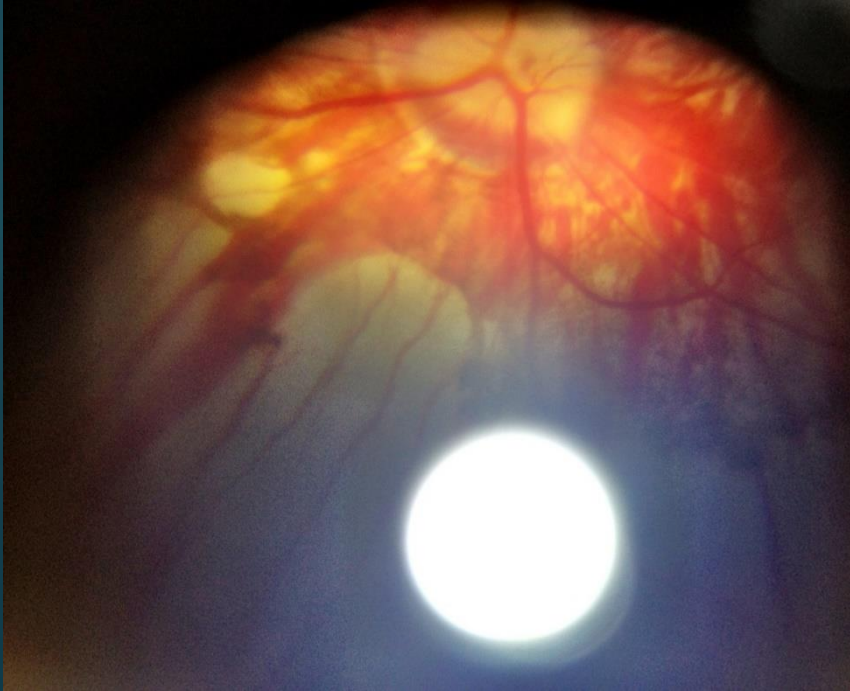
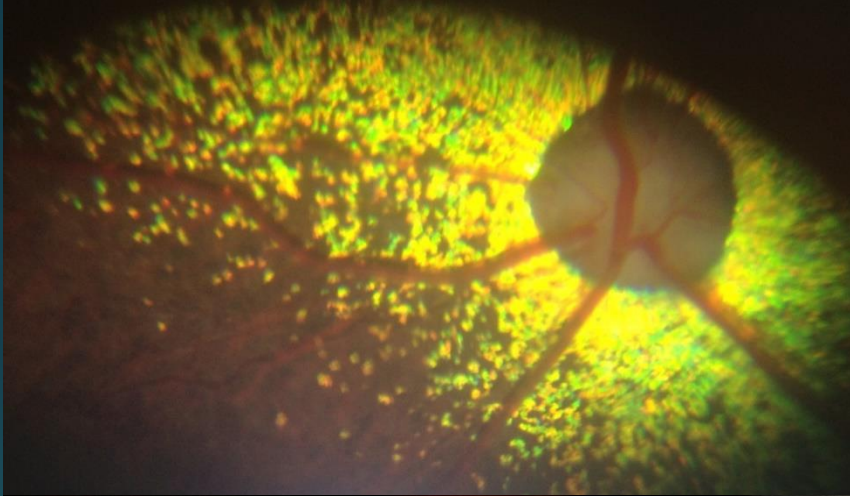


Vertical

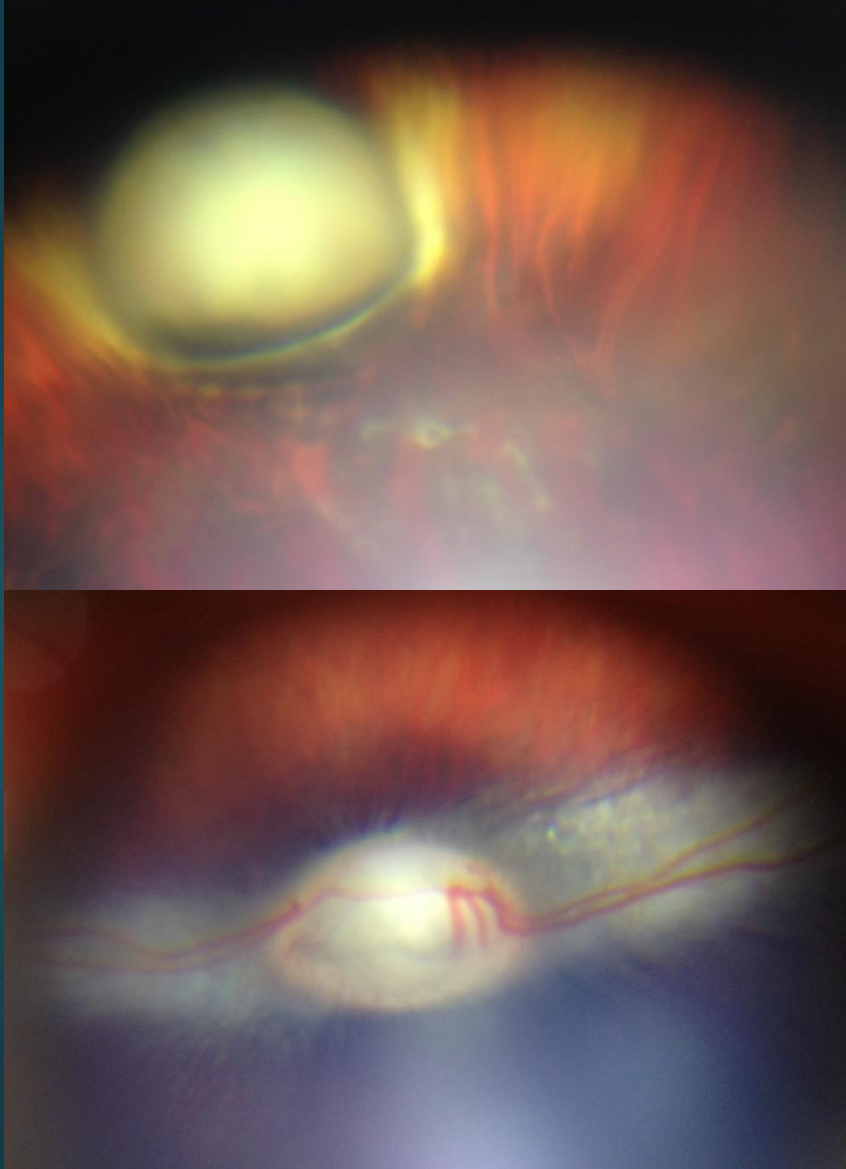


Rob Lowe: Optic neuritis

Dogs



Rabbits



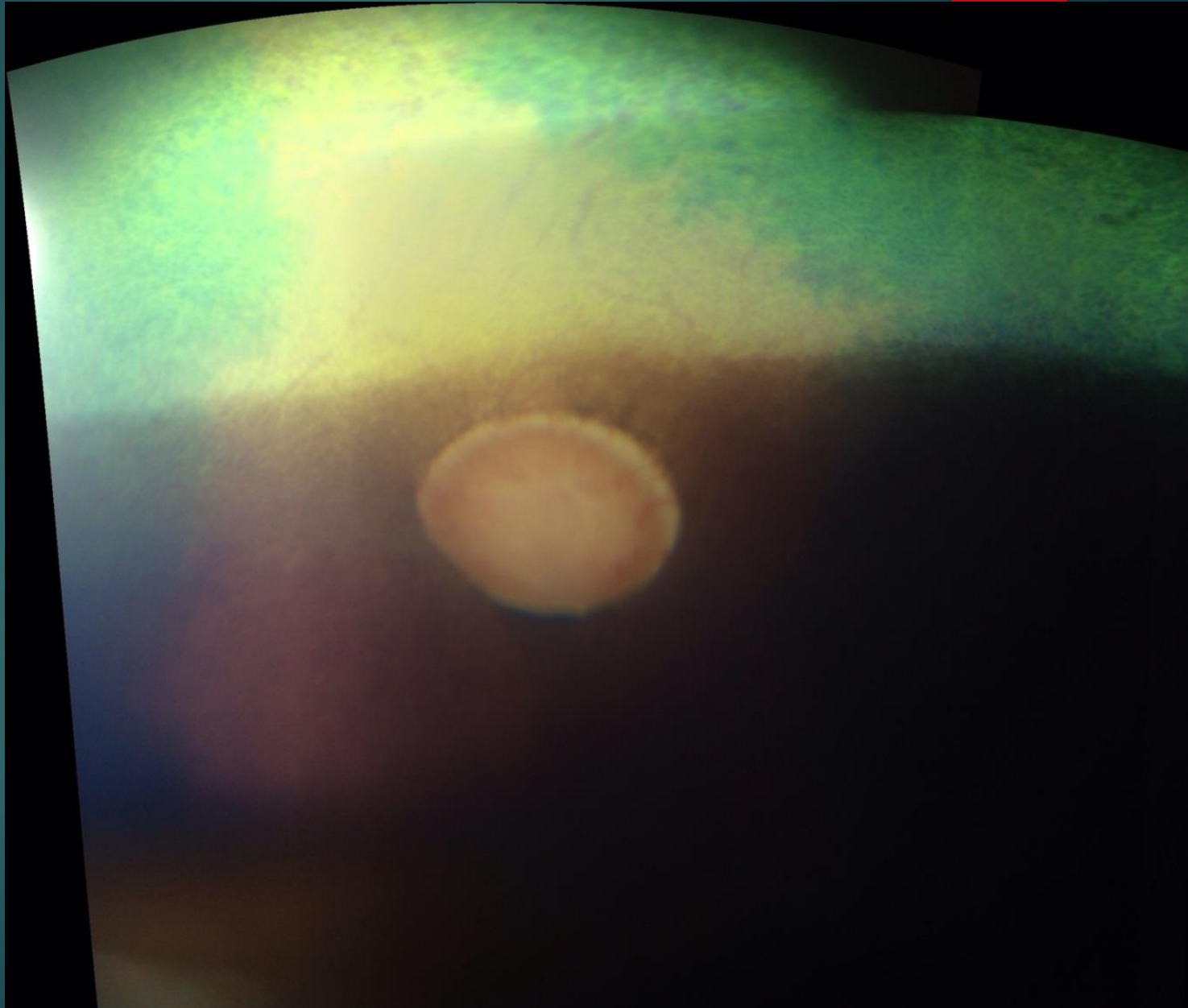


Panorama's

Autostitch App

Full resolution

Crop before
stitch



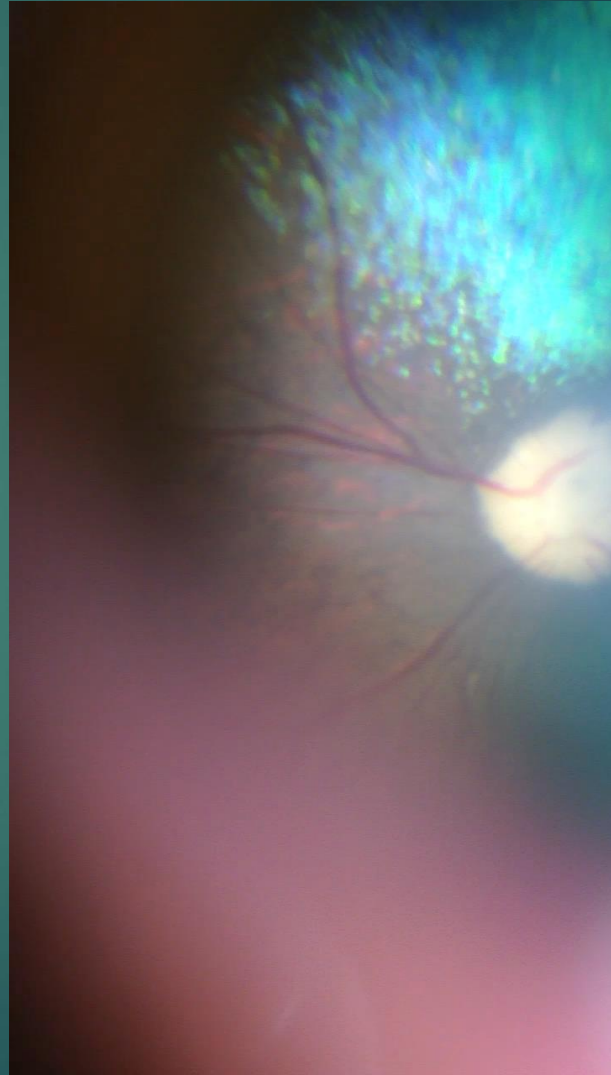


Ophthalmic videoscropy

WHAT ELSE CAN WE DO...







Don't forget
your
microscope



Direct phoneoscopy – a step by step guide:

- ▶ Mydriasis is helpful but not always essential especially if using a phone with a short Light to lens distance.
- ▶ Open camera app – see the “Which App” section on www.theeyephone.com if you don't already have a suitable app installed
- ▶ Turn the LED on continuously – if you do not have a suitable app installed use your embedded video app and turn the light on.
- ▶ Reduce the LED illumination – if this can not be done within the app then apply multiple (3) layers of micropore tape or similar to the LED.
- ▶ Image the tapetal reflection from arm's length- the distant direct ophthalmoscopy technique can be mimicked in this fashion. Zoom in until the tapetal reflection fills the screen.
- ▶ Zoom out again prior to imaging the retina.
- ▶ Move the camera towards the eye – when the eye is closer than the camera's minimum focal distance the retina will start to be imaged.
- ▶ Position the camera close to the cornea (2-5mm) in the same way you would position a direct ophthalmoscope when performing close direct ophthalmoscopy. Removing your camera case will make this easier.
- ▶ Tap the screen to focus on the optic nerve head.
- ▶ If your app allows separate focus and exposure (e.g. Camera +) then tap the tapetal fundus to avoid “white out” due to the highly reflective tapetum.
- ▶ Reposition the exposure on the non-tapetal fundus to image.