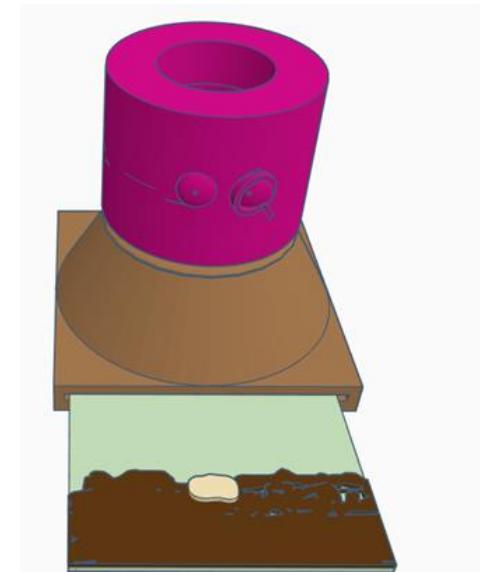
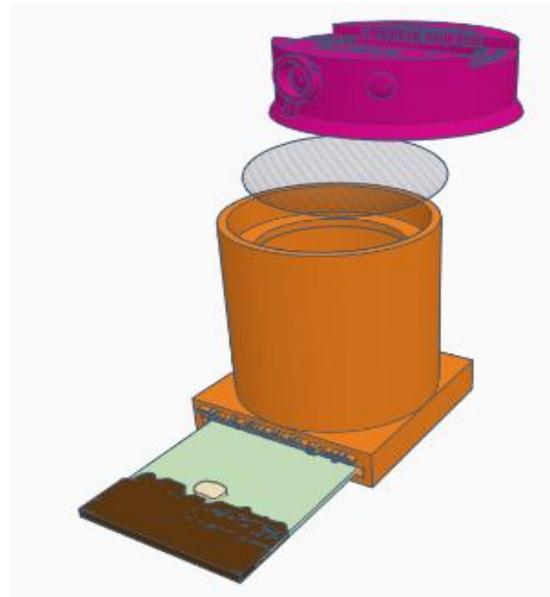
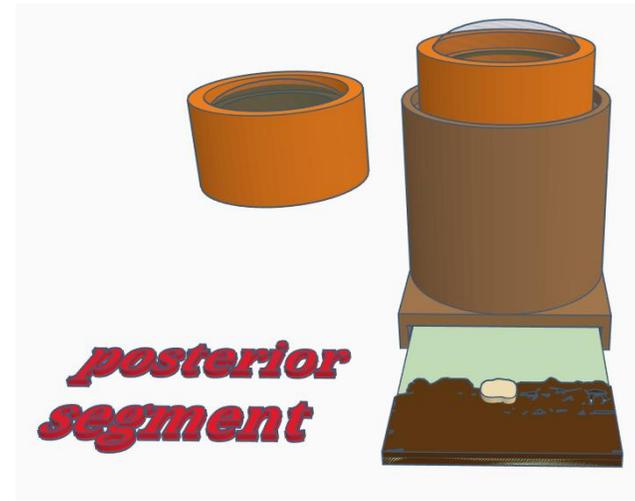
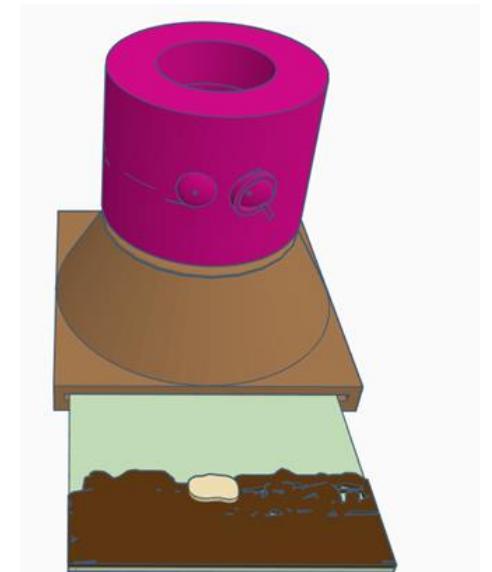
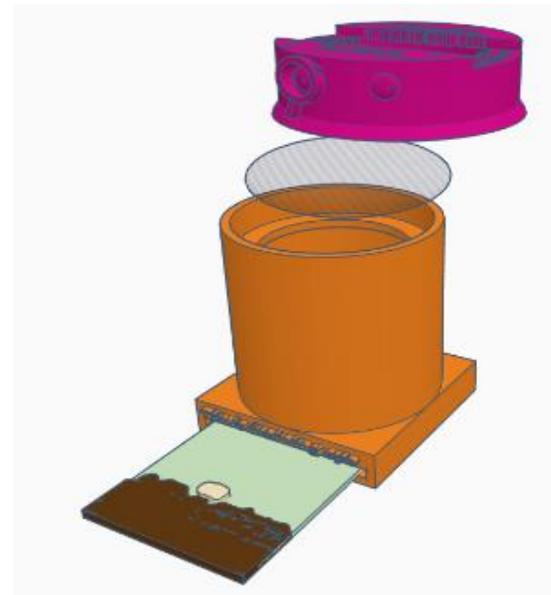


Practical session 3: imaging the posterior segment





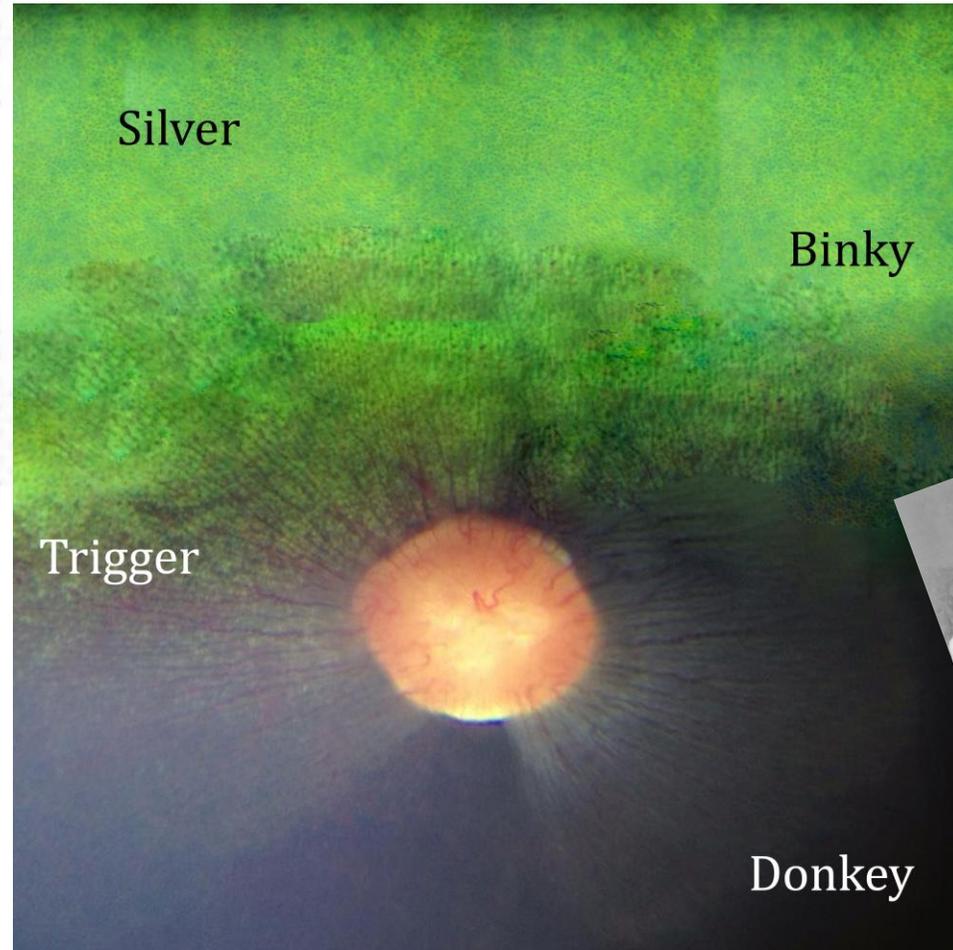
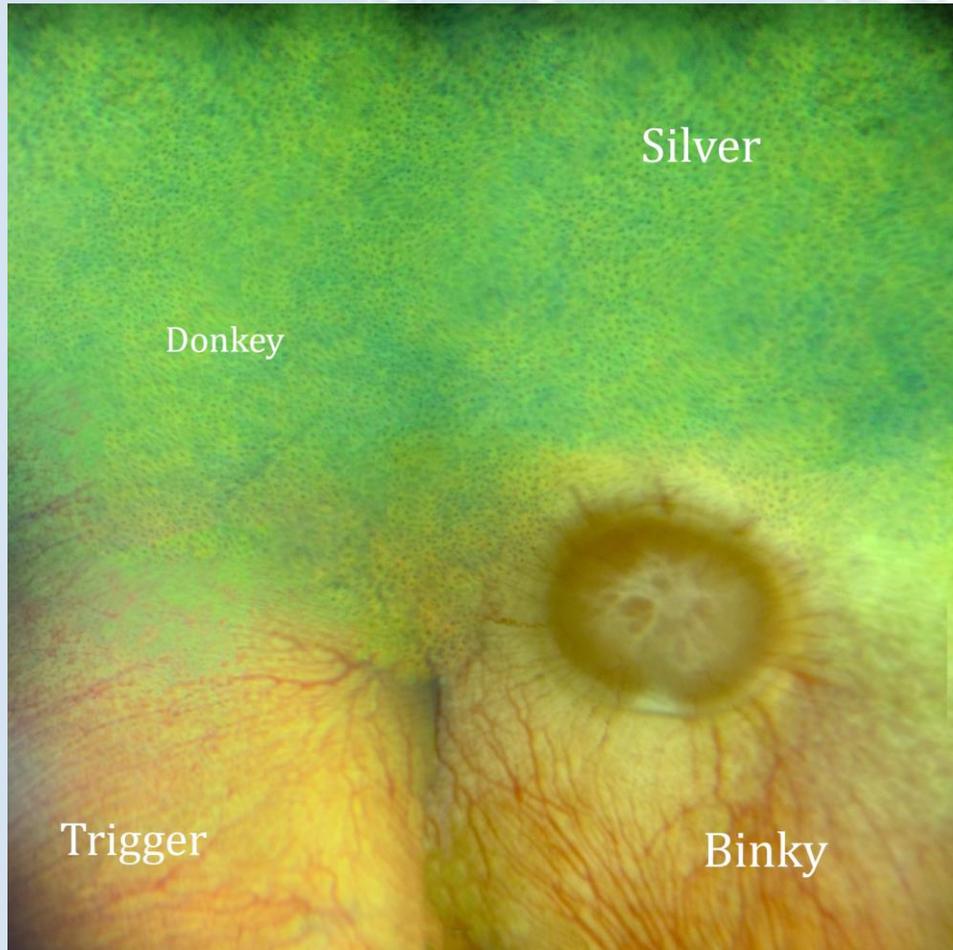
teaching eye in “posterior segment” mode



Task 1: Use Distant direct to identify anterior vitreal or peripheral retinal abnormalities using eye model



Task 2: Use close direct phoneoscopy to directly image the fundus

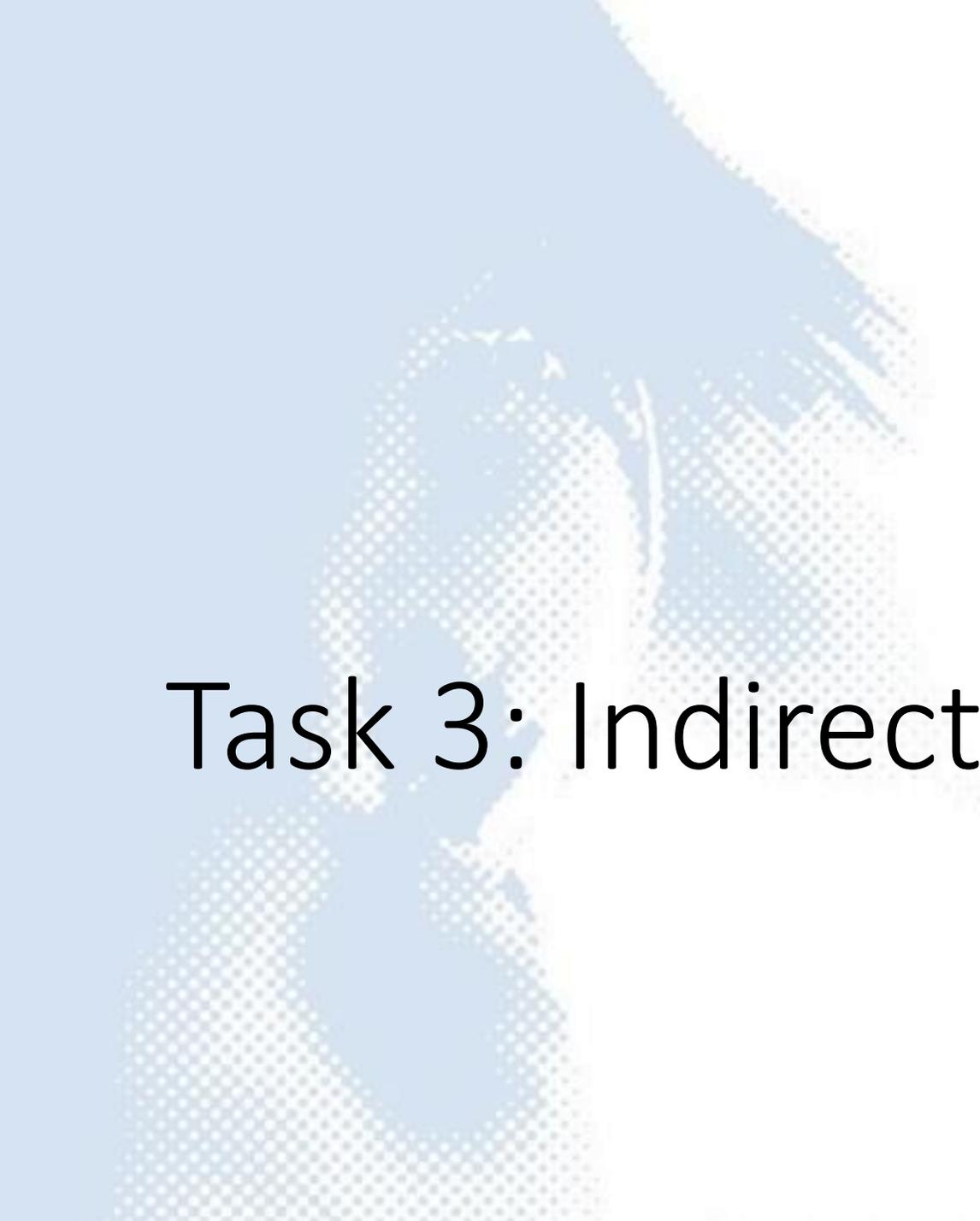


Close direct – step by step guide

- Mydriasis is helpful but not always essential especially if using a phone with a short Light to lens distance and reduced LED illumination.
- Open camera app – see the “Which App” section at 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 cannot be done within the app then apply multiple (3-6) layers of micropore tape, medicine labels or similar over 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.

Close direct – step by step guide continued.

- Locking the focus at infinity will stop the autofocus hunting.
- 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.
- Focus and exposure can be split by moving the focus and the exposure reticle independently. This is very useful for hyper-reflective fundus if your app allows separate focus and exposure (e.g. Open Camera, Procamera, Camera +) then tap the tapetal fundus to avoid overexposure due to the reflective tapetum.
- Reposition the exposure reticle on the non-tapetal fundus to image.
- Move camera to image the peripheral fundus in 4 quadrants. You may need to rotate your phone through 180 degrees to image the superior fundus.



Task 3: Indirect ophthalmoscopy

Indirect “phoneoscopy” Technique

- This technique is much more challenging to learn than direct phoneoscopy. Similar to the monocular indirect ophthalmoscopy technique the phone light is used to produce a tapetal reflection and the diagnostic lens is then positioned to focus the indirect image in front of the lens. This projected image is recorded on the phone camera. *I rarely use this technique in large animals* but is usually the first technique I will attempt in small animals.

Indirect “phoneoscopy” Technique

pros

- The light to lens distance has little effect in this technique ***making it suitable for nearly all phone cameras.***
- Fundic image less affected by opacities in the visual axis e.g. corneal lesions and cataracts.
- Can use through a small pupil
- lens to light distance less critical than in direct fundic imaging
- can use a separate light source if needed

cons

- technically more difficult
- requires diagnostic lens
- requires digital zoom to obtain screen filling image with overall reduction in image resolution

Indirect “phoneoscopy” Technique – step by step

- Mydriasis is helpful but not always essential - a dark room and reducing the LED intensity is usually sufficient to image the retina.
- Work out your camera’s minimum focal distance before you start – this will help you get the best image possible later.
- Open camera app
- Turn the LED on continuously – if you do not have a suitable app installed use your embedded video app and turn the light on.
- If necessary, reduce the LED illumination – if this cannot be done within the app then apply multiple (3-6) layers of micropore tape or similar to the LED.
- Hold diagnostic lens between thumb and forefinger, rest your little finger on the lateral orbital rim and hold the lens away from the eye.
- Image the tapetal reflection from arm’s length
- Once the tapetal reflection is imaged move the diagnostic lens in front of the eye in the same manner as you would with indirect ophthalmoscopy – a retinal image should be visible focused 50mm in front of the lens (assuming a 20Dioptre lens is used).
- Move the camera towards the image until the camera is positioned with its minimum focal distance positioned 50mm in front of the lens.
- Zoom in until the retinal image fills your screen.

Task 3: Use indirect fundoscopy to image the fundus



Task 3: Use indirect funduscopy to image the fundus



Task 3: Use indirect fundoscopy to image the fundus

