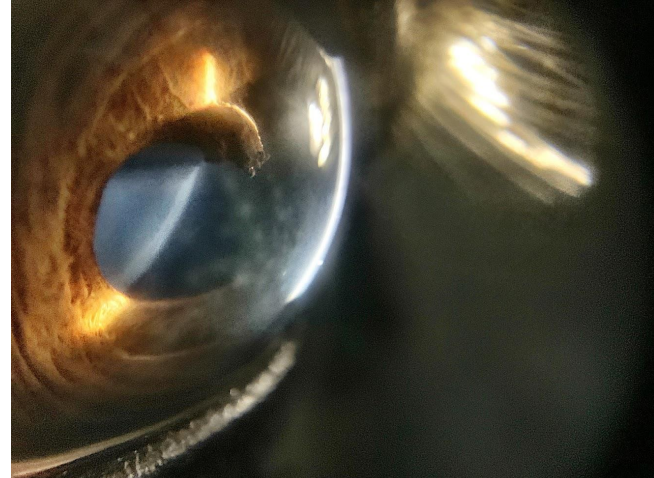


Imaging the anterior segment



Basic skills

- Learn to embrace the narrative – tell a story *
- Distant direct “phoneoscopy”
- Smartphone Macro Photography
- Learn to use lighting
- Slit lamp photography



*Google photos assistant automatically makes “case videos” for you

Trigger's story

Focal refractive change at edge of superficial ulcer.

Central area of shadowing – is this an opacity?

Corneal infiltrate?

Foreign body?

***Distant direct –iPhone
XSM, digital zoom from
30cm.***



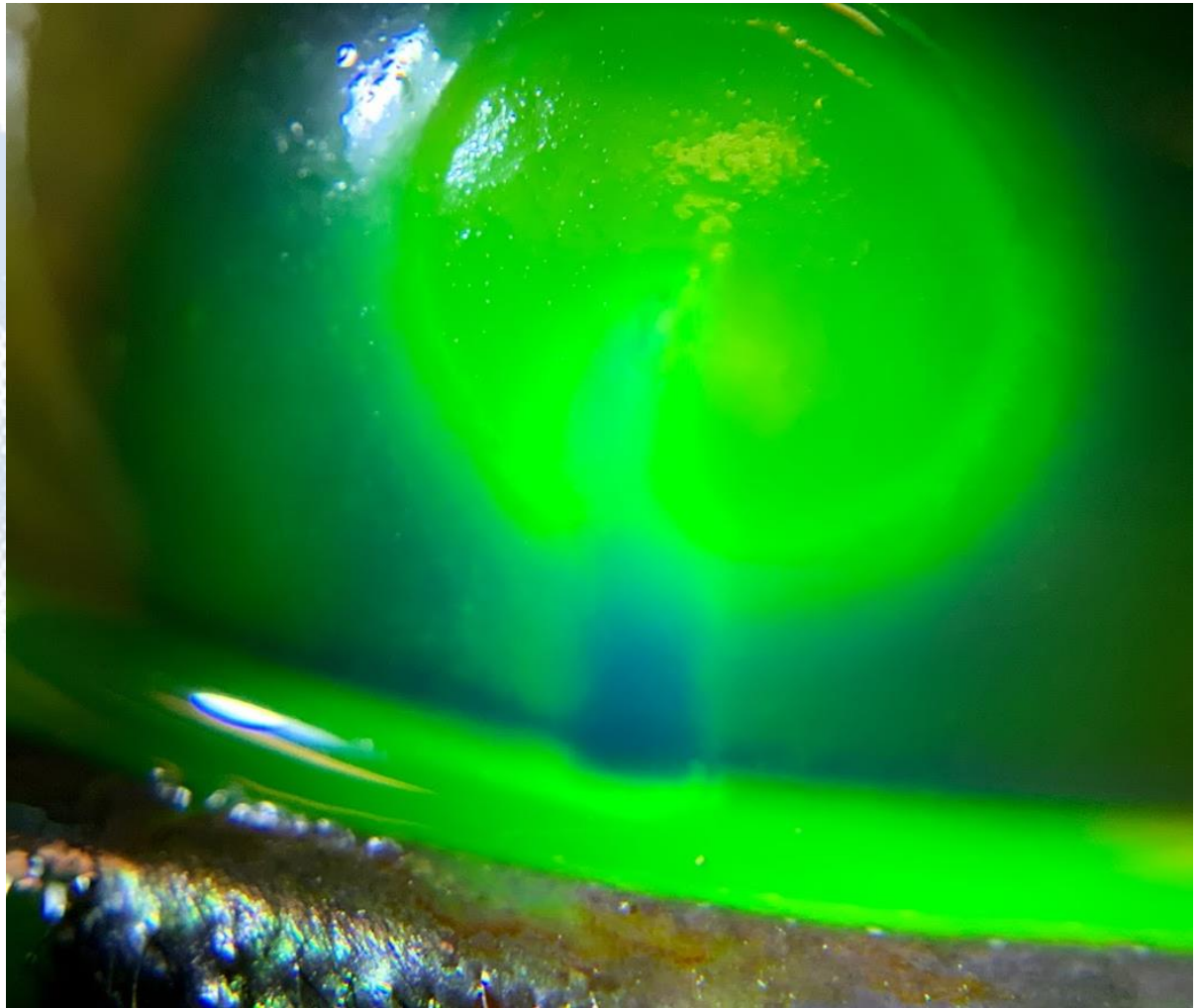
Trigger's story

Under-run epithelium

Leaking?

Foreign body?

***Macro photograph, iPhone
XSM and x10 lens Oblique
handheld lighting***



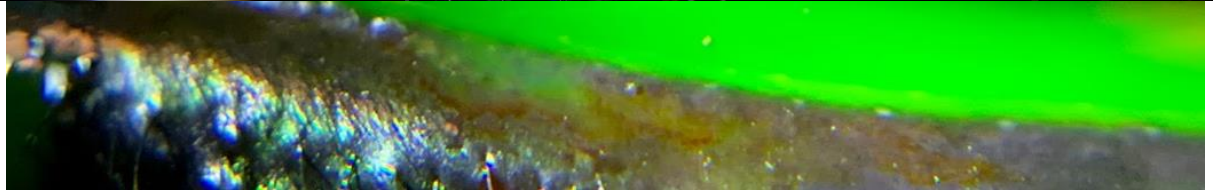
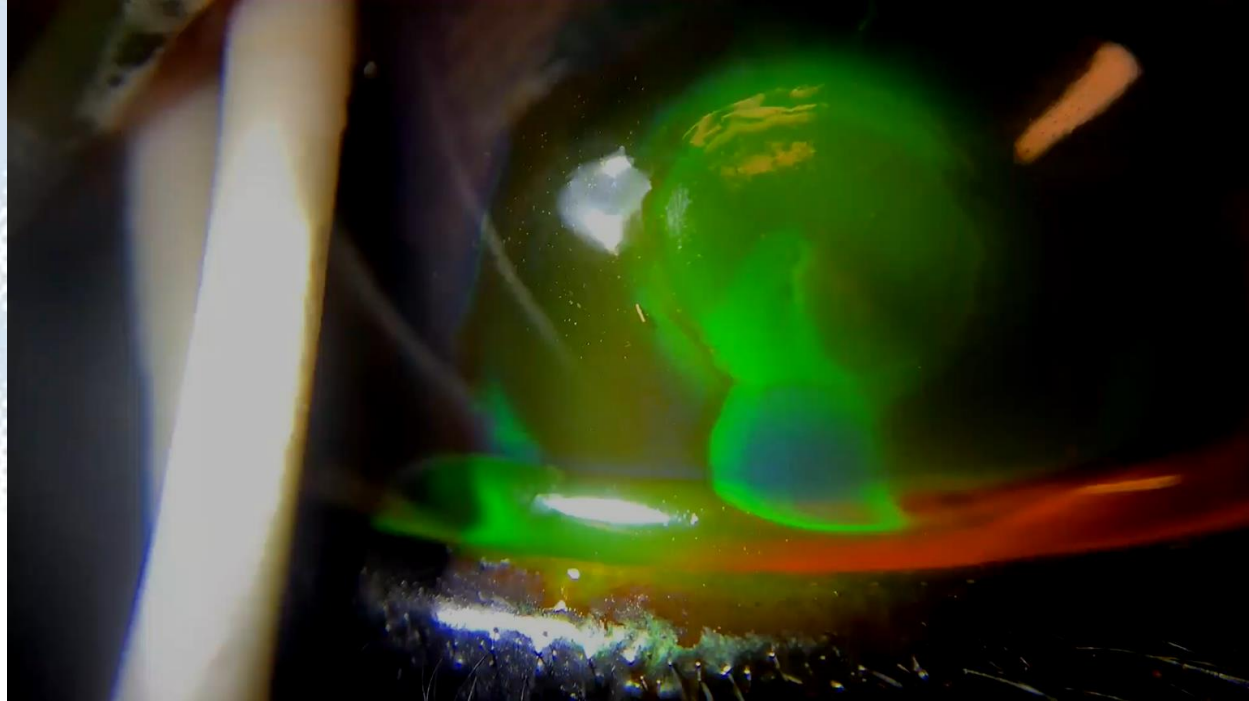
Trigger's story

Under-run epithelium

Leaking?

Foreign body?

Oblique handheld lighting
Video, iPhone XSM



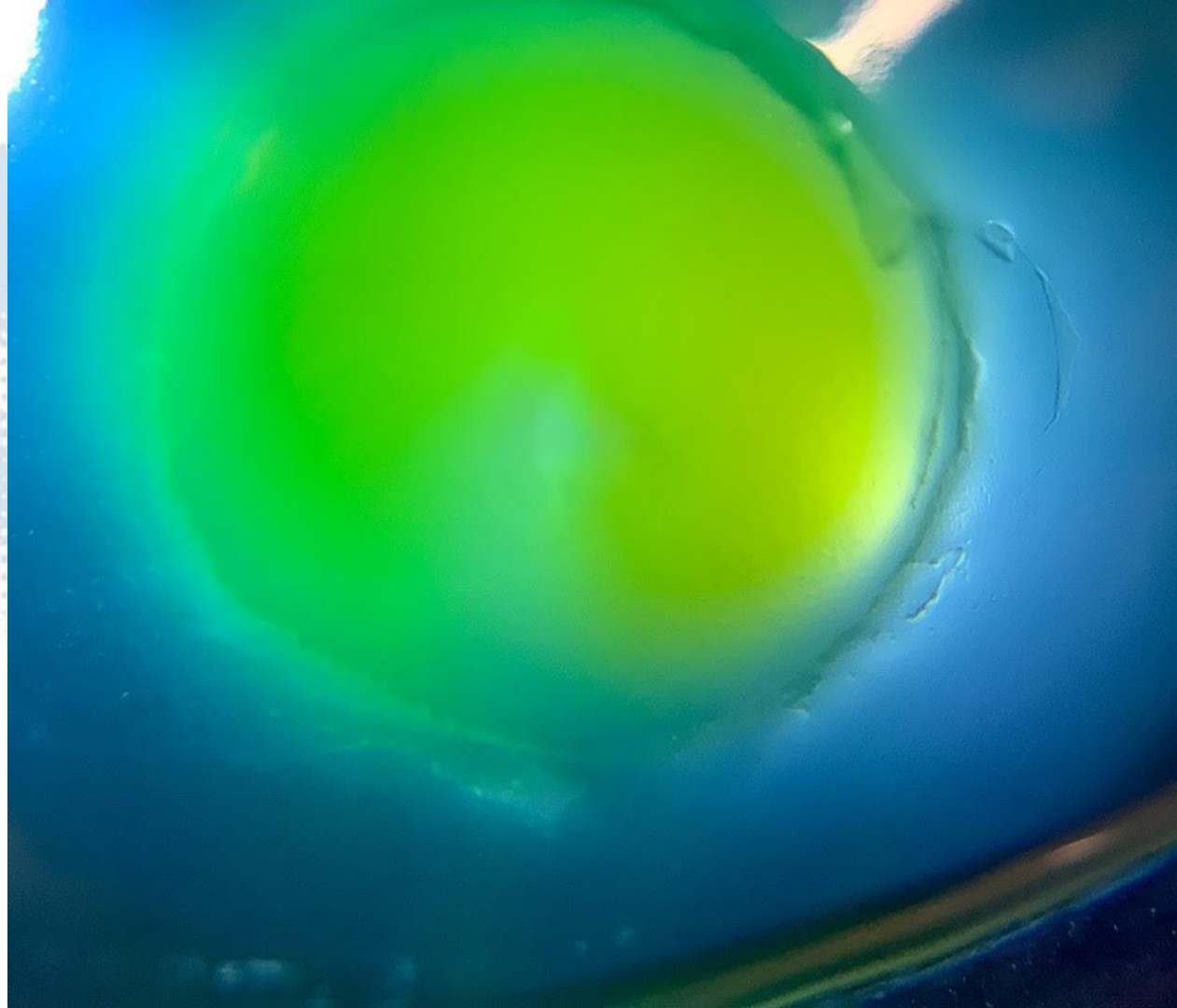
Trigger's story

Under-run epithelium

Leaking?

Foreign body?

*Macrophotograph, iPhone
XSM and x10 lens, retro
illumination*



Trigger's story

In clinic monitoring.

iPhone SE, distant direct image, digital zoom and "torch mode"





Distant direct phoneoscopy

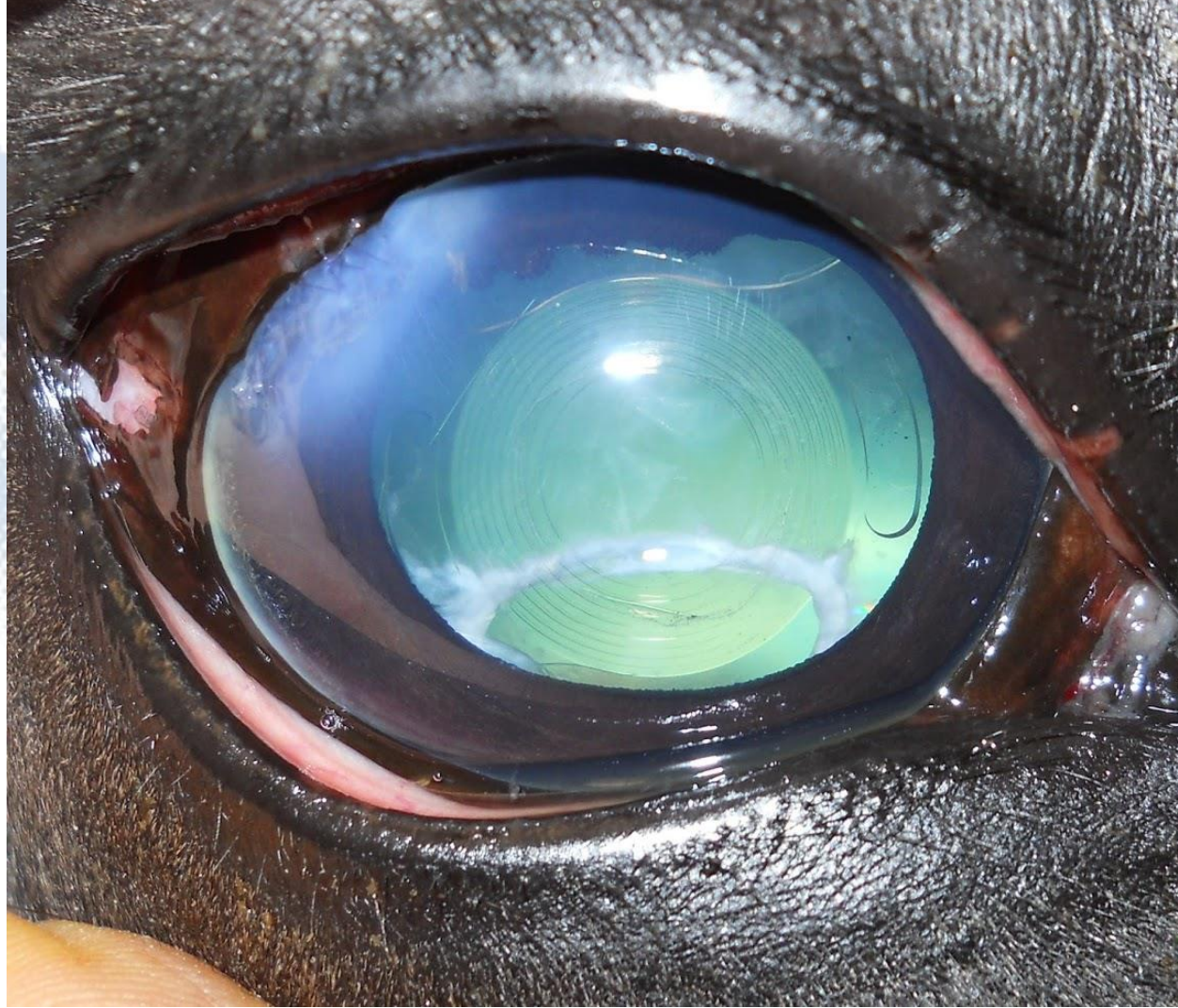
In the year 2 BS (2008)

“Before Smartphones”

Using fundic reflections to highlight required a small light to lens distance achievable only using :

- Ring flashes
- Compact cameras
- Distance

Canon ixus 95



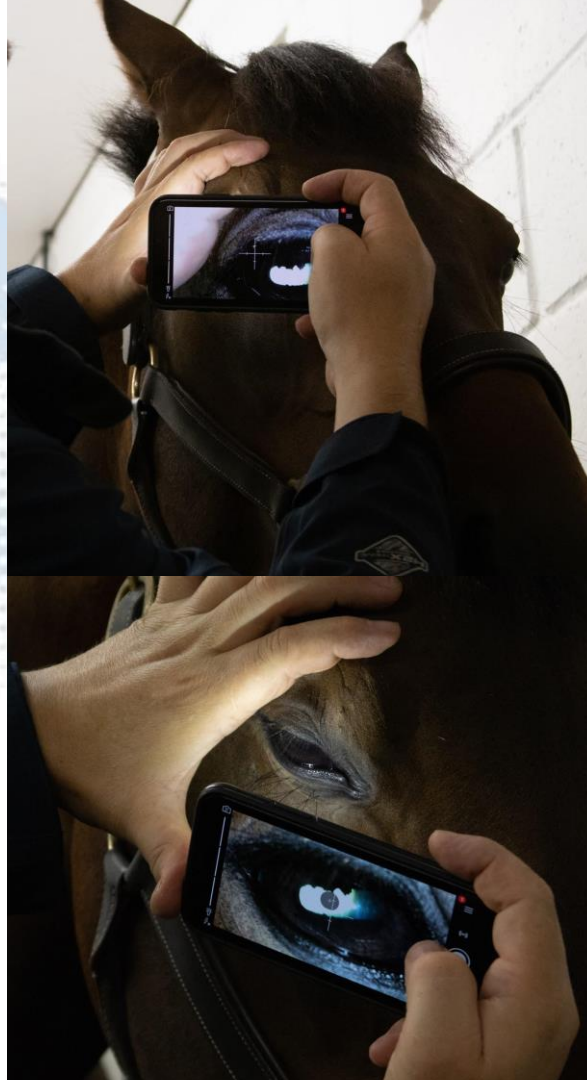
Distant direct phoneoscopy

- Mimics distant direct ophthalmoscopy
 - “Arms length” (30cm)
 - Defocussed fundic reflection highlights opacities and changes in refraction
- I. Torch mode on
 - II. Position as far away from eye as can and still see the screen (remember your reading glasses!)
 - III. Digital zoom to get pupil to fill screen
 - IV. Move around to see outside the visual axis
 - V. Repeat at camera’s minimum focal distance to document pathology



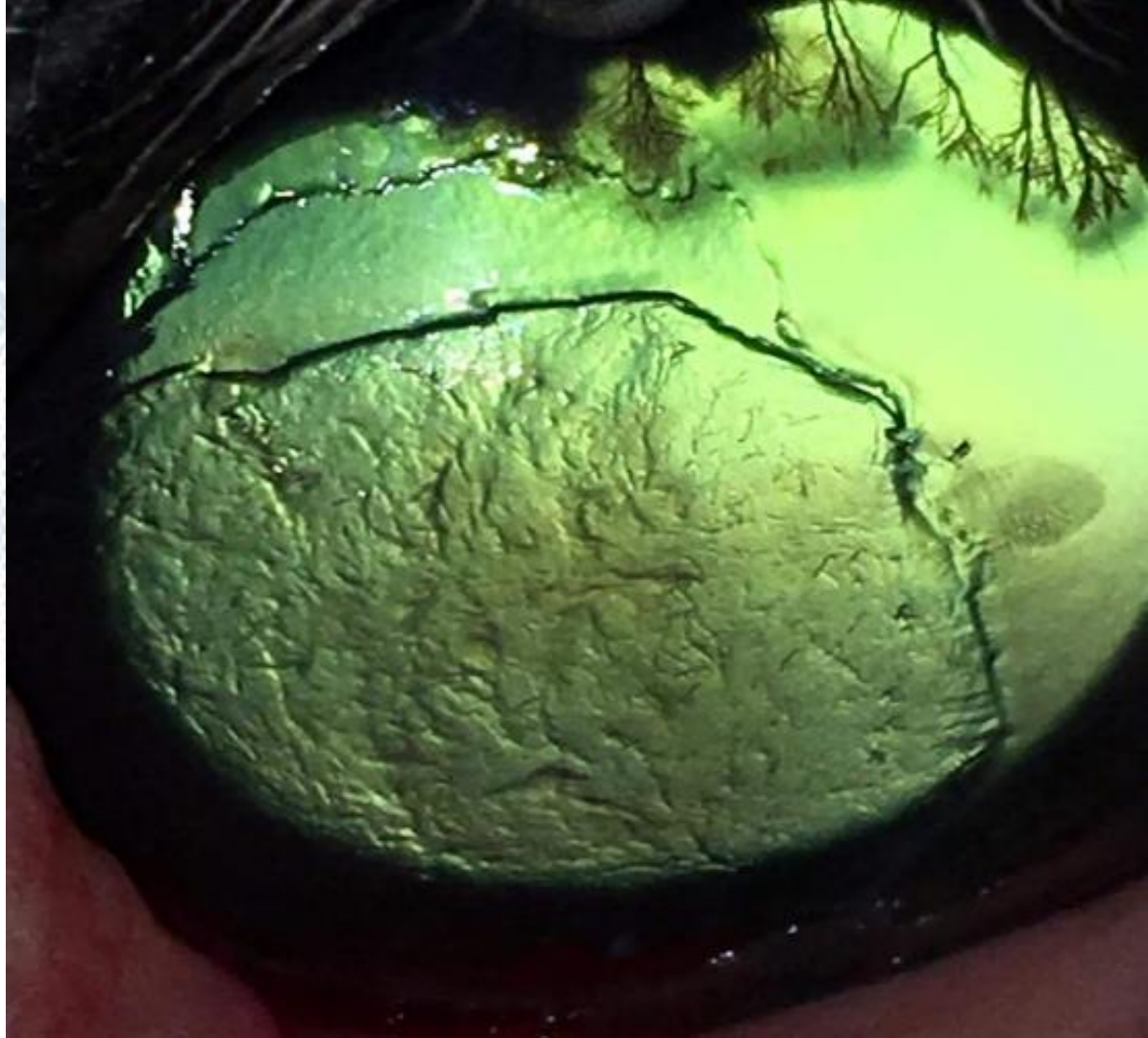
Distant direct phoneoscopy

- Mimics distant direct ophthalmoscopy
 - “Arms length” (30cm)
 - Defocused fundic reflection highlights opacities and changes in refraction
- I. Torch mode on
 - II. Position as far away from eye as can and still see the screen (remember your reading glasses!)
 - III. Digital zoom to get pupil to fill screen
 - IV. Move around to see outside the visual axis
 - V. Repeat at camera’s minimum focal distance to document pathology



Distant direct phoneoscopy

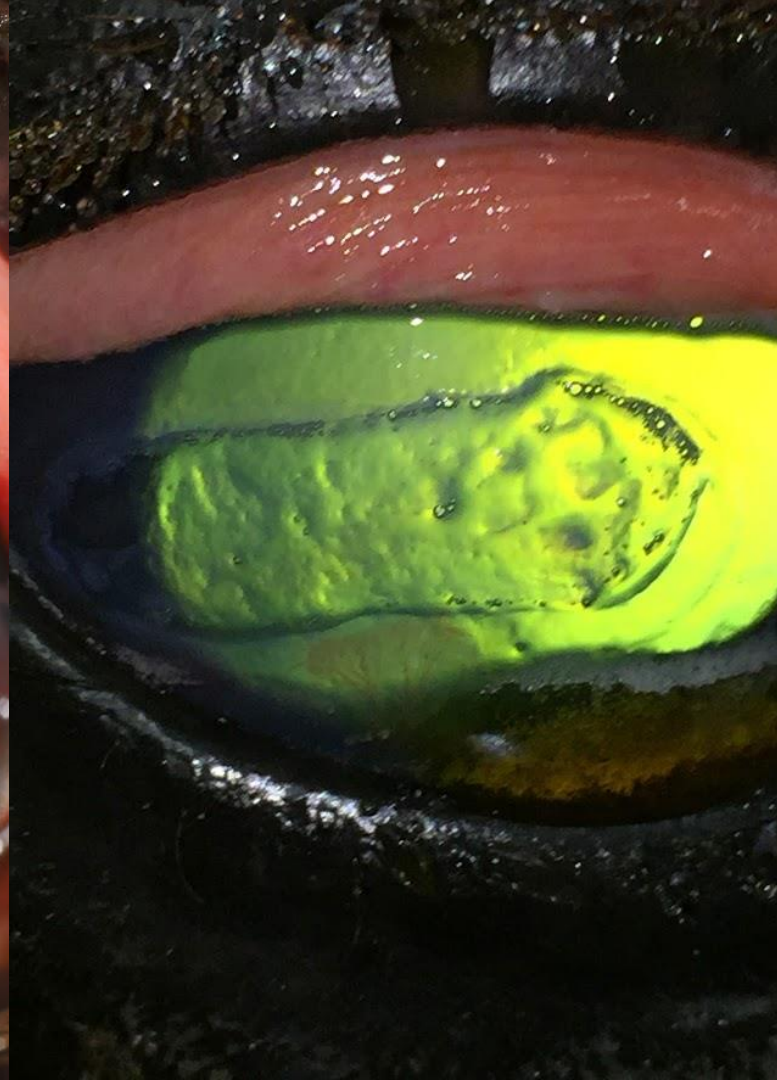
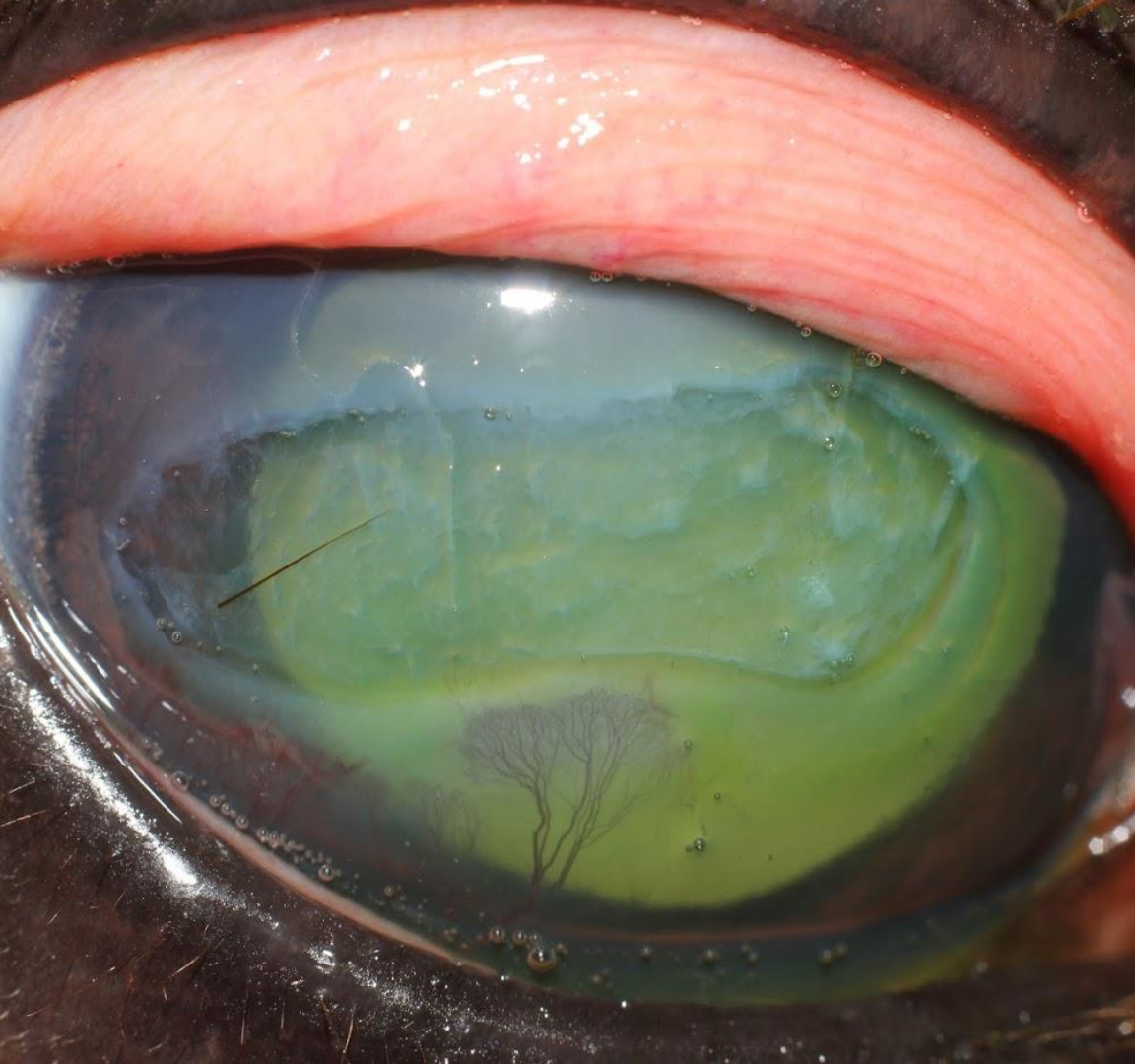
- Mimics distant direct ophthalmoscopy
- “Arms length” (30cm)
- Defocussed fundic reflection highlights opacities and changes in refraction
- If light intensity low enough refractive changes will appear as shadows



Distant direct phoneoscopy

- Mimics distant direct ophthalmoscopy
- “Arms length” (30cm)
- Defocussed fundic reflection highlights opacities and changes in refraction
- Increased incident lighting changes appearance of edge of ulcer but not the opaque blood vessels
- Adding oblique lighting can add more information







Smartphone Macro photography



Macro lens

Look for:

- Black
- Case fitted lens?
- Magnification x10 fine
- x20 can be helpful
- Coated glass lenses ideal
- Small (light to lens distance?)





Macro lens

Look for:

- Black
- Case fitted lens?
- Magnification x10 fine
- x20 can be helpful
- Coated glass lenses ideal
- Small (light to lens distance?)



Macro lens

Look for:

- Black
- Case fitted lens?
- Magnification x10 fine
- x20 can be helpful
- Coated glass lenses ideal
- Small (light to lens distance?)
- iPod touch vs iPhone 7+

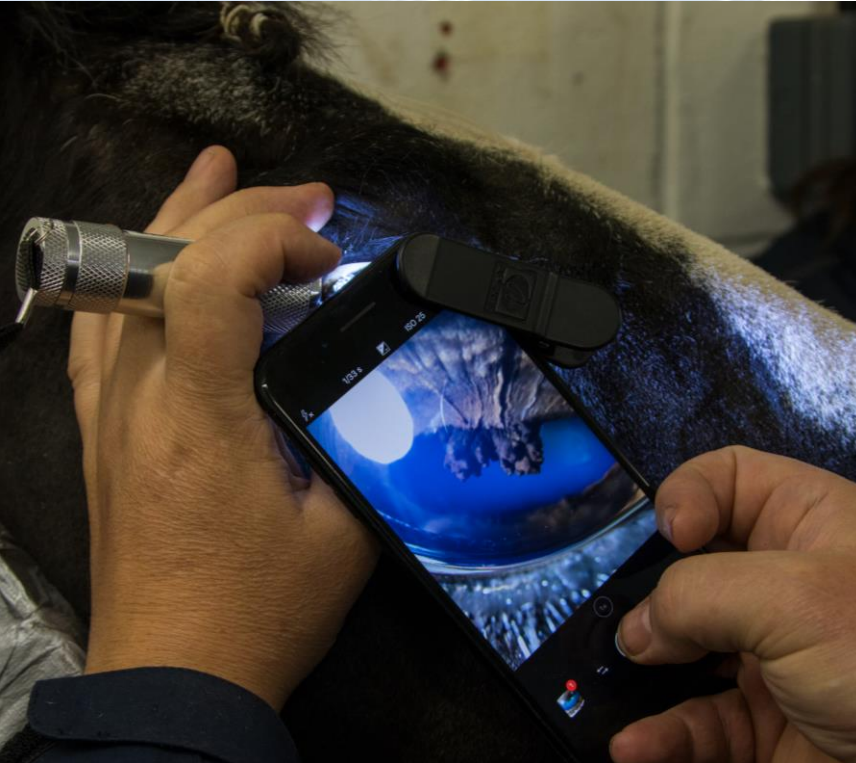








modelling lights vs on-phone light



focus with micromovements



Creative holding techniques



Use digital zoom





Improving your macro-photography

EXIF data

cyst

DETAILS

Mar 27, 2017
Mon, 1:53 PM

IMG_1080.JPG
12.2MP 3024 x 4032 6 MB

Apple iPhone 7 Plus
f/1.8 1/33 3.99mm ISO64

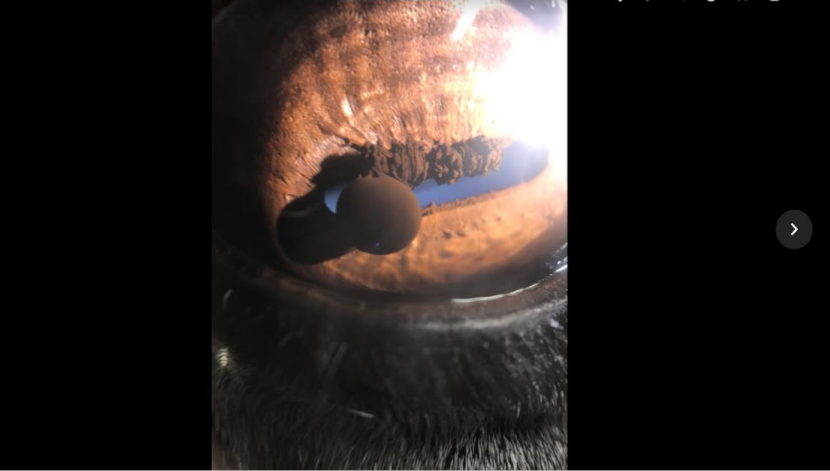
Unknown location

Bournstream

IEOC photo: X | Untitled pr... | Photo - Go... | Untitled di... | IEOC photo: X | smart pho... | Macro pho... | canon cro... | Statement: X | +

https://photos.google.com/photo/AF1QipPRVatugWD1k3BNs9wxVdnXR6zAnR6NnJmjbual

Apps | EndNote | Capture Reference | Chrome Remote De... | pub med Bibliogra... | Find books, articles... | Google Calendar | Google Photos - All... | Google | Other bookmarks



cyst

DETAILS

Mar 27, 2017
Mon, 1:53 PM

IMG_1080.JPG
12.2MP 3024 x 4032 6 MB

Apple iPhone 7 Plus
f/1.8 1/33 3.99mm ISO64

Unknown location

Bournstream

BRADLEY GREEN

IMG_1412.MOV | Photos (2).zip | IMG_1412.JPG | IMG_1406.MOV | 388E49EF-B4ED...MOV | Show all X

00:51
24/03/2019

Macrophotography

Apple iPhone XS Max

f/2.41/2566mm ISO16

X10 macro lens, modelling
light

Flesh fly (Sarcophaginae spp.)



Macrophotography

Apple iPhone XS Max

f/2.41/1226mmISO25

X10 macro lens

Cucumber green spider (Araniella cucurbitina)



Macrophotography



Apple iPhone XS Max,
f/2.41 1226mm ISO25,
X10 macro lens

Shield bug
(*Acanthosomatidae* spp.)



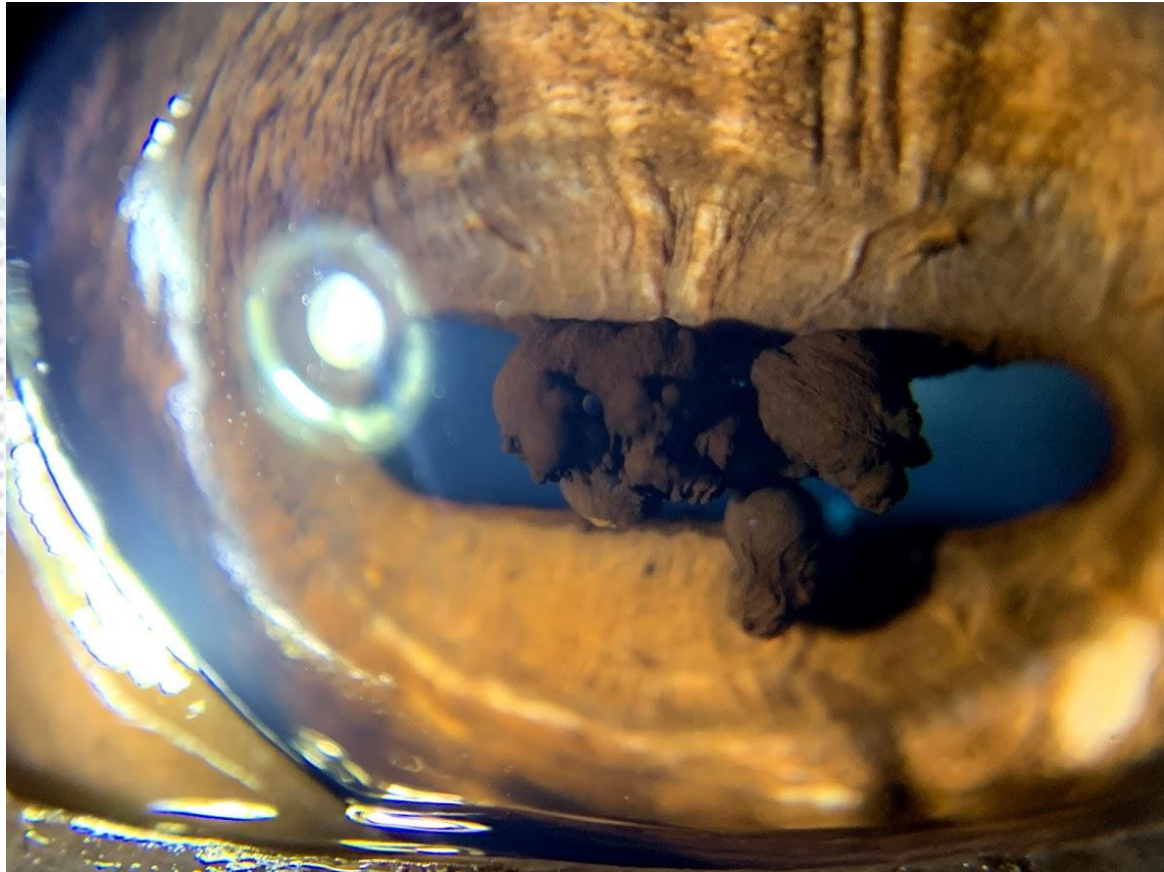
Macrophotography



critique

*12.2MP 4032 × 3024 6.7 MB
f/1.81/504.25mm ISO100*

- Light sufficient (ISO 100)
- Light angle highlights anatomy
- Focussed middle of granula iridica



iPhone XS Max, x10 macro & modelling light

critique

*12.2MP 4032 × 3024 6.7 MB
f/1.81/504.25mm ISO100*

- Light sufficient (ISO 100)
- Light angle highlights anatomy
- Focussed middle of granula iridica



iPhone XS Max, x10 macro & modelling light

Focus - DOF

*12.2MP 4032 × 3024 7 MB
f/1.81/504.25mm ISO125*

- Light close, good intensity
- Direction light allows nice shadowing of iris architecture, PPMs & ventral cyst.
- Focussed at iris



iPhone XS Max, x10 macro & modelling light

Exposure - ISO

12.2MP 4032 × 3024 6.8
MB
f/2.41/306mm ISO1000

- Light direction good
- Shadowed by lid
reducing light intensity



iPhone XS Max, x10 macro & modelling light

Modelling light

12.2MP 4032 × 3024 6.6 MB
f/1.81/504.25mm ISO80

Corneal reflection obscures
detail



iPhone XS Max, x10 macro & modelling light

Slit lamp photography



Digiscoping vs macrophotography

Adaptor attaches phone to slit lamp
eye piece

Use voice activated software to take
image (“Hey Camera”)

Care when attaching

Can be fiddly with large phones
(iPod)

Image what the slit lamp sees



Digiscoping vs macrophotography

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Digiscoping vs macrophotography

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Use voice activated software to
take image (“Hey Camera”)

Care when attaching

Can be fiddly with large phones
(iPod)

Image what the slit lamp sees

Remember your telephoto lens



Digiscoping vs macrophotography

*“Image the slit beam with
macrophotography or digital zoom”*

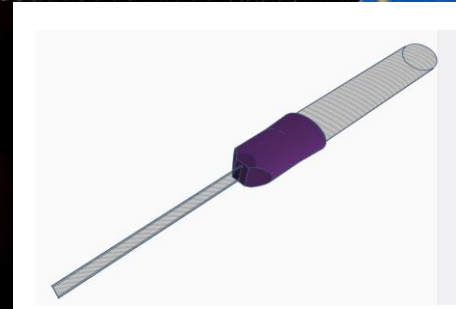
Need two people – usually

Binocular or monocular slit lamp

Slit beam on ophthalmoscope or pen
torch

Lens-less slit beam adaptor

iPhone XS, x10 macro lens, slit beam adaptor



Digiscoping vs macrophotography

*“Image the slit beam with
macrophotography or digital zoom”*

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torch

Lens-less slit beam adaptor

iPhone XS, digital zoom, slit beam adaptor



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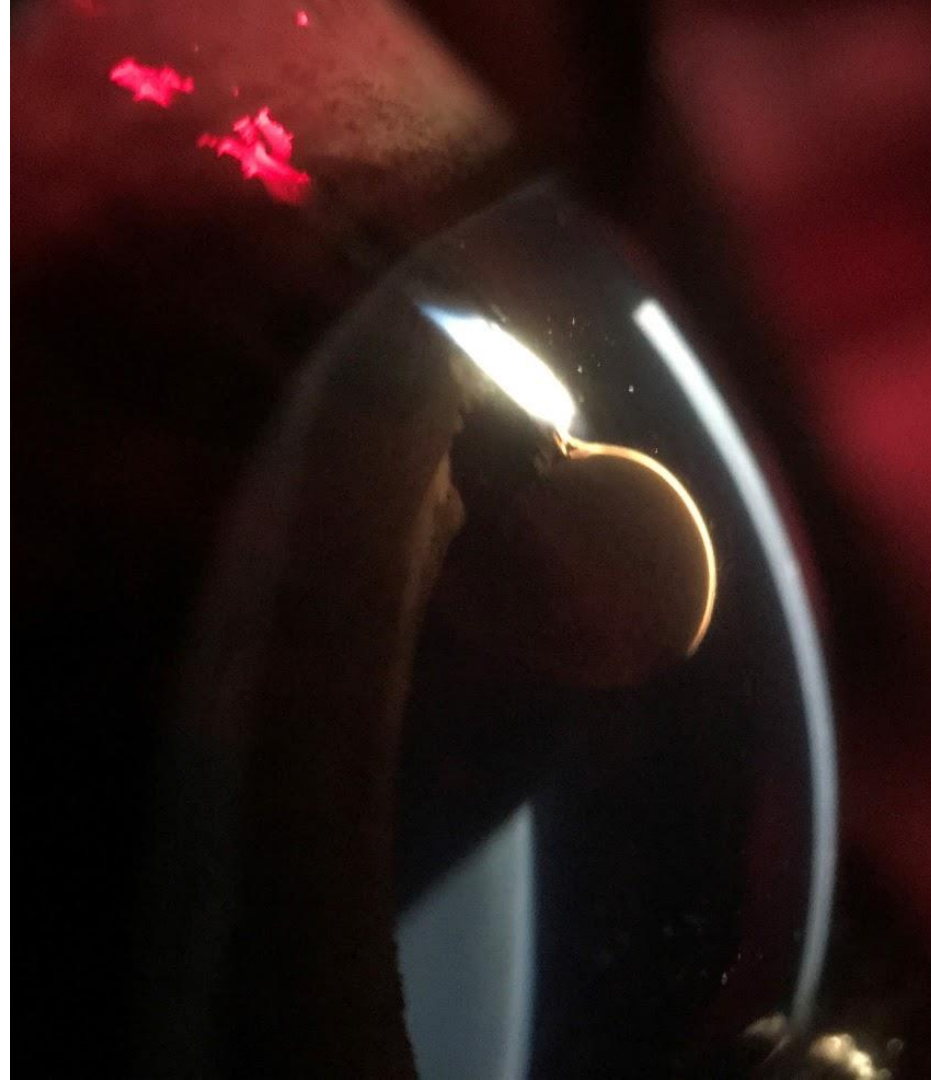
Need two people – usually

Binocular or monocular slit lamp

Slit beam on ophthalmoscope or pen
torch

Lens-less slit beam adaptor

iPhone XS, digital zoom, Kowa SL17



Digiscoping vs macrophotography

*“Image the slit beam with
macrophotography or digital zoom”*

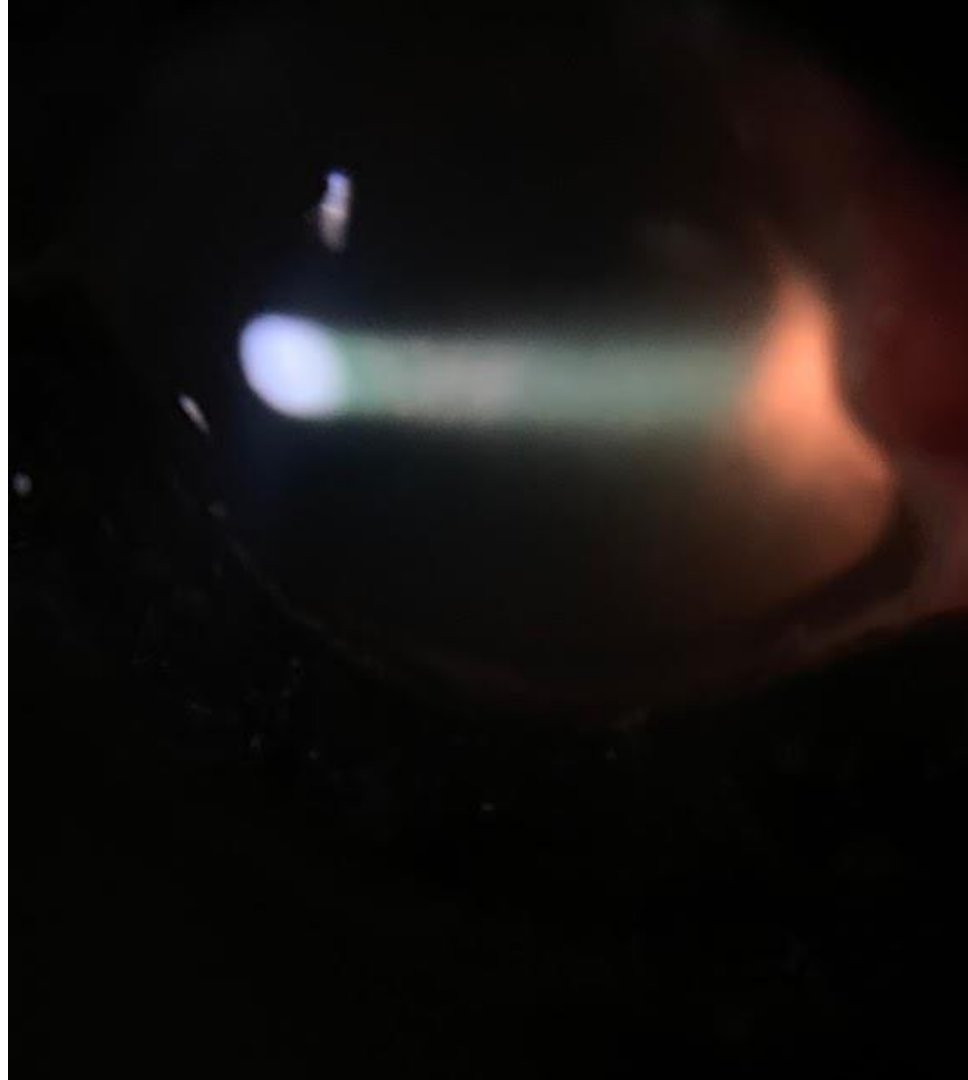
Need two people – usually

Binocular or monocular slit lamp

Slit beam on ophthalmoscope or pen
torch

Lens-less slit beam adaptor

iPhone XS, x10 macro lens, Kowa SL17



Digiscoping vs macrophotography

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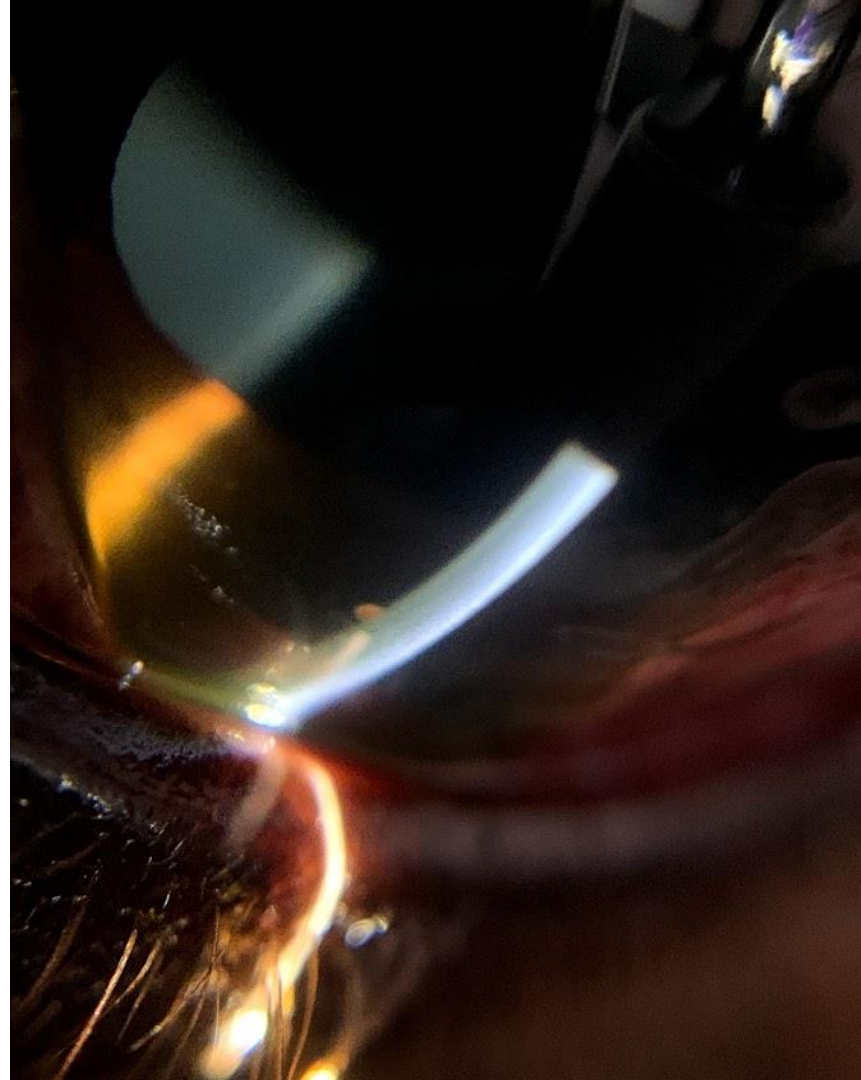
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torch

Lens-less slit beam adaptor

iPhone XS, x10 macro lens, Kowa SL17



Digiscoping vs macrophotography

*“Image the slit beam with
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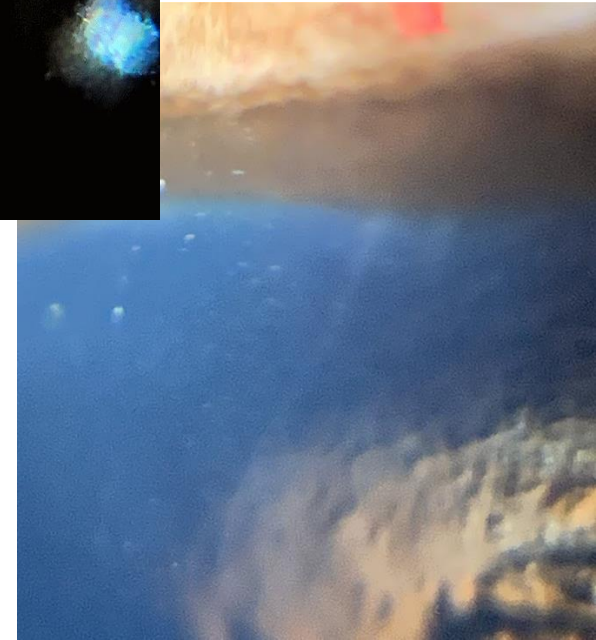
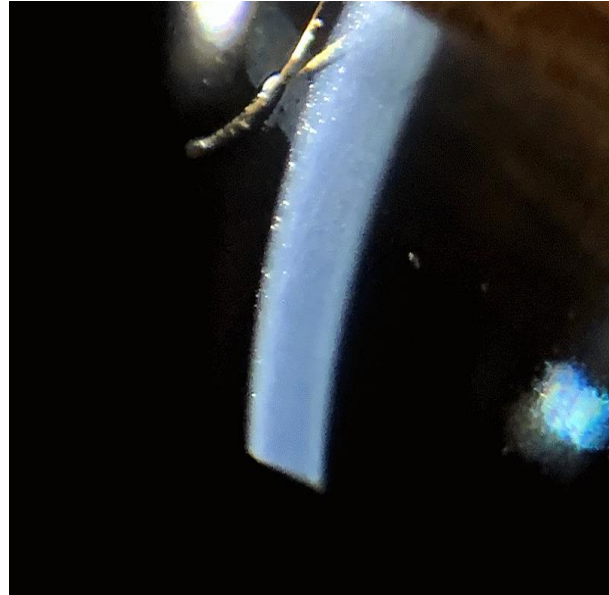
Binocular or monocular slit lamp

Slit beam on ophthalmoscope or pen
torch

Lens-less slit beam adaptor

Video helpful for complex lesions

iPhone XS, x10 macro lens, cropped, Kowa SL17



Digiscoping vs macrophotography

*“Image the slit beam with
macrophotography or digital zoom”*

Need two people – usually

Binocular or monocular slit lamp

Slit beam on ophthalmoscope or pen
torch

Lens-less slit beam adaptor

**Post processing can help find hidden
detail**

iPhone XS, x10 macro lens Kowa SL17



Digiscoping vs macrophotography

*“Image the slit beam with
macrophotography or digital zoom”*

Need two people – usually

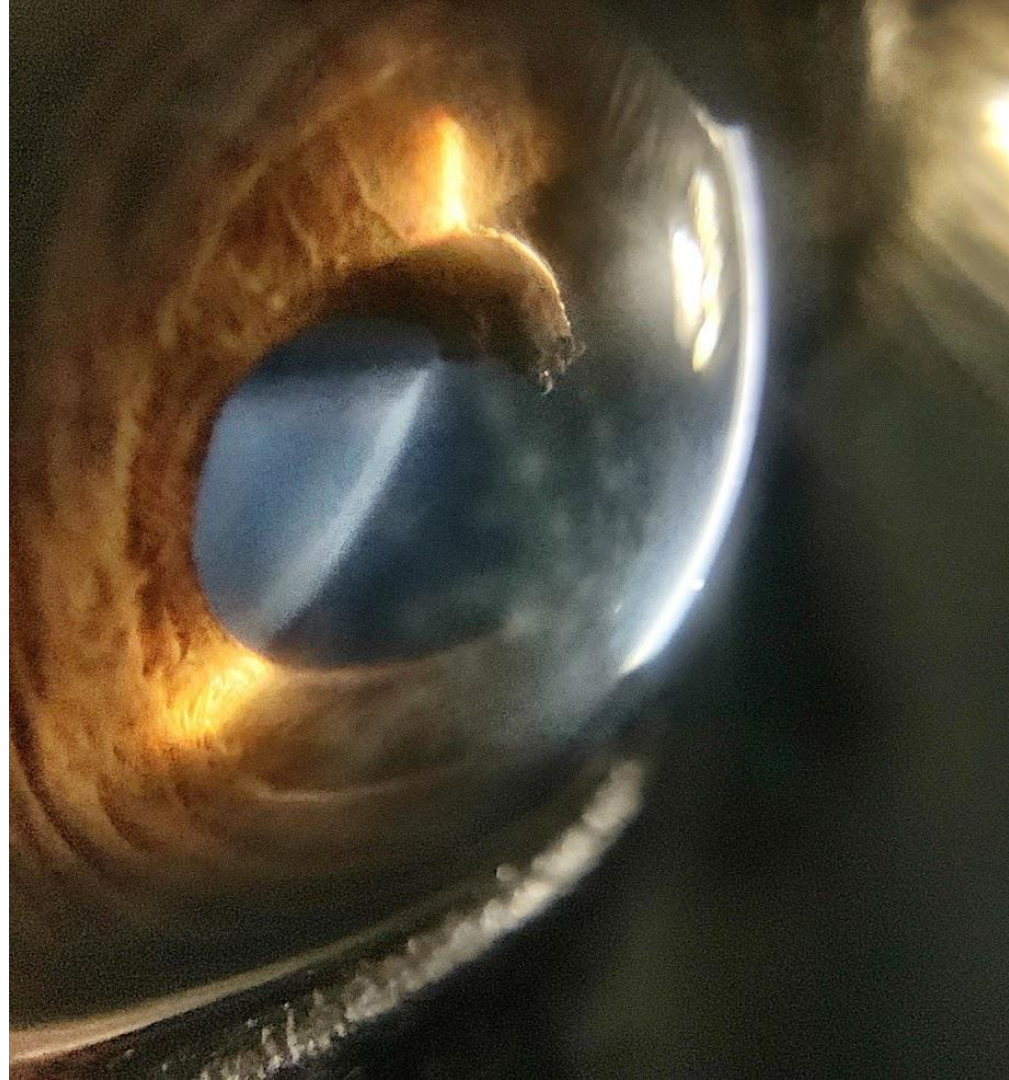
Binocular or monocular slit lamp

Slit beam on ophthalmoscope or pen
torch

Lens-less slit beam adaptor

Post processing can help find hidden
detail

iPhone XS, x10 macro lens Kowa SL17



Digiscoping vs macrophotography

*“Image the slit beam with
macrophotography”*

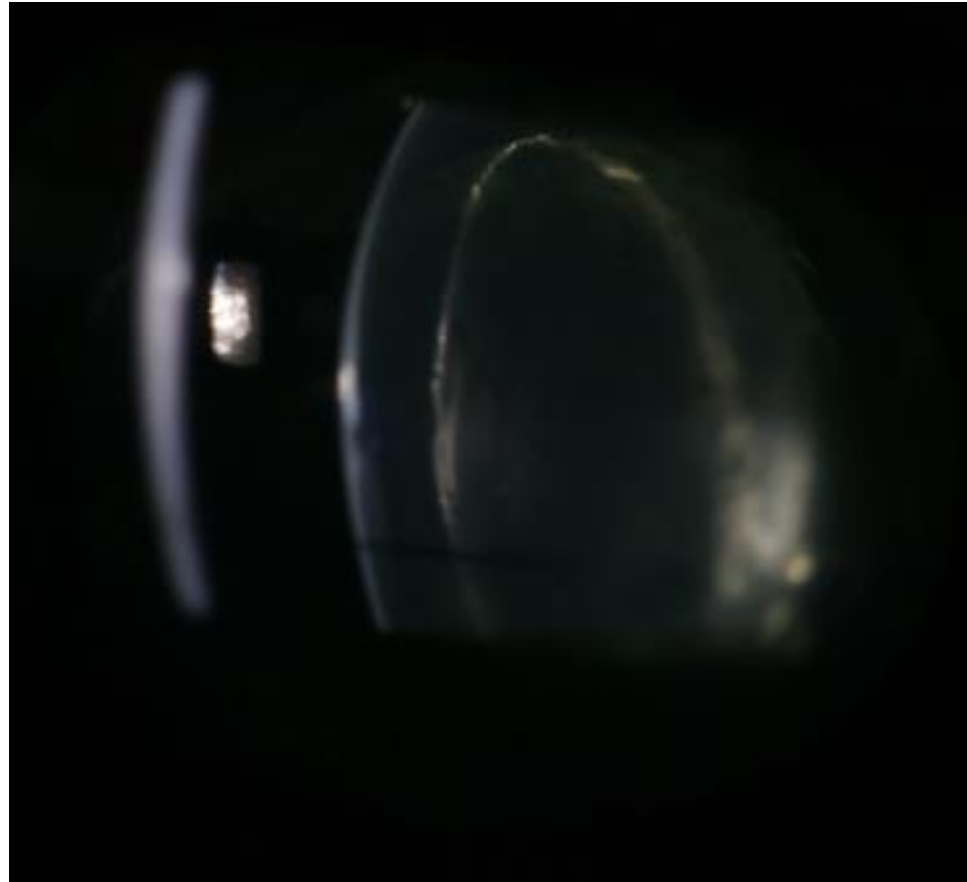
Need two people – usually

Binocular or monocular slit lamp

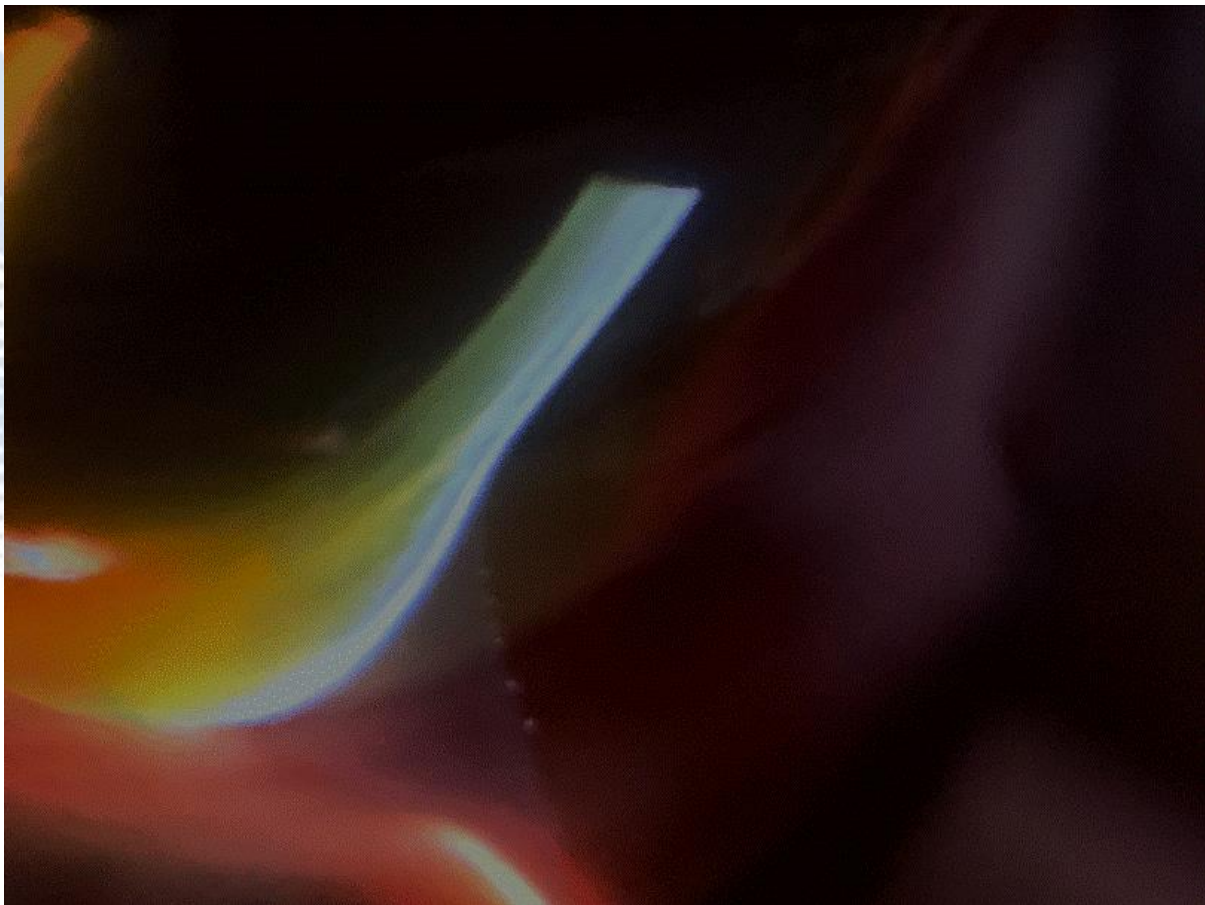
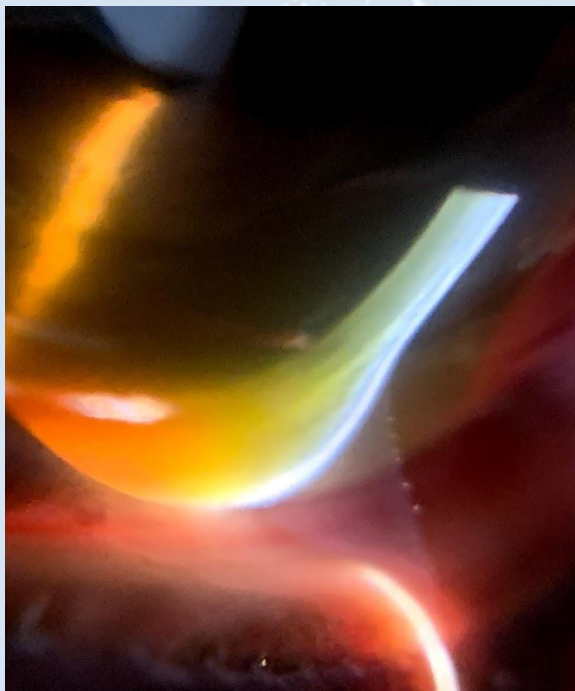
Slit beam on ophthalmoscope or pen
torch

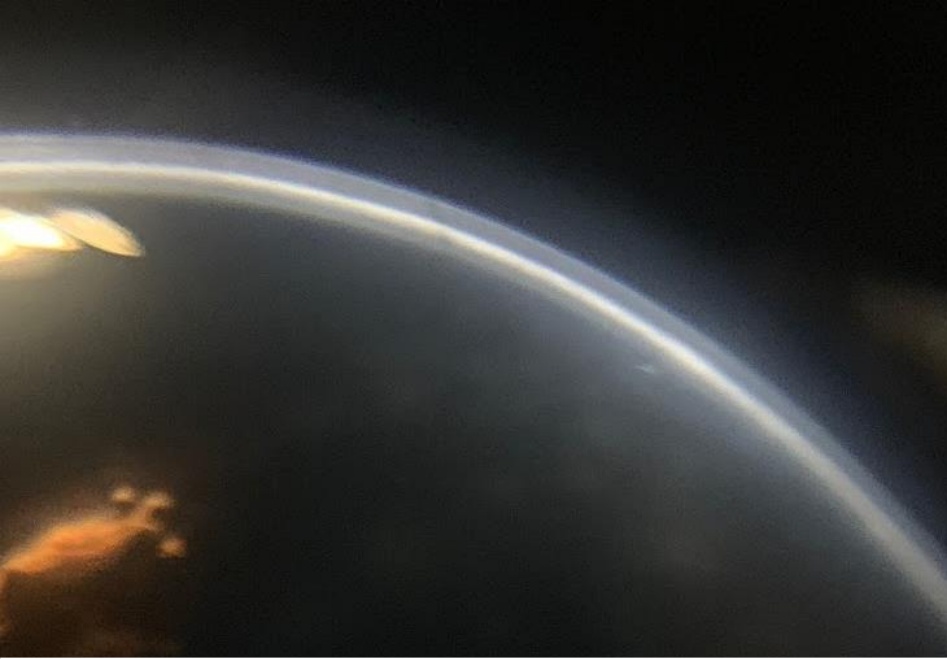
DSLR's are better then smartphones

*Canon 760D, 50 mm f1.8, extension tubes f8 ,ISO 1600,
1/30s, Kowa SL17*



GIFs
Apple iPhone XS Max
f/1.81/334.25mmISO400





Imaging the cornea

Photography as a clinical tool:

Questions

Reflectance

Transparency

Visual axis Significance

Depth

Curvature

Profile

Techniques

“Distant direct” and “close distant direct”

Using a macro lens

Oblique lighting

Retro illumination

Camera angle

Photography as a clinical tool:

Questions

Reflectance

Transparency

Visual axis Significance

Depth

Curvature

Profile

Lesions

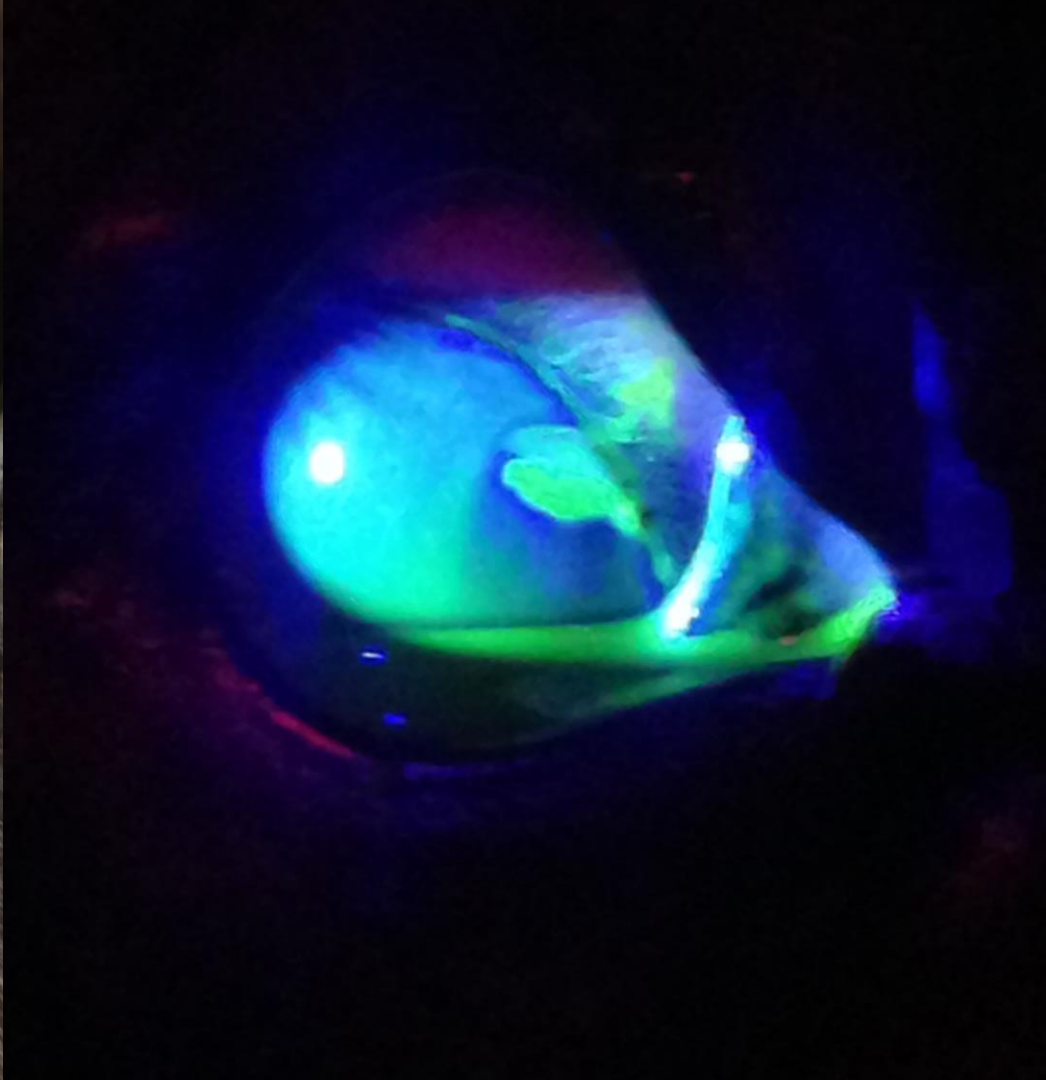
Deep ulcers - it's all about the angles

Stromal infiltration - transparent or opaque?

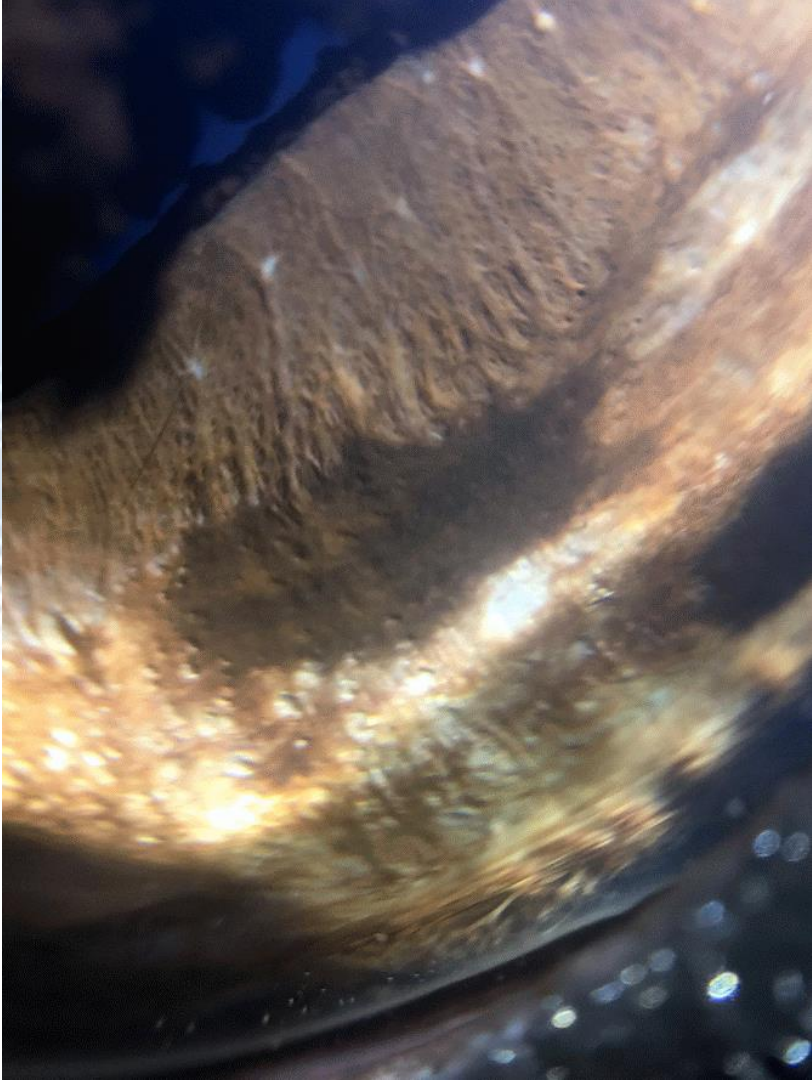
Subtle corneal opacities

Endothelial deposits

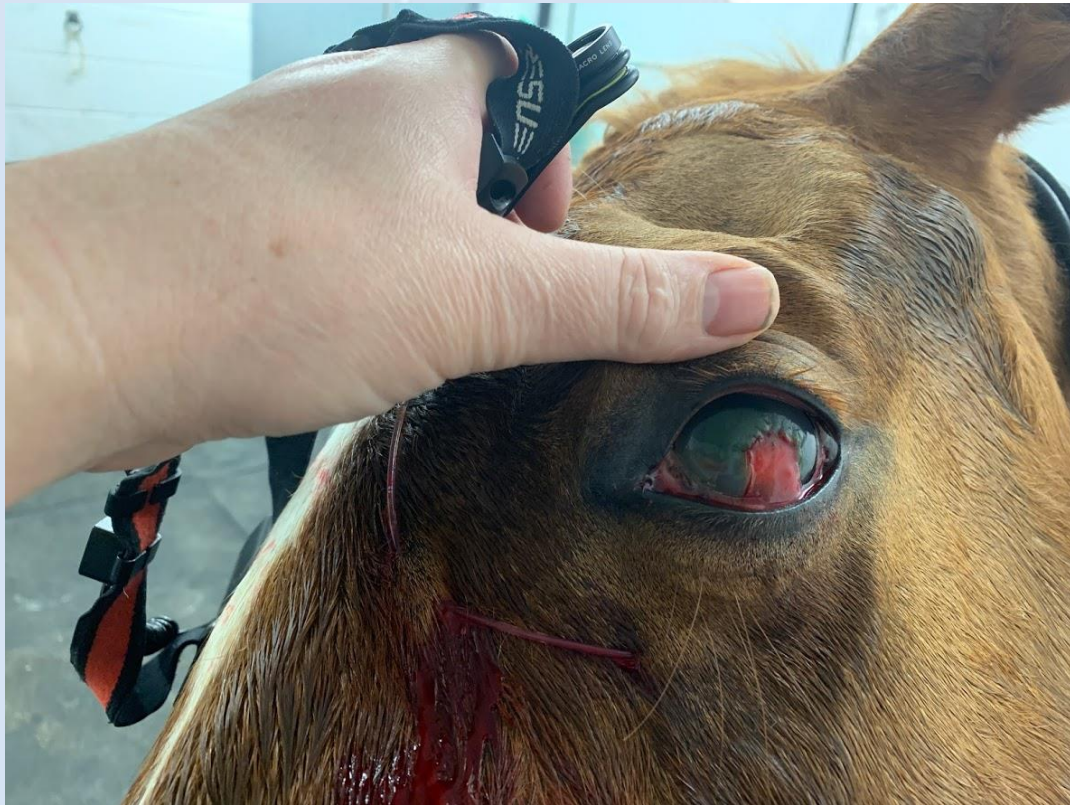
Linear keratopathy lesions and Haab's striae



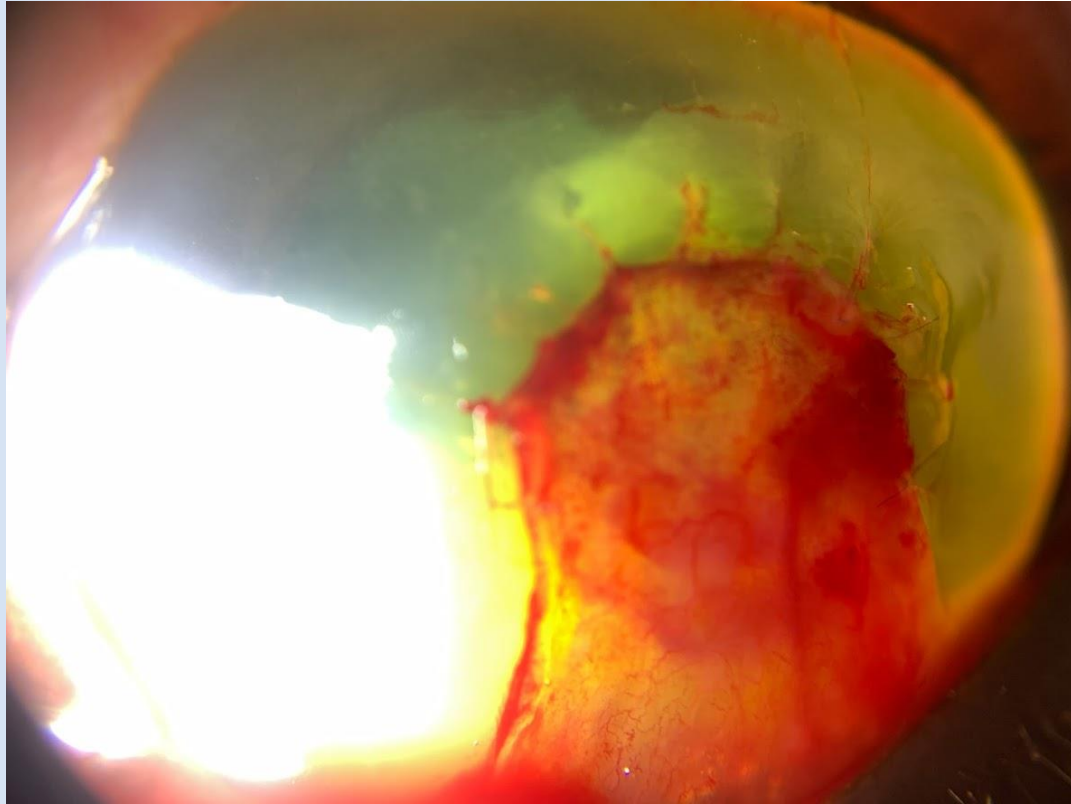


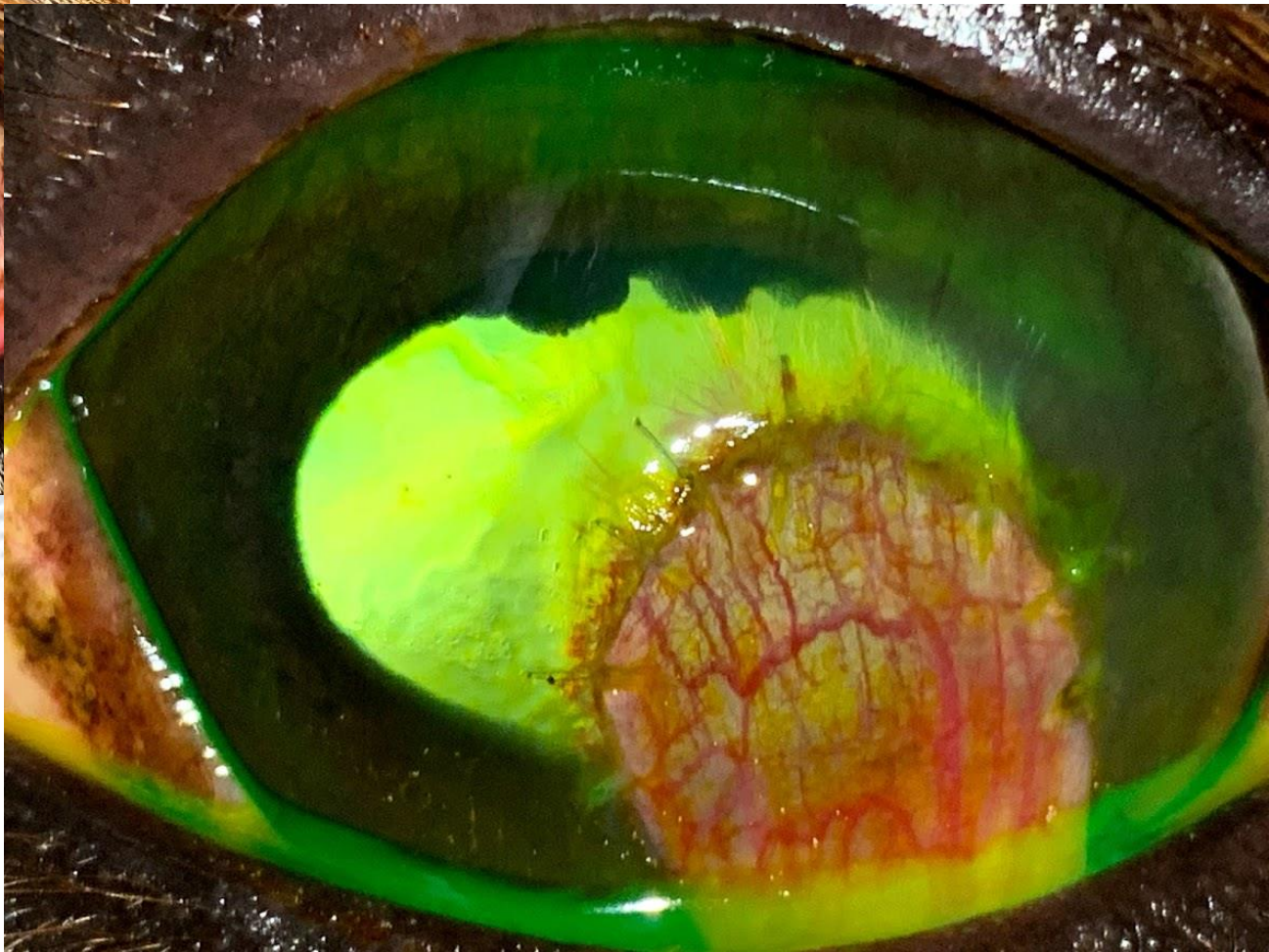
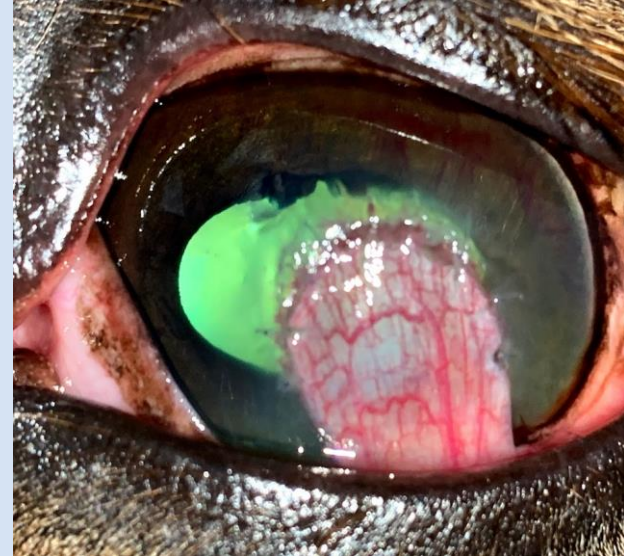


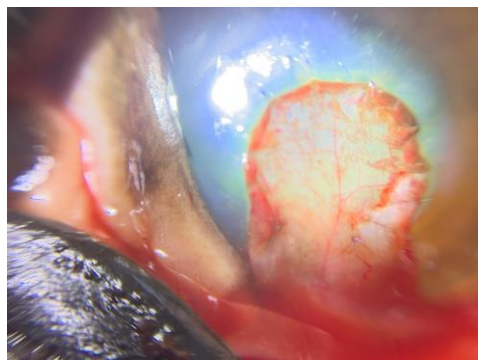
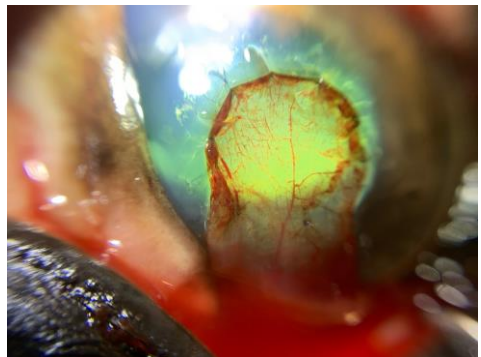
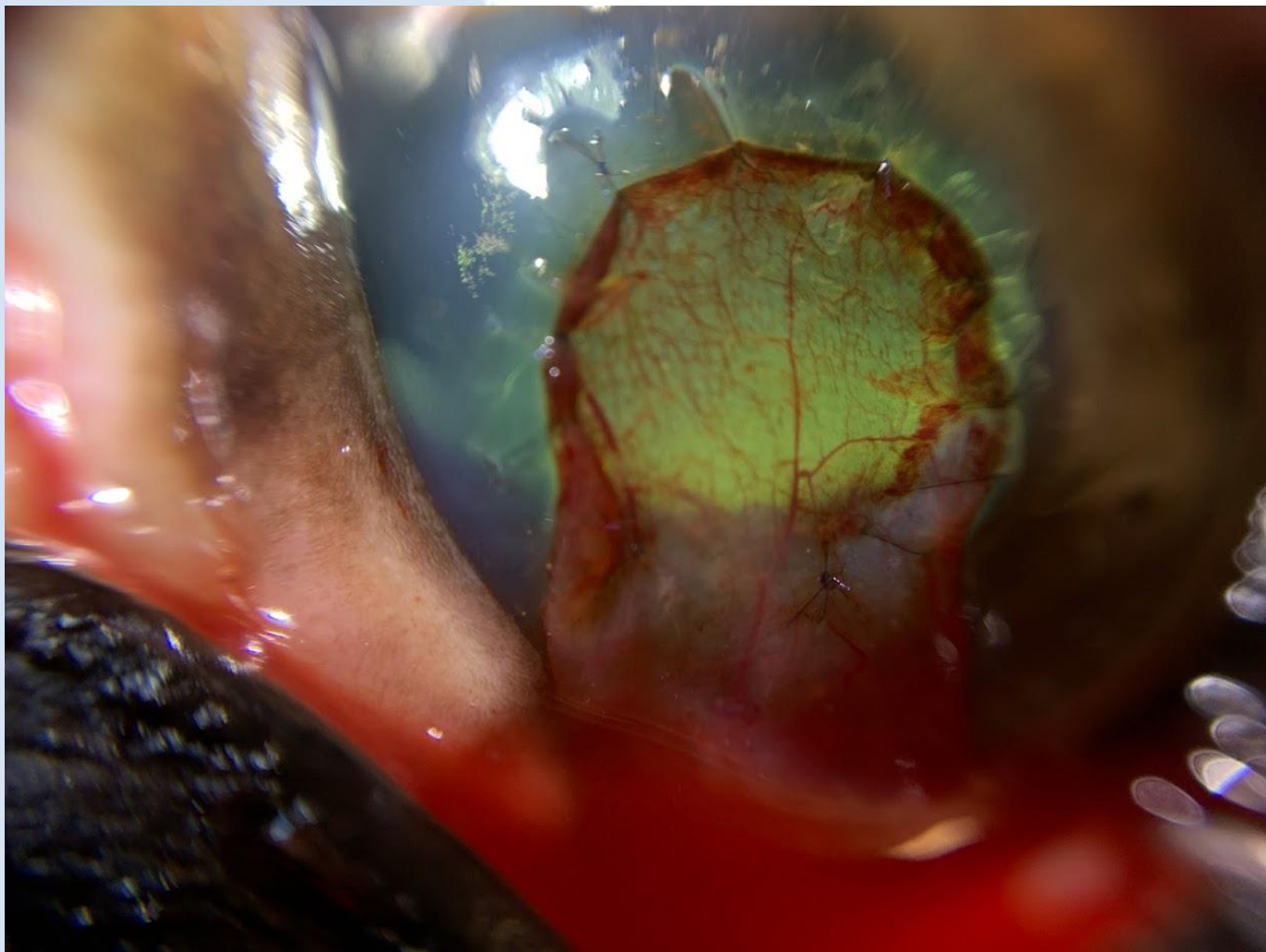
Transparency? Distant direct



Retroillumination





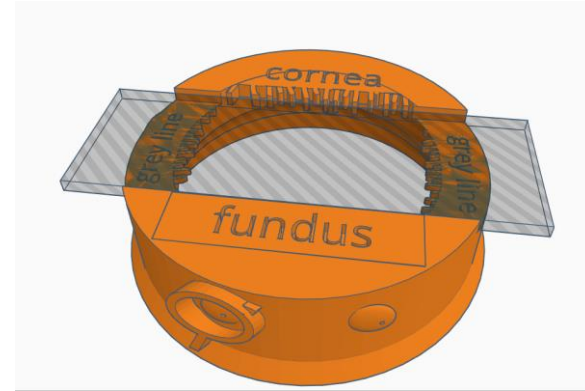




Practical session 2: the cornea

Key skills

- Use DD to identify opacities and focal refractive corneal lesions
- Use Macro lens to obtain magnified view of lesions
- Use direct (oblique broad beam) and indirect (retroillumination and “sclerotic” scatter) lighting techniques to document corneal opacities



Task 1: Use Distant direct to identify & image opacities and refractive errors

Arm's length technique allows both fundic reflexes to be assessed.

Distance = ↓ light intensity = ↓ miosis

Distance = ↓ light intensity = Opacities appear as shadows

Distance = ↓ light intensity = refractive changes visible against a muted fundic reflex

Tip: Use digital zoom to fill the screen



Task 2: Use macro lens to image corneal opacities

Remember to remove the outer (0.67) lens, remove phone case & turn torch mode off.

Position over lens.

Practice supporting hand to allow micro movements for fine focus.

Try with and without additional light

Corneal reflections can sometimes be documented which helps to assess the PCTF



Task 2: Use macro lens to image corneal opacities

Remember to remove the outer (0.67) lens, remove phone case & turn torch mode off.

Position over lens.

Practice supporting hand to allow micro movements for fine focus.

Try with and without additional light

Corneal reflections can sometimes be documented which helps to assess the PCTF



Task 2: Use macro lens to image corneal opacities

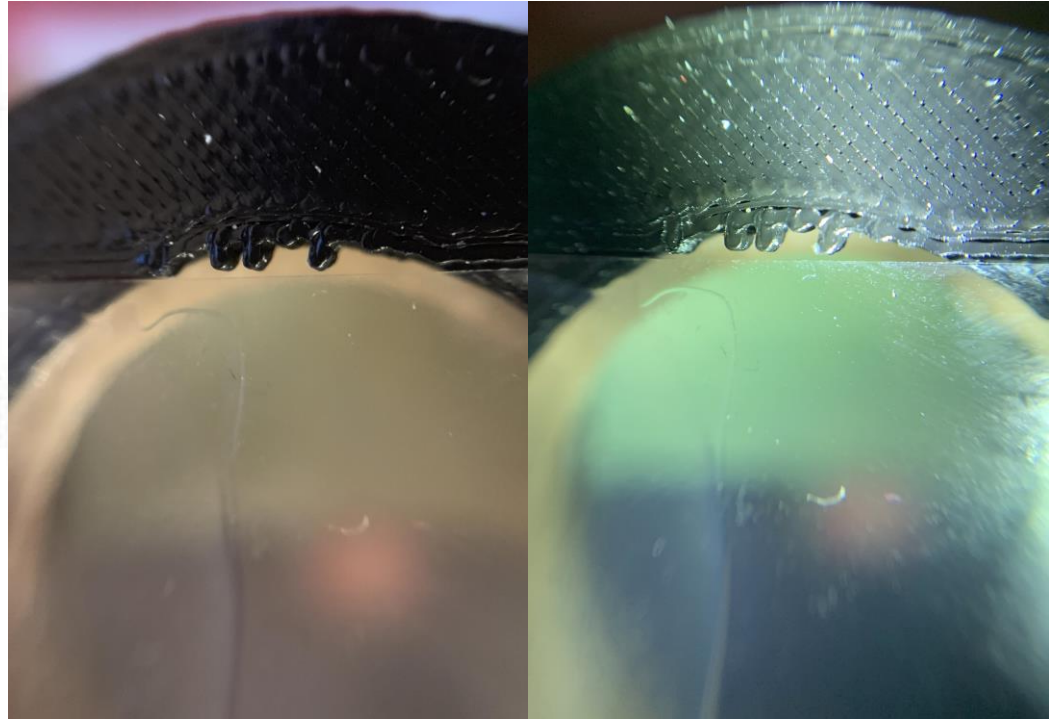
Remember to remove the outer (0.67) lens, remove phone case & turn torch mode off.

Position over lens.

Practice supporting hand to allow micro movements for fine focus.

Try with and without additional light

Corneal reflections can sometimes be documented which helps to assess the PCTF



Task 2: Use macro lens to image corneal opacities

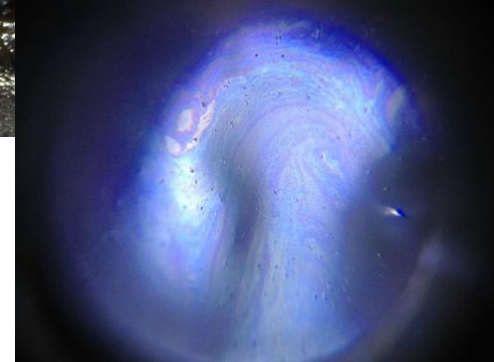
Remember to remove the outer (0.67) lens, remove phone case & turn torch mode off.

Position over lens.

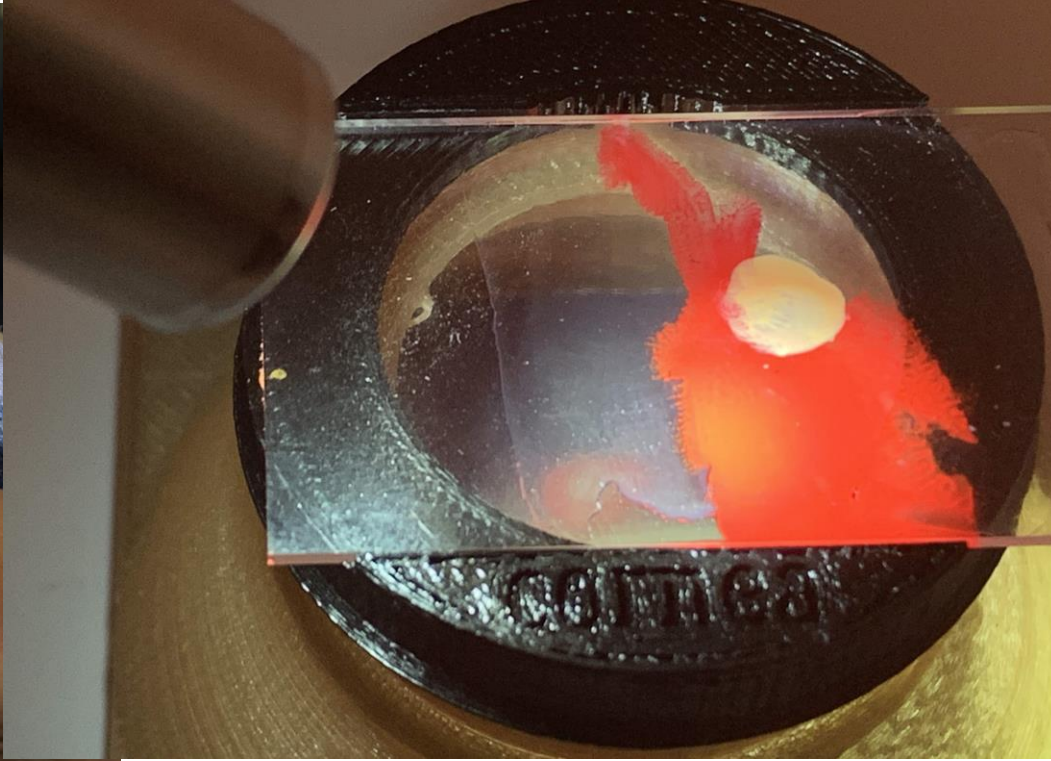
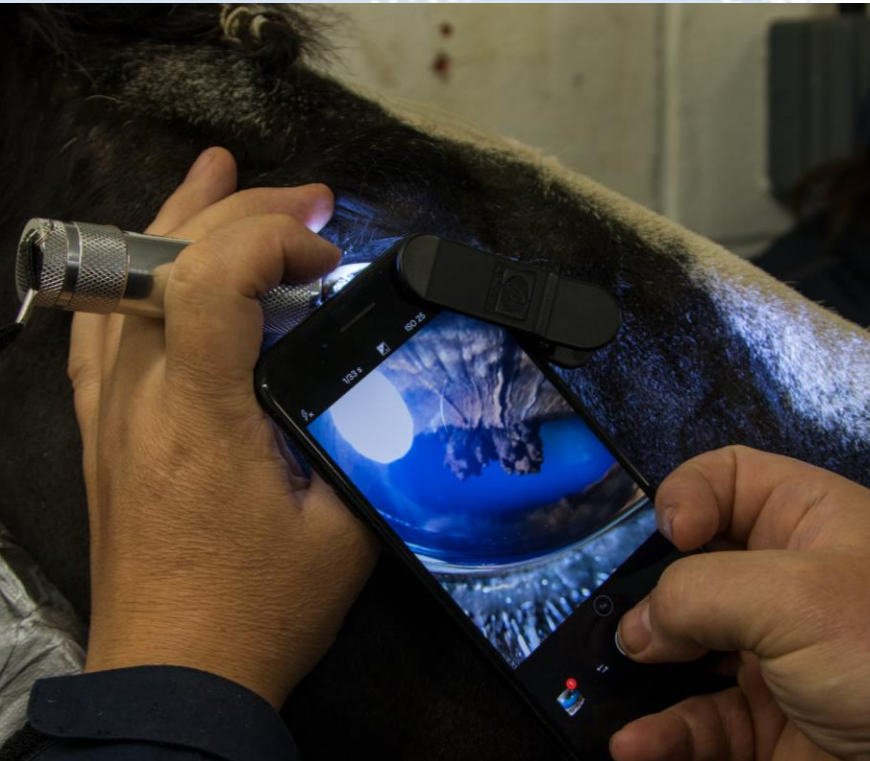
Practice supporting hand to allow micro movements for fine focus.

Try with and without additional light

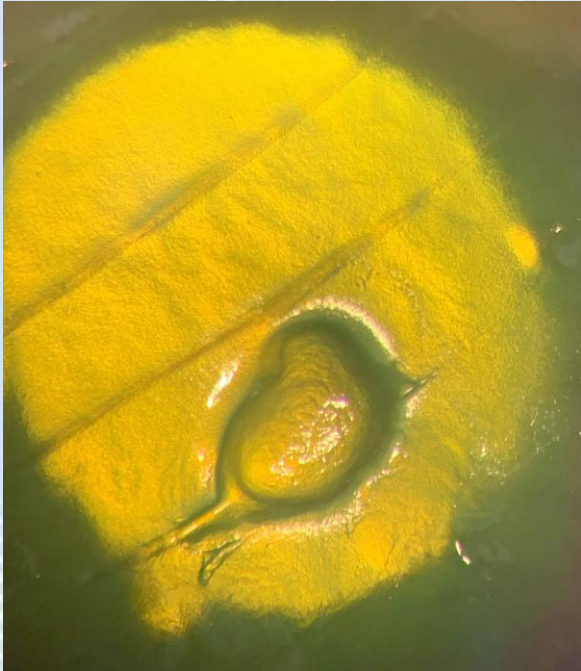
Corneal reflections can sometimes be documented which helps to assess the PCTF



Task 3: Use oblique lighting to image the corneal lesions: practice on your model.



Task 4: Use retroillumination to image corneal lesions

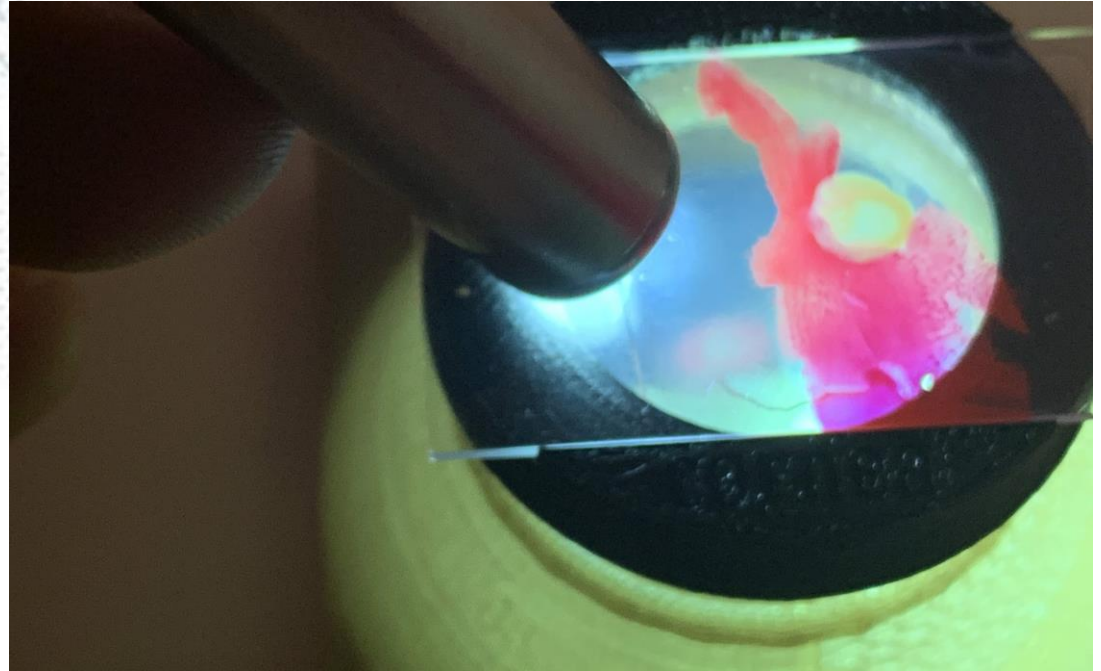
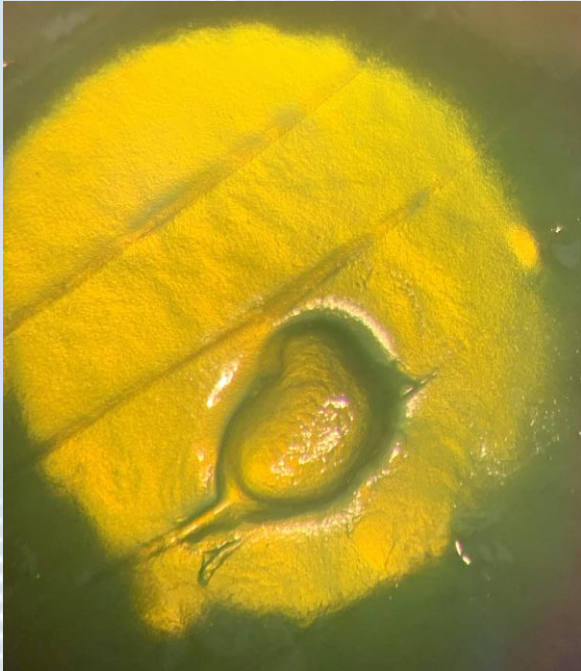


iPhone XS Max- operating microscope eye piece image



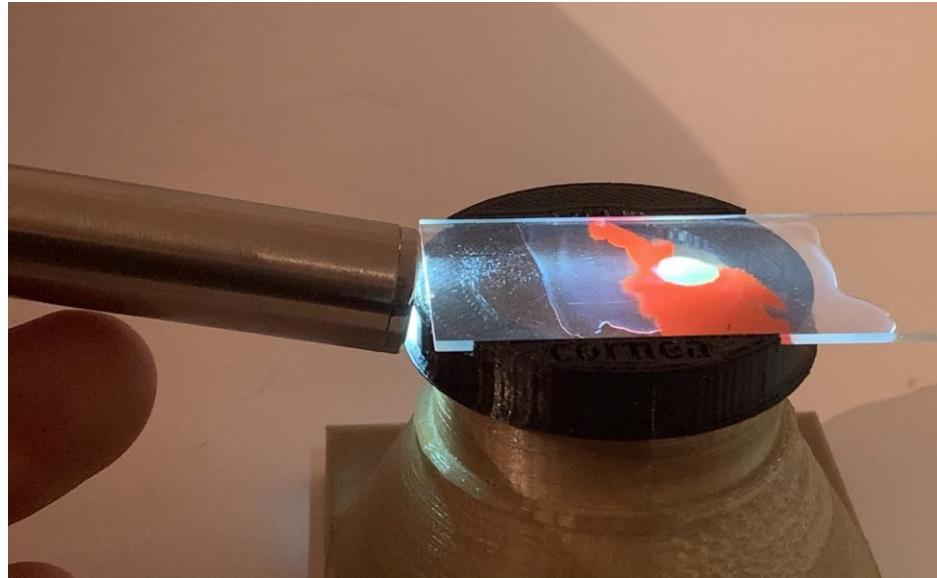
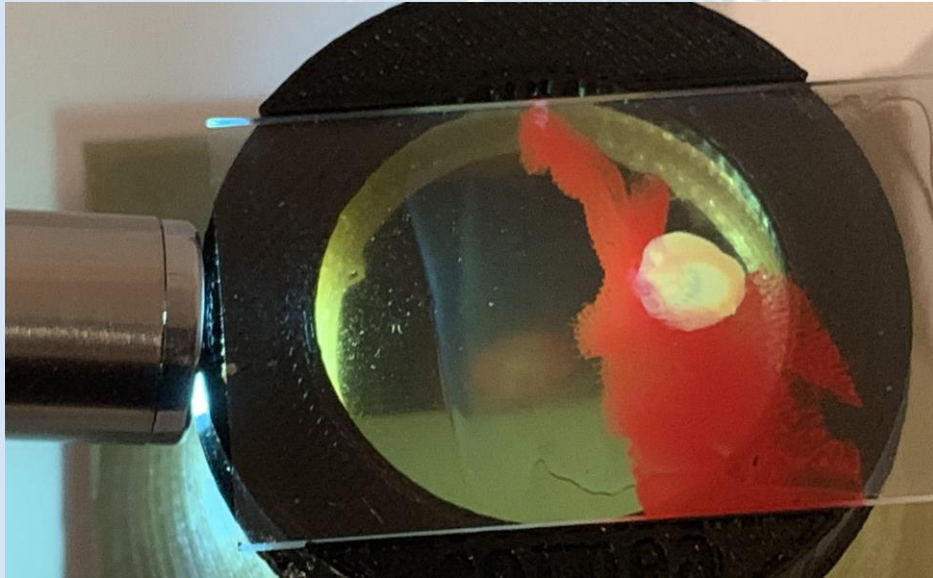
iPhone 7plus and 12x macro lens

Task 4: Use retroillumination to image corneal lesions



iPhone XS Max- operating microscope eye piece image

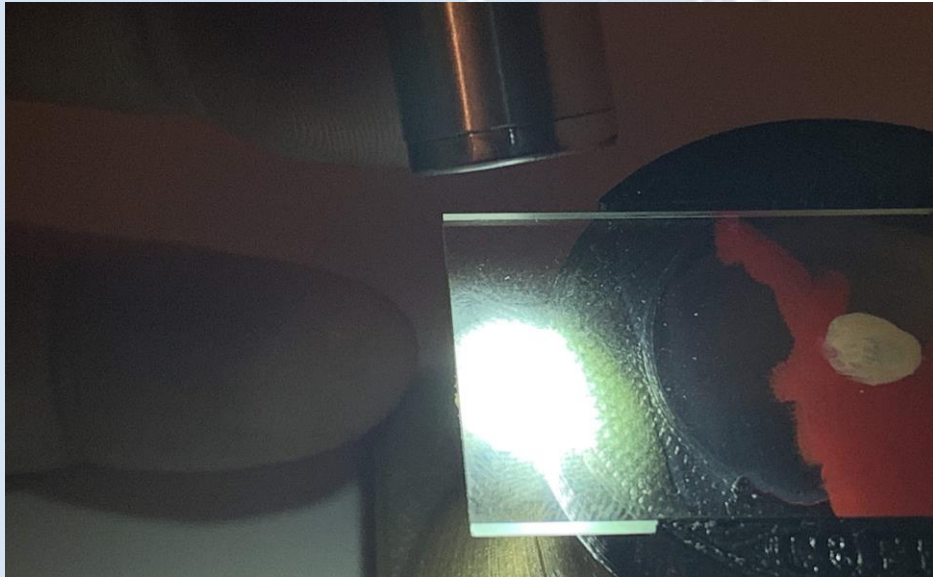
Task 5: Simulate “sclerotic scatter like” technique to illuminate and image corneal lesions.



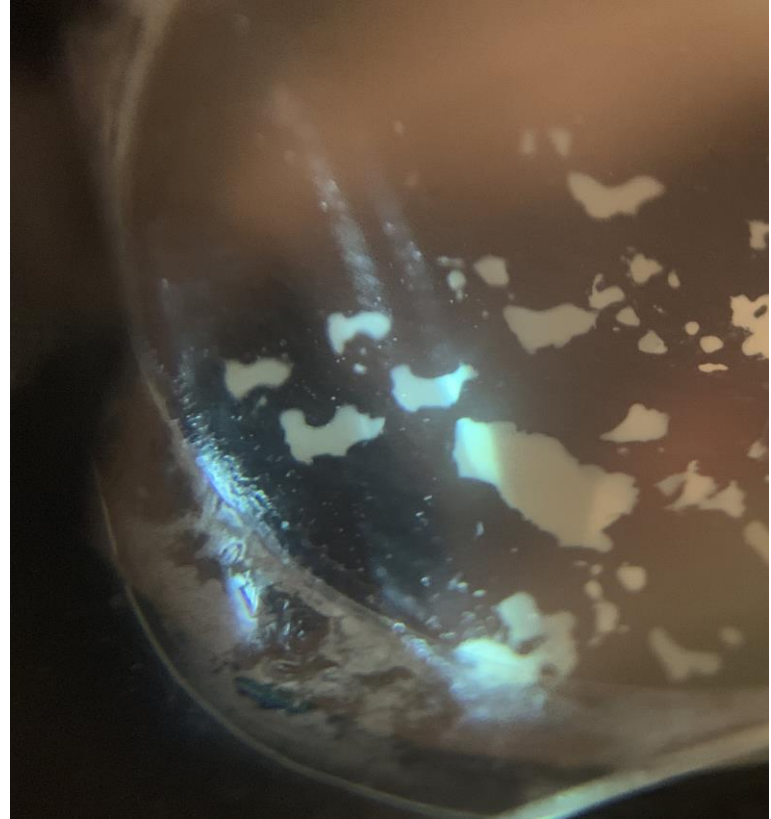
Task 5: Simulate “sclerotic scatter like” technique to illuminate and image corneal lesions.



Task 5: Simulate “sclerotic scatter like” technique to illuminate and image corneal lesions.



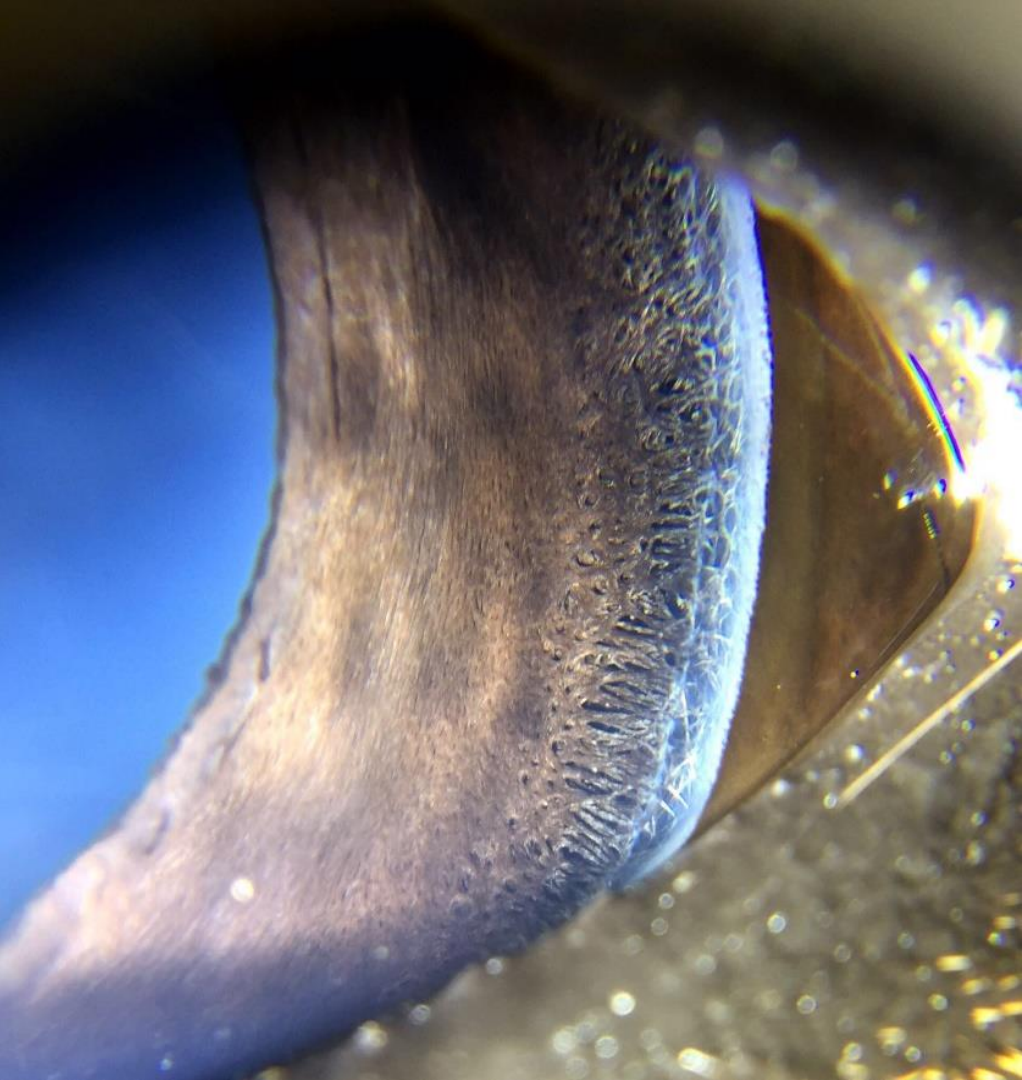
Try the slit beam with the macro lens

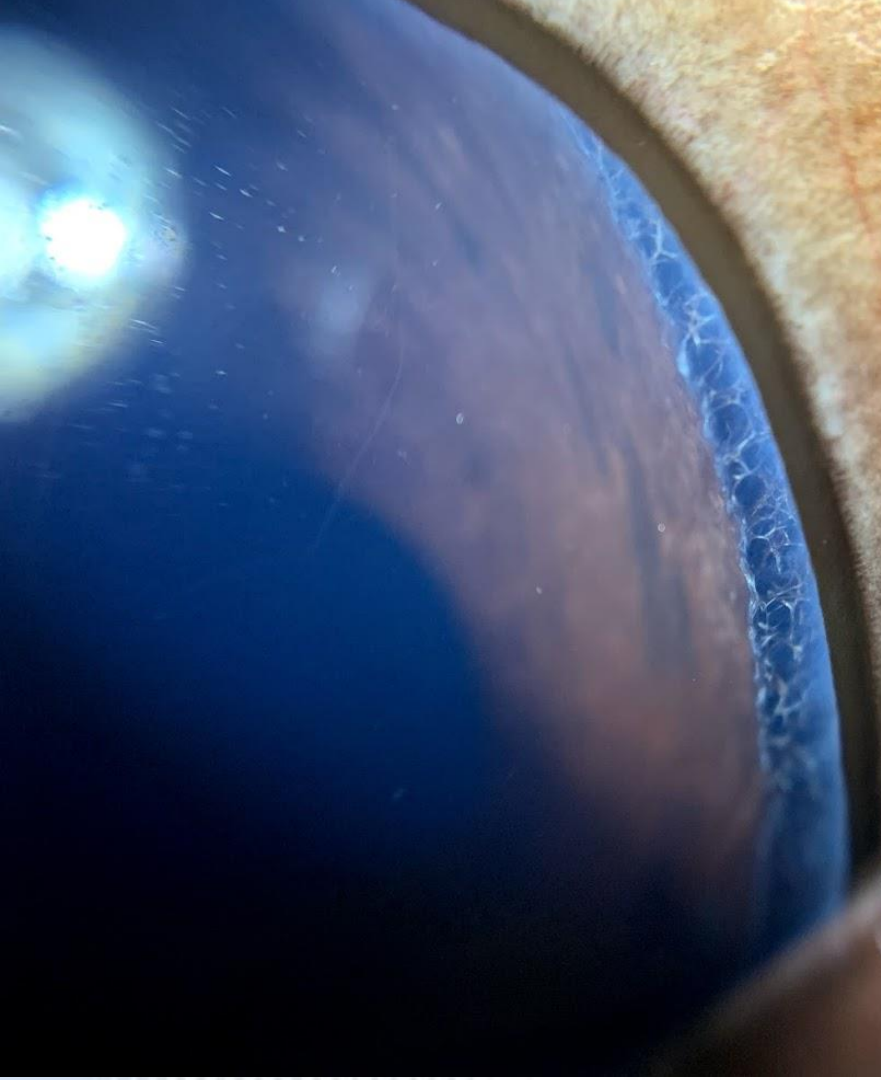


Imaging the
drainage angle





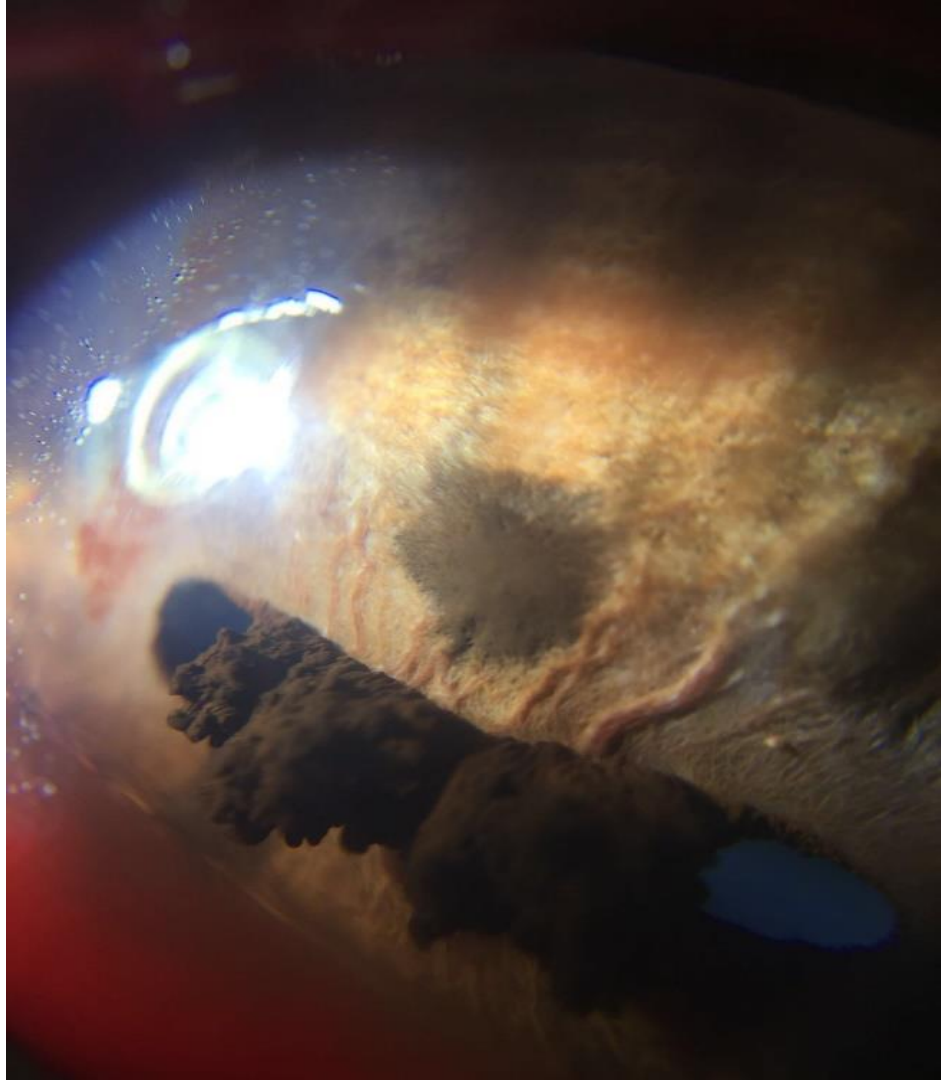
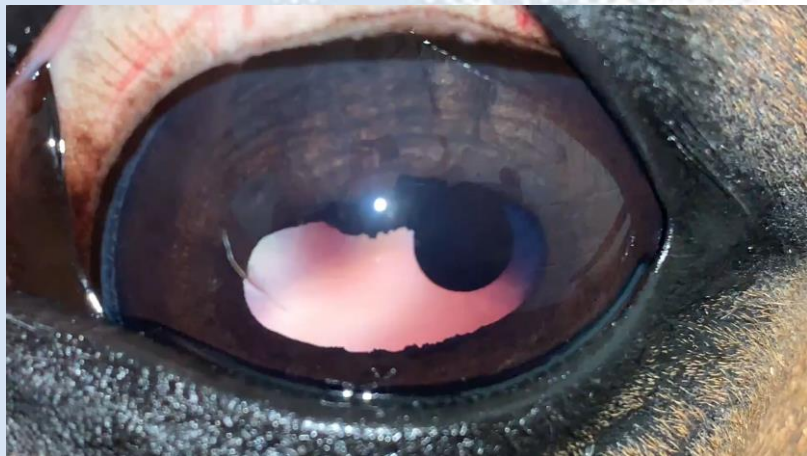


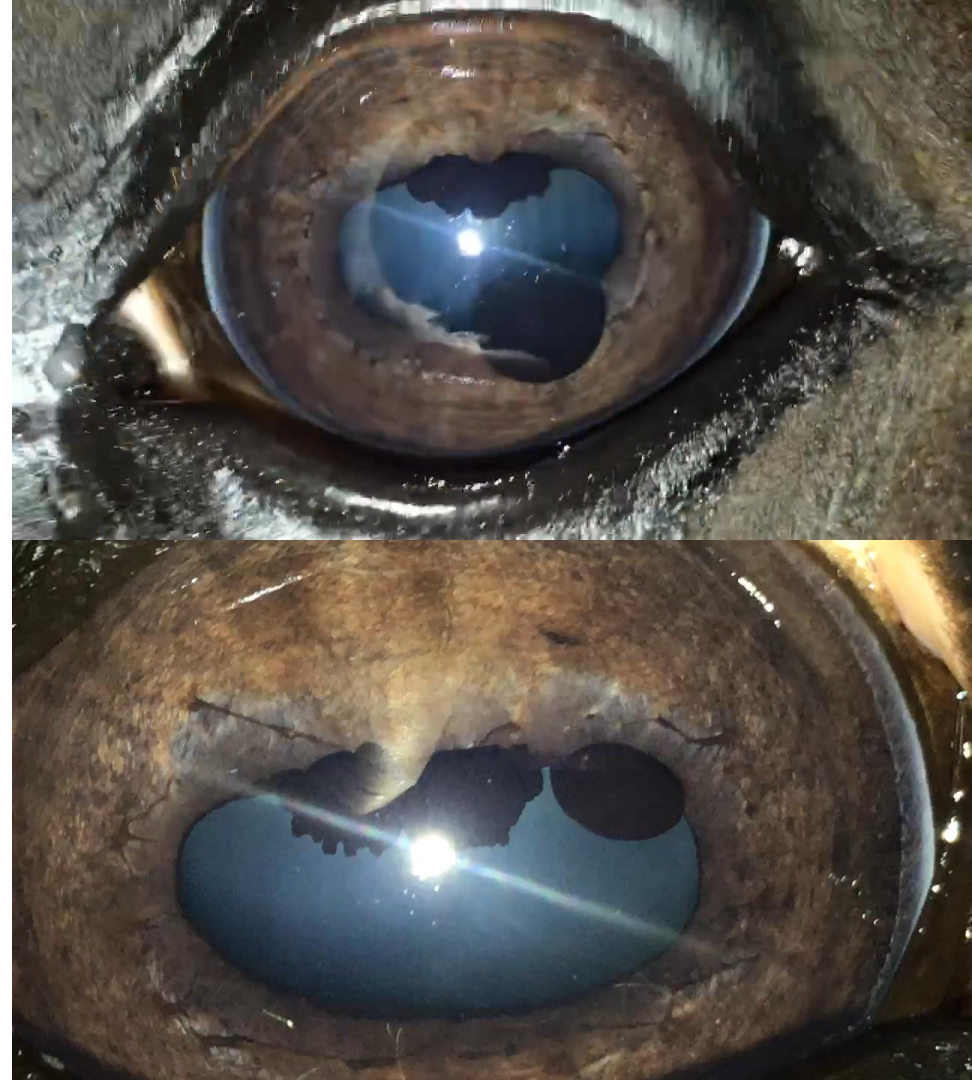


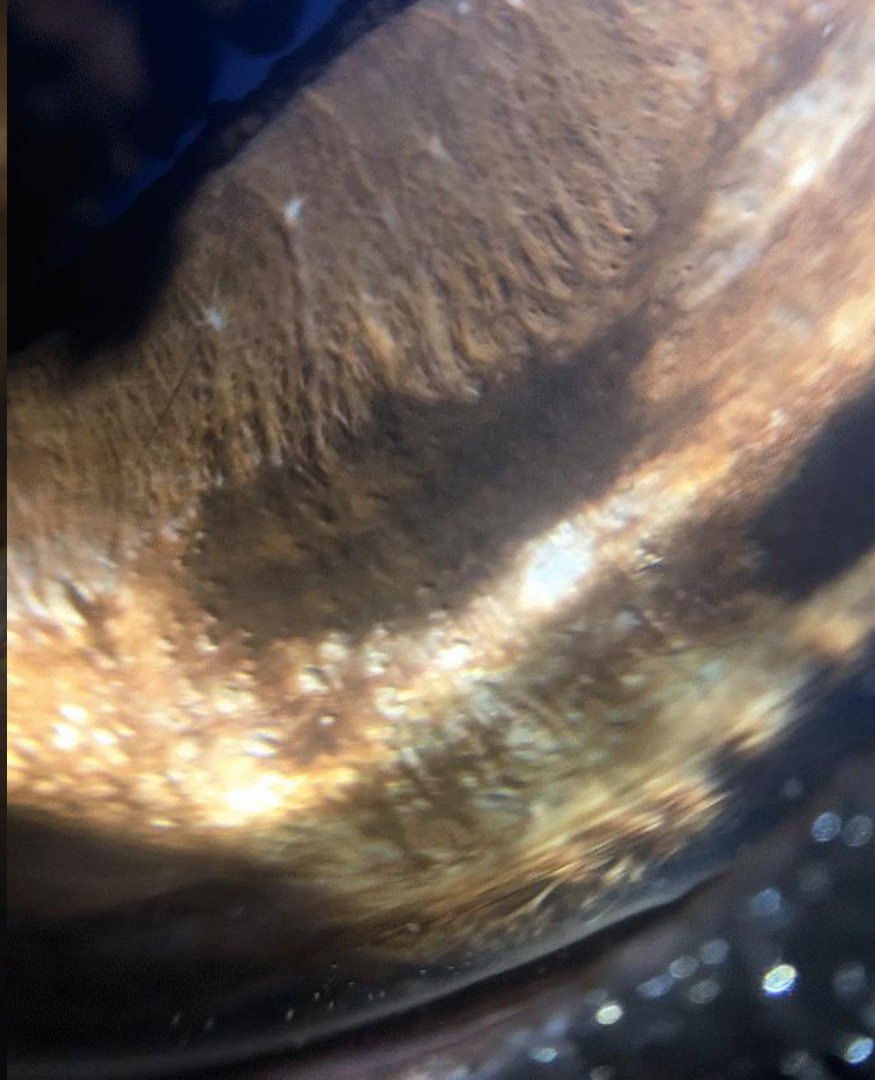
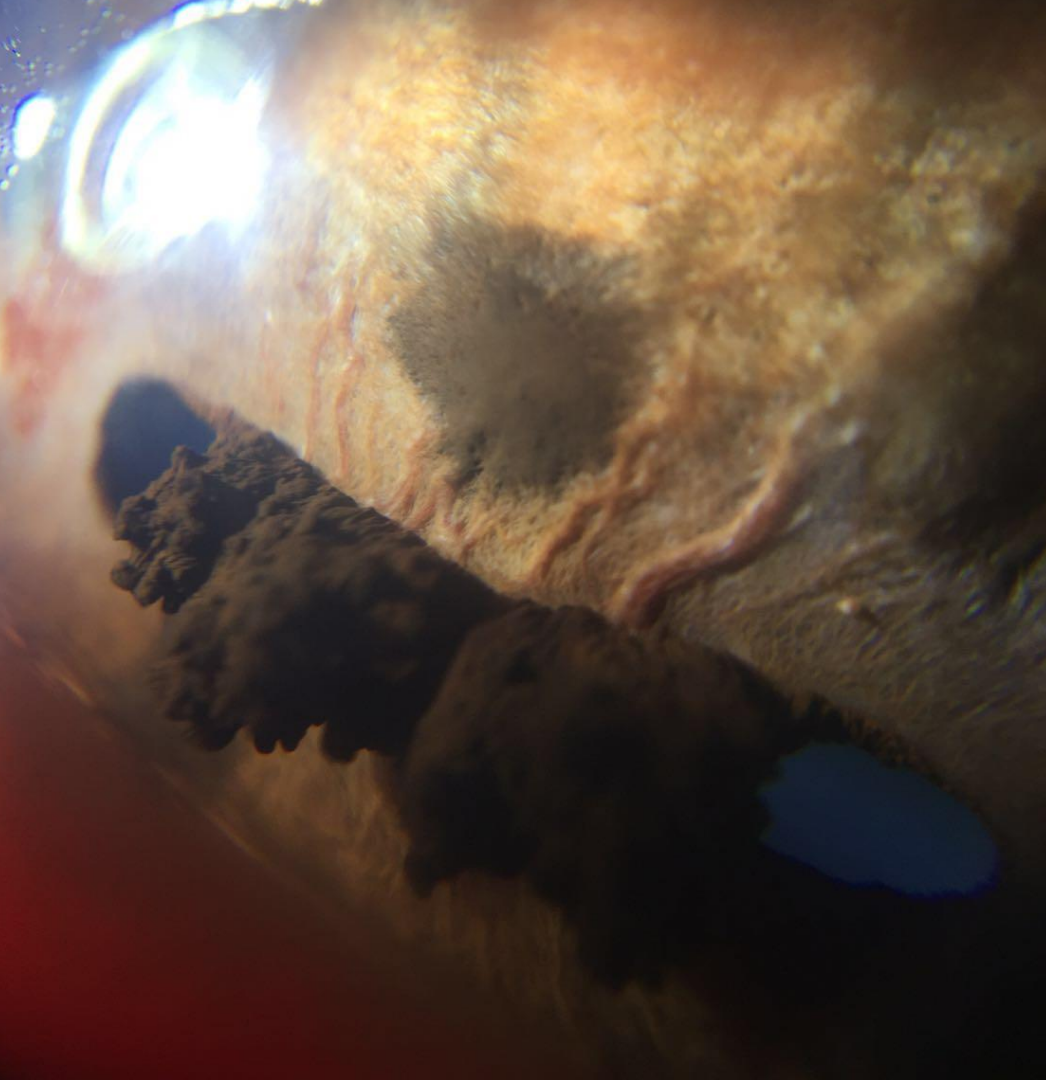
A close-up photograph of a human eye. The iris is a vibrant blue color, and the sclera is white. The pupil is visible in the center. The image is slightly out of focus, with a soft, blurred background. The text "Imaging the iris" is overlaid in the center in a white, sans-serif font.

Imaging the iris

Close vs macro









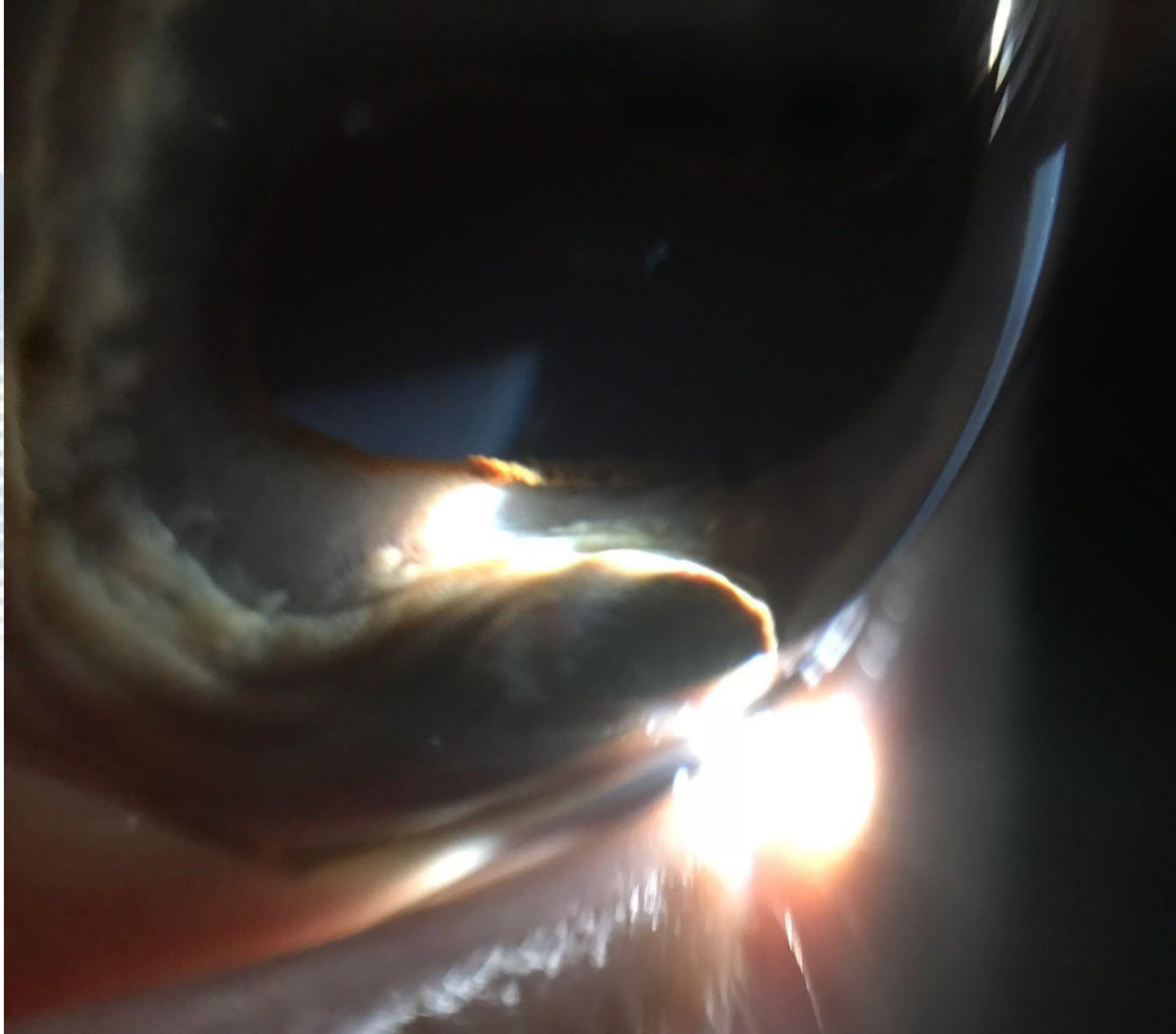
Saffire's story

- iPhone 7plus
- Digital zoom



Saffire's story

- iPhone 7plus, digital zoom, Kowa SL17



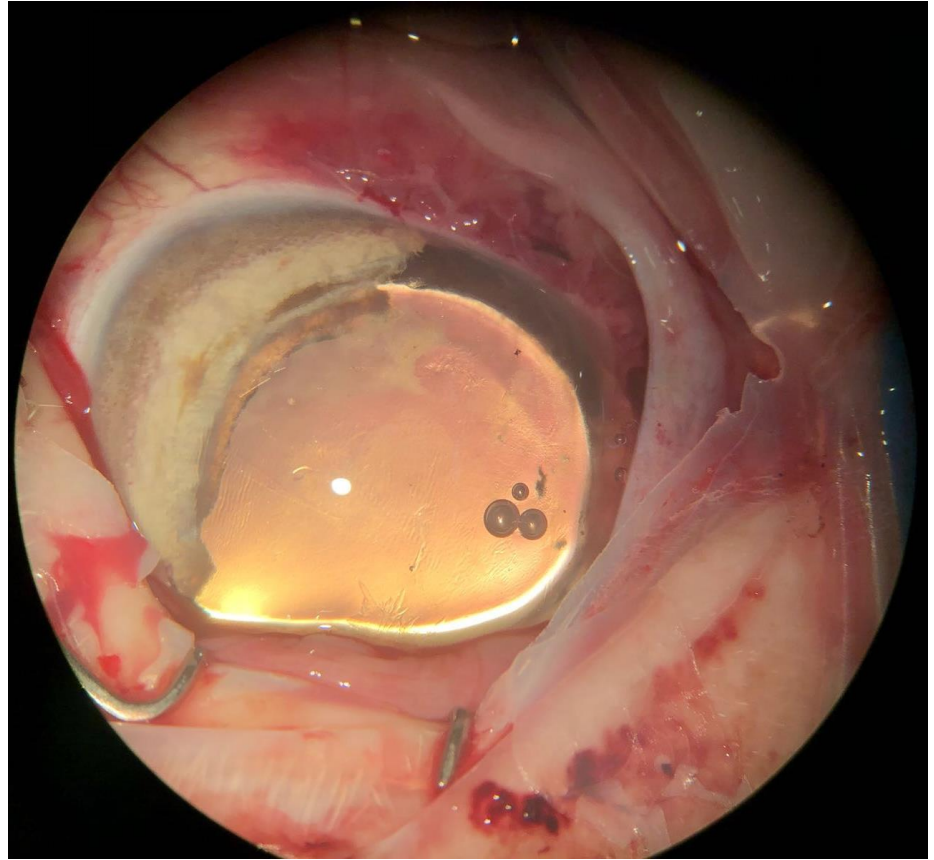
Saffire's story

- Oblique lighting
- Macro x10 iPhone 7 Plus



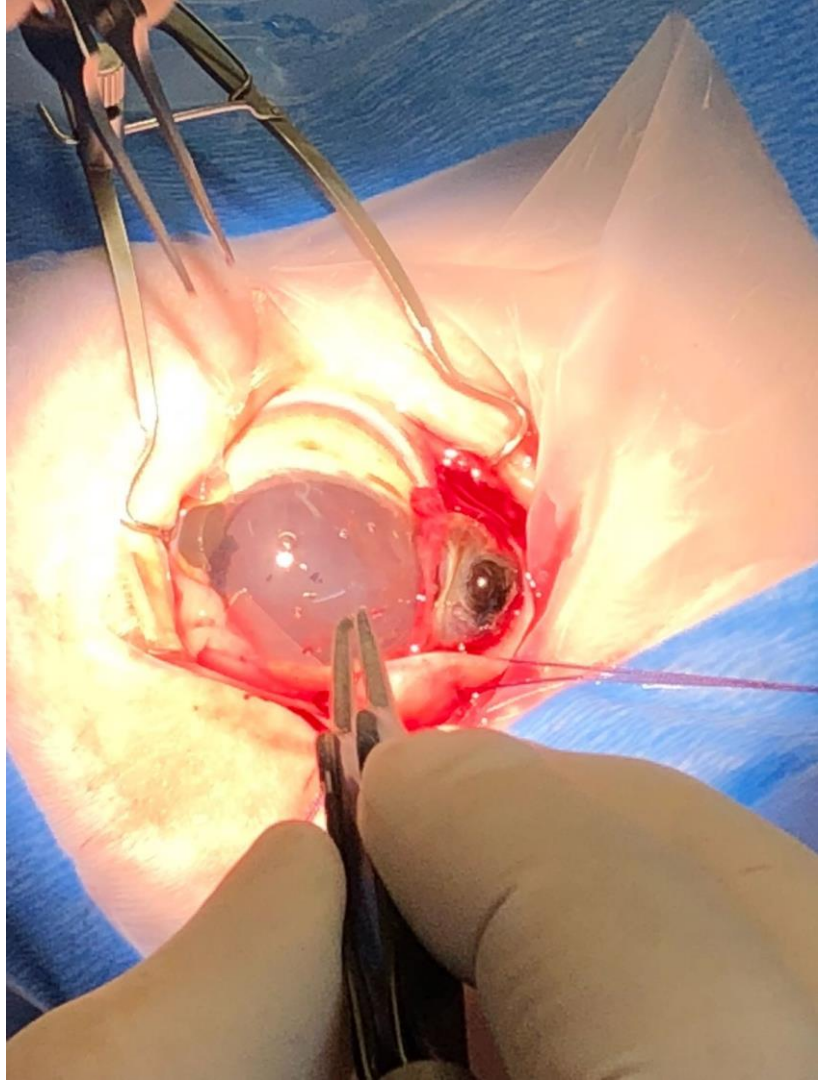
Saffire's story

- iPhone 7plus
- Operating microscope view



Saffire's story

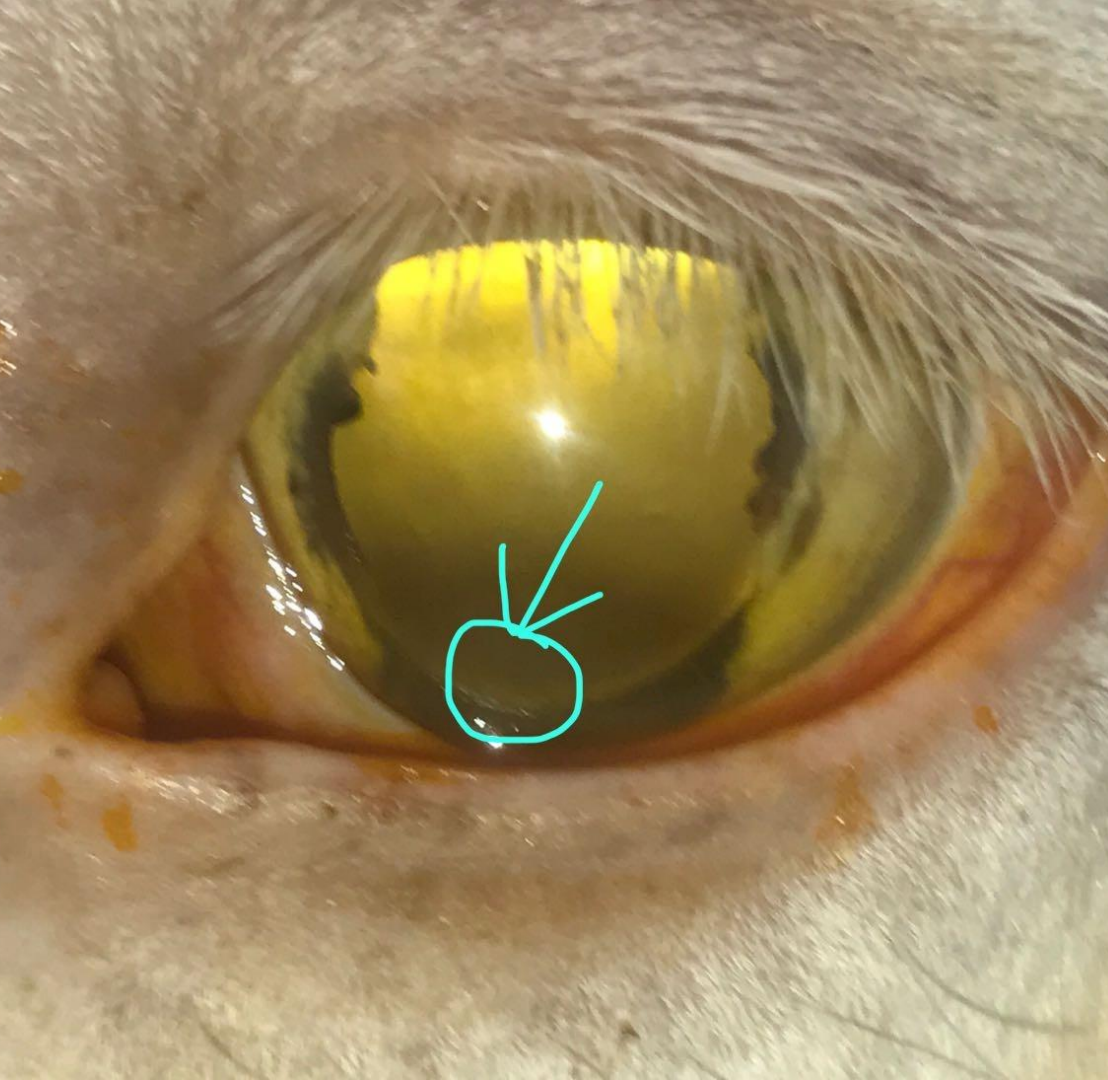
- iPhoneSE
- Digital zoom



Saffire's story

- iPhone 7plus
- Distant direct view, torch mode, digital zoom





Team saffire
James, Jemma, Lyn, You

← saffire ×

CHATS

Team saffire 1/6/2019
Jemma: She's been a very good girl thank you Tim an...

MESSAGES

James Rushton New Iphone 12/11/2018
saffire looking amazing, quite an accomplishment, congrats, w...

Hooman 12/11/2018
✔ Saffires most recent picture - off all meds' and back to work

Eye vets 2018 12/11/2018
✔ This is Saffire the double iridectomy from a few weeks ...

Team saffire 11/18/2018
✔ Saffire doing so well will help other horses as it will give us...

Team saffire 11/18/2018
✔ Nelson thinks the fibrin all gone after the clot busting injec...

Team saffire 11/17/2018
✔ Saffire doing amazingly well !!! Small blood clot and some...

Team saffire 11/16/2018
✔ Generally pleased with saffire when checked late last ni...

Team saffire 11/14/2018
✔ Really pleased with saffire - there's a little bit fibrin in t...

Team saffire 11/13/2018
✔ All done - op went well and most import of all saffire f...

Team saffire 11/13/2018



Lyn Brocklehurst



Lyn Brocklehurst



Hi Tim these are the photos Jaqui took on Friday. Hope they are ok?

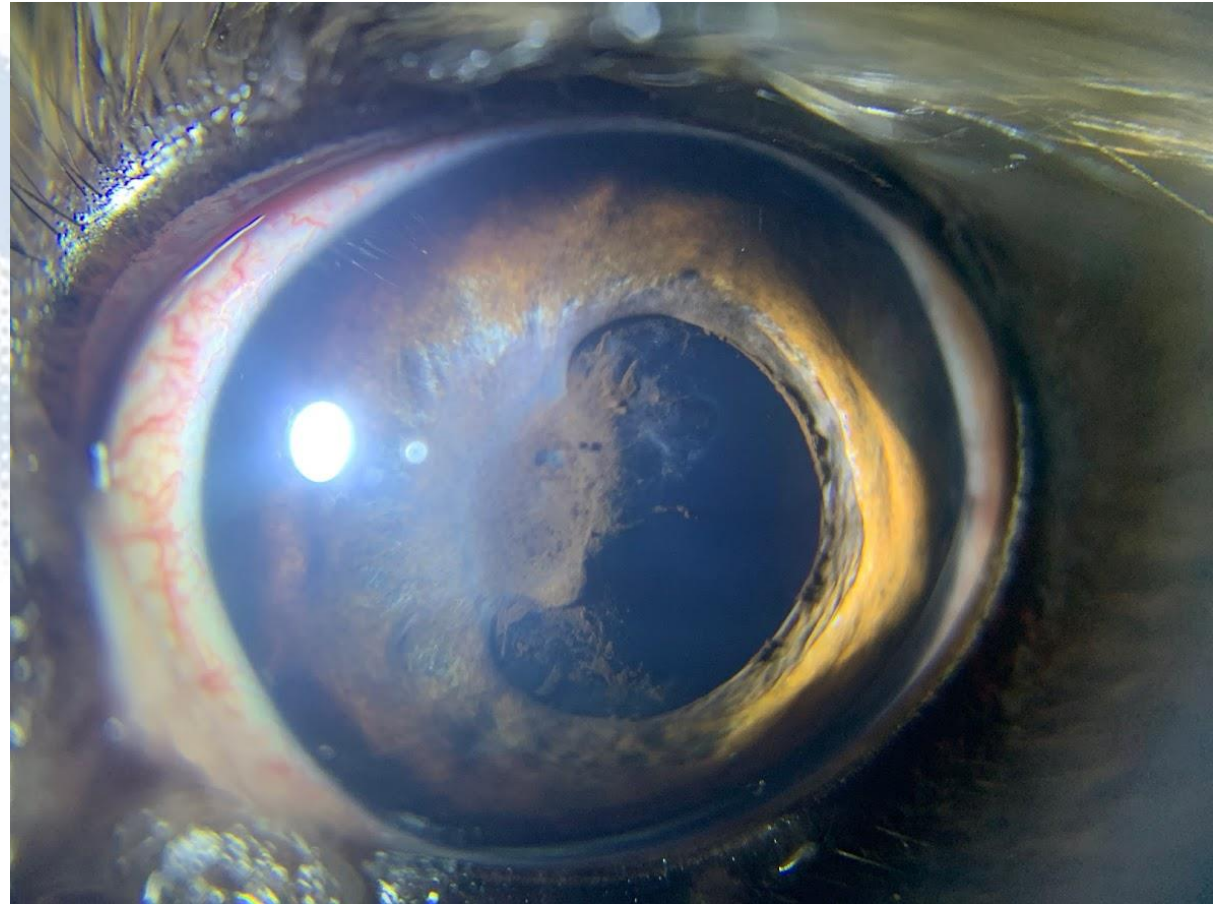
Type a message

←

MEDIA DOCS LINKS

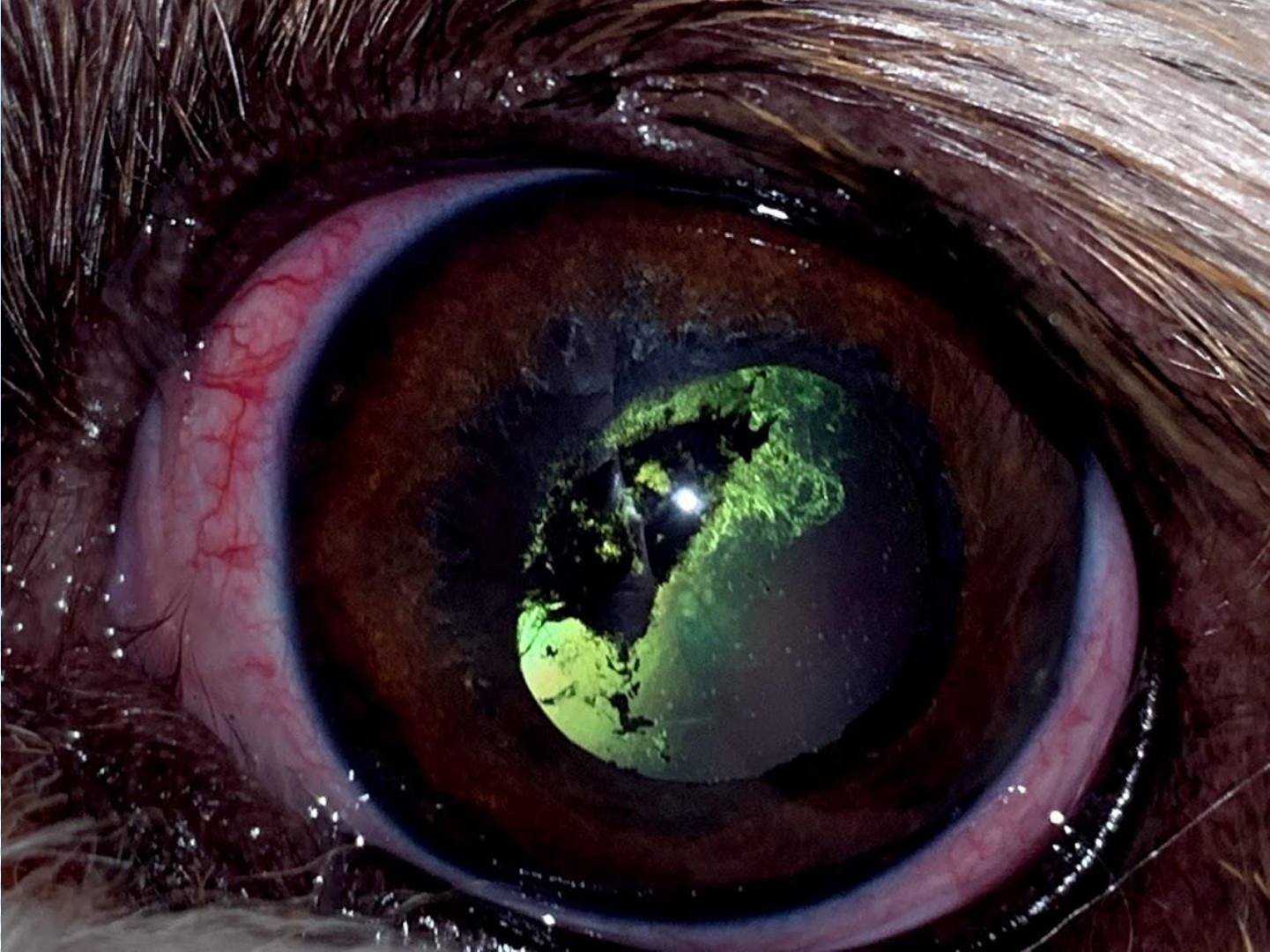


Imaging the lens

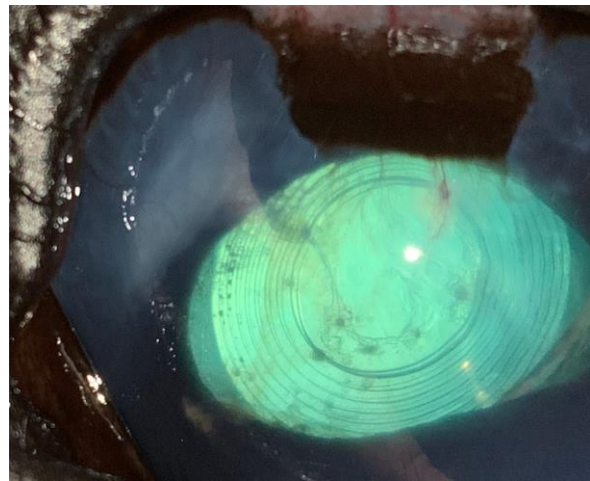




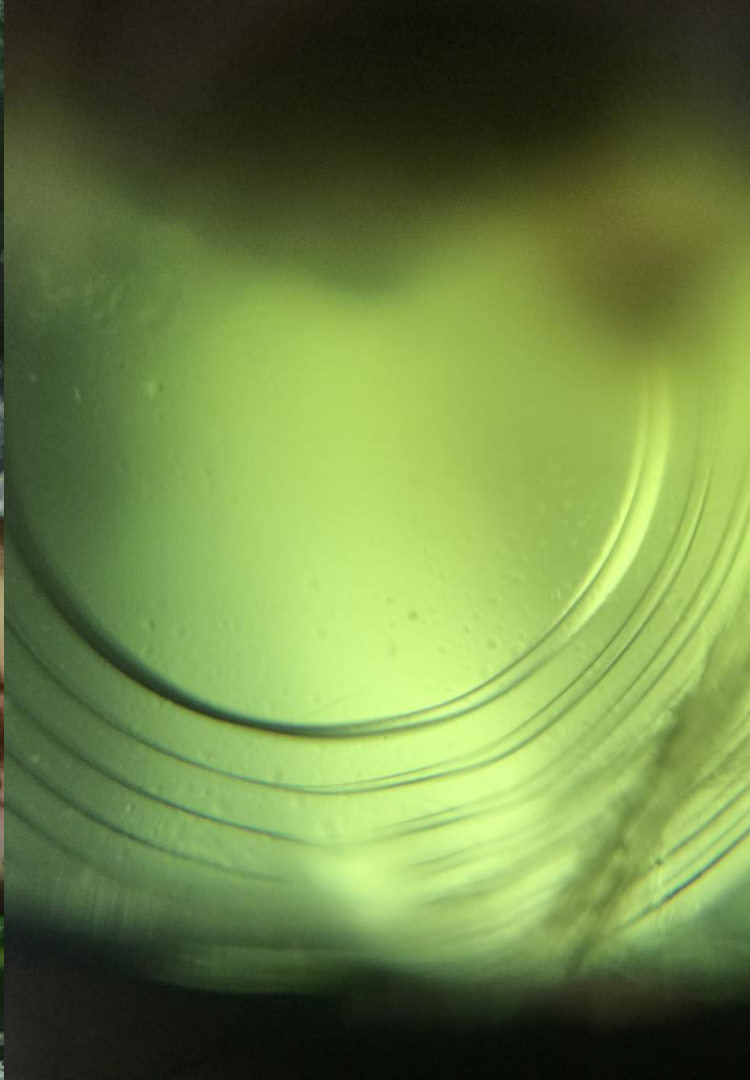
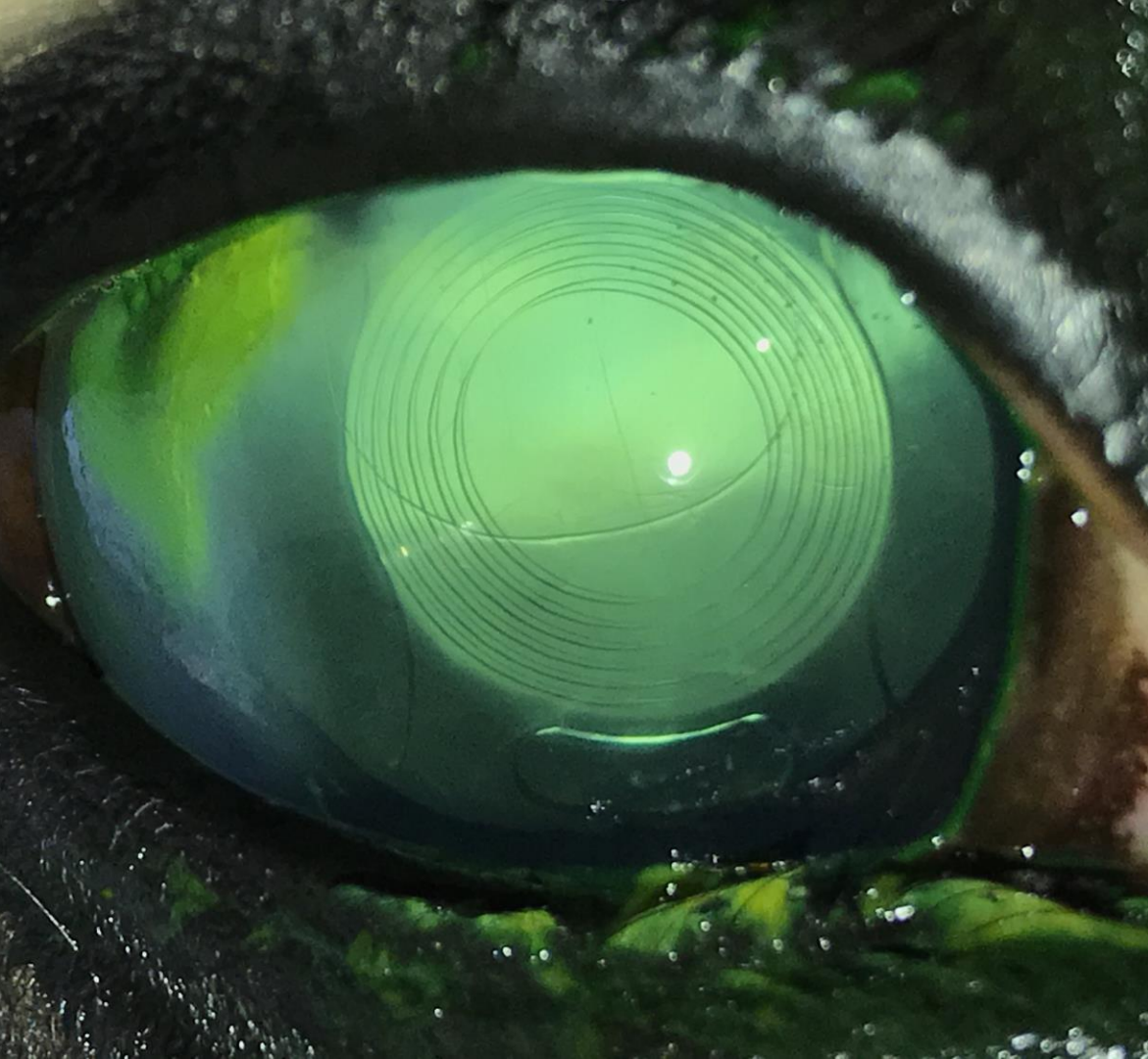




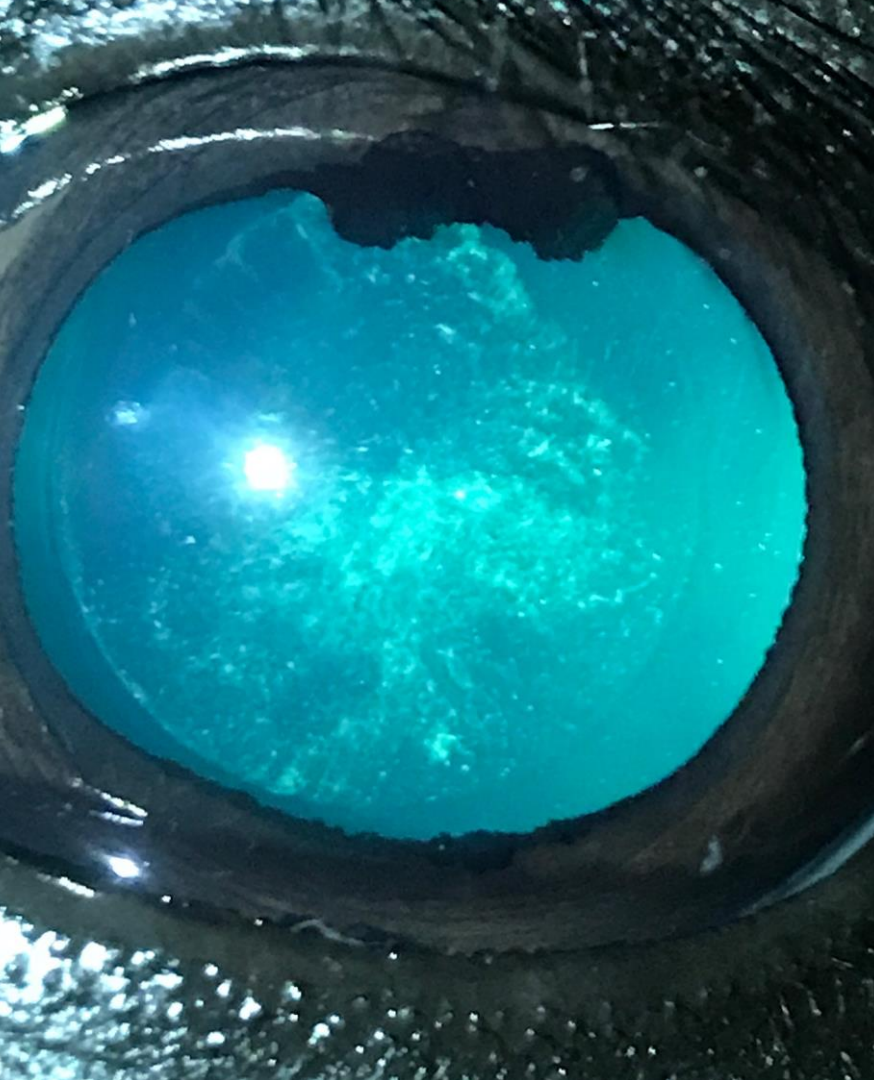


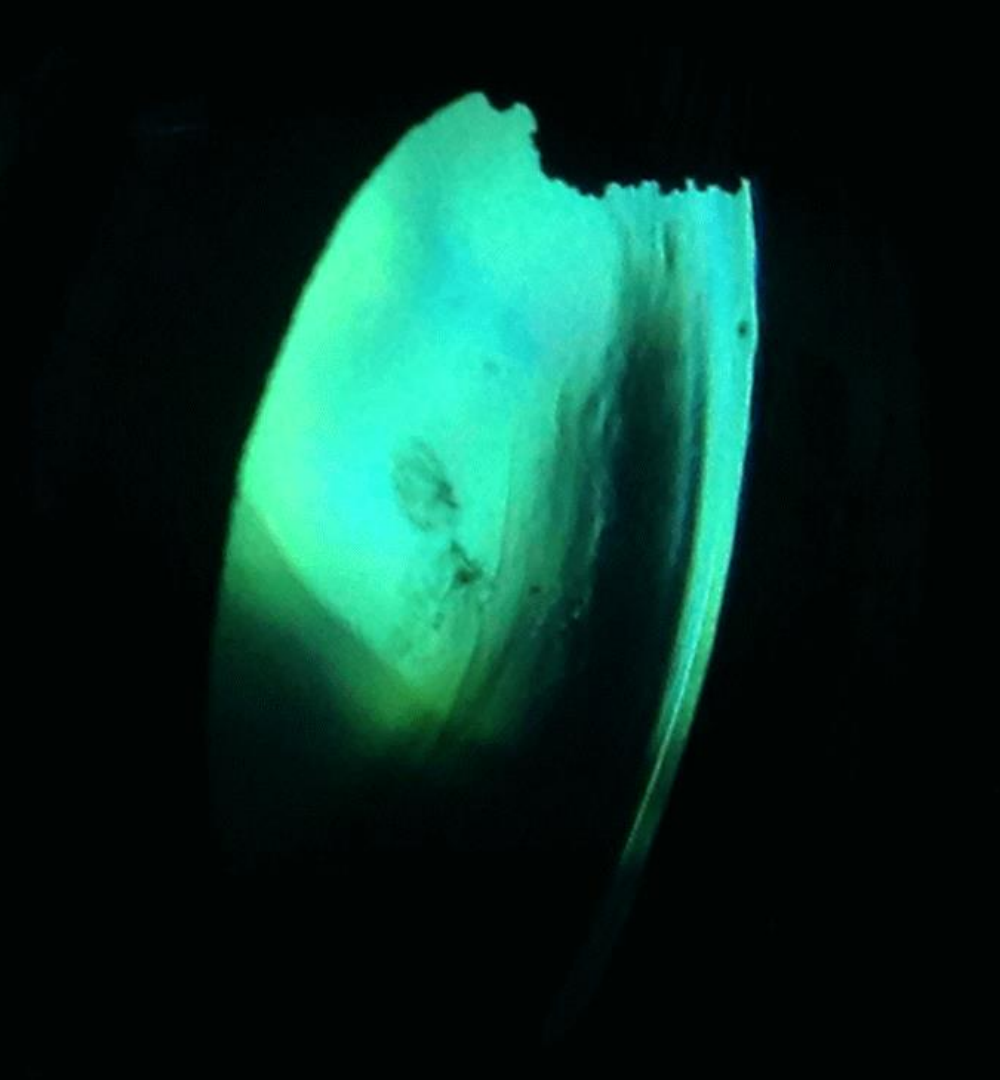




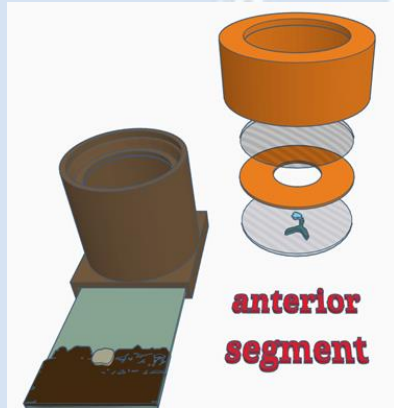








Practical session 3: iris & lens



Practical session 3: iris & lens

Key skills

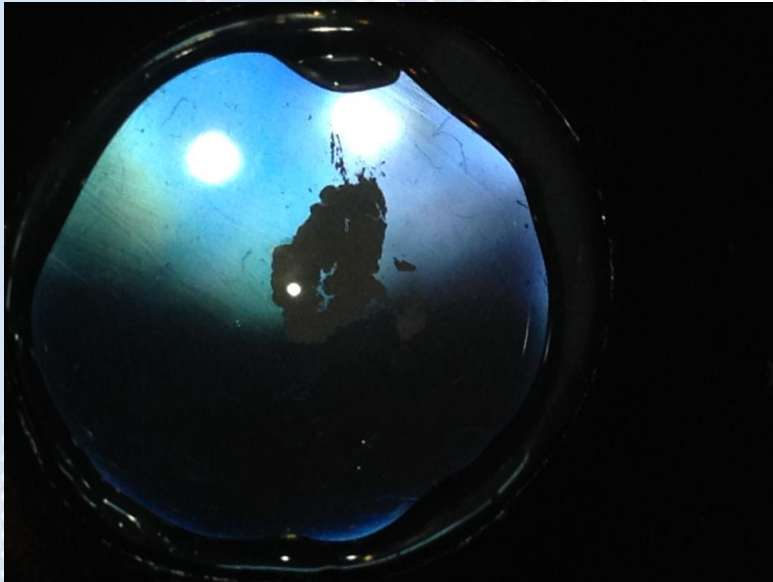
- Use DD to identify lens opacities
- Use DD to localise lesions using parallax
- Use Macro lens to obtain magnified view of iris face and anterior lens lesions using both direct (oblique broad beam) and indirect (retro illumination) lighting techniques to document lens opacities
- Use slit beam adaptor on pen torch, localise lens opacities using slit beam and image with and without the macro lens

Equipment needed

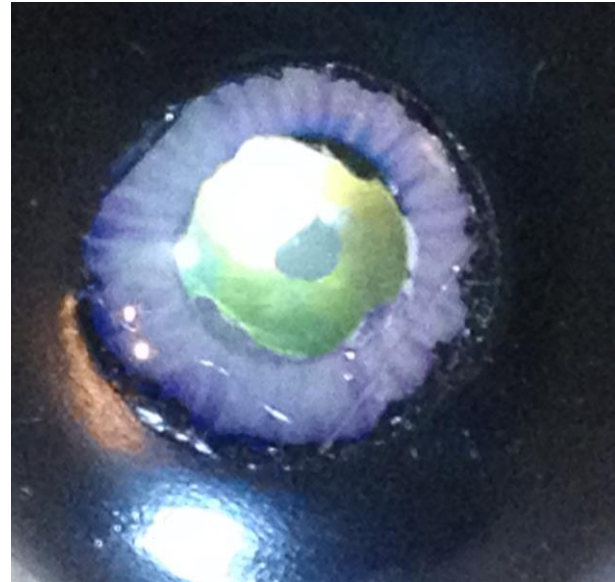
- Smart phone.
- Camera app which allows light to be in “torch mode” whilst capturing images.
- Pen torch +/- slit lamp adaptor.
- Macro lens
- Eye model set up in “anterior segment” mode. (1) simple lid (2) retinal image (3) top planoconvex lens with no opacities (4) paper iris (5) bottom planoconvex lens with painted anterior and posterior “lens” opacities.

Task 1: Use Distant direct to identify & image lens opacities using eye model

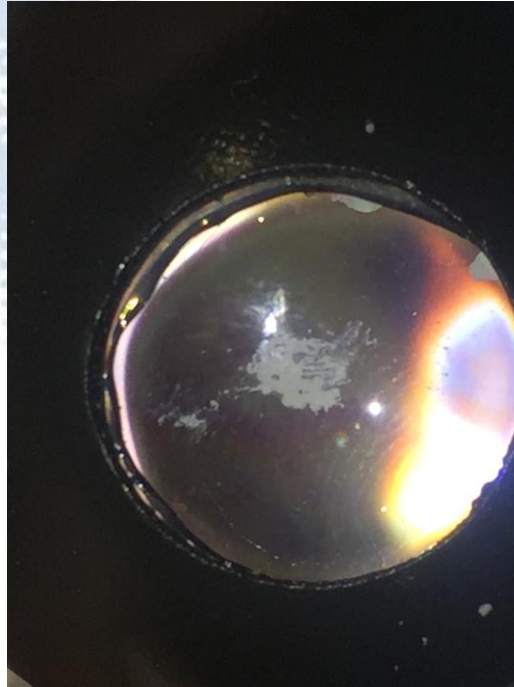
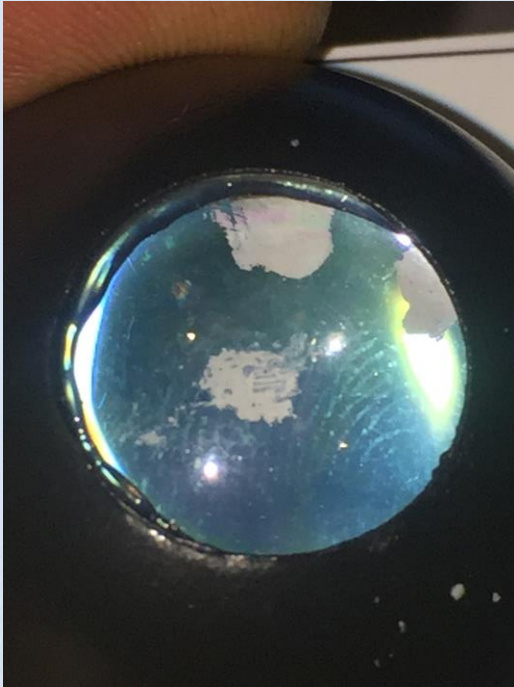
Distant direct at 30cm



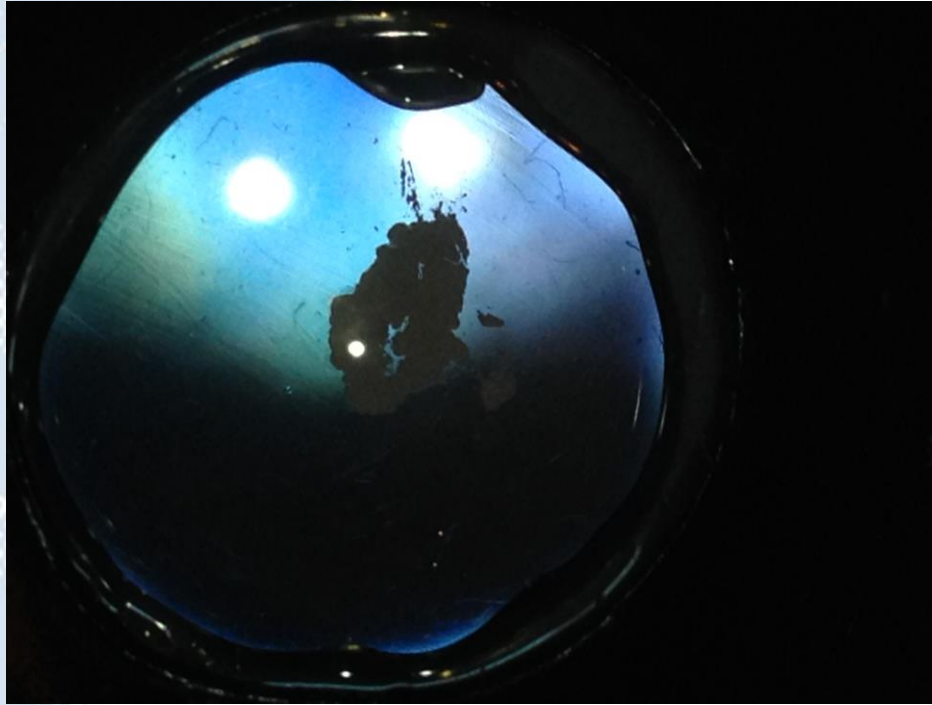
“Close” Distant direct at 10cm



Task 2: Use macro lens to image iris and anterior lens opacity using eye model



Task 3: Use retroillumination to image the lens lesions



Task 4: Simulate slit beam illumination technique to localise and image lens lesions



Task 5: Use your new macro lens skills to image your partner's anterior chamber.

Oblique illumination, 10x macro lens, iPhone 7plus. Post processed with HDR type filter (Camera +, "Clarity filter")

WhatsApp me your best image for a prize !

+447782219868





+447782219868

Tim